



ISMSIT 2017

1st International Symposium on Multidisciplinary Studies and Innovative Technologies



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Gaziosmanpaşa University Tokat / Turkey November 2-4, 2017

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Invited Speaker/Paper

The Case of Firat Technopark ICT Cluster in the framework of Smart Specialization Strategy

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Abstract

Today, the universal development tool of the globalization in the world is ICT. Therefore, the capacity of using advanced tools of ICT in developed countries is increasing rapidly. Intelligent technological tools have become a part of our lives. Intelligent systems in our world that try to adapt to the era of information after the industrial revolution and the strategies governing these systems have a great importance in terms of emerging industries. Industry 4.0 and Smart Specialization Strategy, which is the most important management tool for the distribution of Horizon 2020 fund resources of the European Union, also have importance for developing countries like Turkey in terms of implementation of development policies.

Now the awareness of the knowledge is unquestionable that every inhabitant countries can be developed society. Turkey attaches great importance to the youth population and new technologies and initiatives with open culture in ICT. Just as in the developed world, in Turkey, the entrepreneurship of technology development zones / technoparks as one of the most important players of the regional development ecosystem has already proved its importance for the development of the country. The increase in the quantity and quality of the technoparks in Turkey also contributes positively to the growth of the ICT sector. The emergence of high-tech creative industries in the region of technoparks have good conditions for creating micro-clusters of these sectors, attracting talent and investors, creating employment and accessing high-skilled talent pools. Because cluster dynamics are an important power for the economic, industrial and technological specialization of a region or country. In the context of new regional innovation strategies supported by the European Union and focused on the Smart Specialization Strategy, clusters are an important tool for discover the regional strengths and potentials of new emerging sector.

In this study, we will investigate the role of technoparks in Turkey, which forming cluster in relation to smart specialization. Also we will analyse the potential of ICT technoparks in the world and Turkey in the development of region, the potential of Firat Teknokent to create a ICT cluster for the last 5 years, the state of the ICT cluster, the increase in employment capacity, the exploit of technoparks facilities and cluster growth capability.

Keywords: *Technoparks, Cluster, Smart Specialization, ICT Cluster*



Invited Speaker/Paper

The Process of Industrial Change and Social Transformation

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Abstract

The paper aims is to highlight the unavoidable changes in industrial society together with the basic elements of this transformation as well as to take the attention of the readers on the healthiest change process. Some actions which are considered to be very essential in coping with the changes and getting the especially manufacturing society to be aligned with those.

Keywords: *Industry 4.0, Change Management, Change Process, Social Transformation*



Invited Speaker/Paper

Development of National Medical Diagnostic Kits from Locally Produced Enzymes

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Abstract

The effective control and treatment of chronic diseases requires access to diagnostic tests that are rapid, reliable and very sensitive. Nucleic acid based methods of pathogen detection technologies offer very rapid and accurate results with high sensitivity and specificity, at relatively low cost. This study aims to develop very high-sensitivity nucleic acid based diagnostic kits using locally produced enzymes that will enable rapid and accurate detection of Hepatitis B and Hepatitis C viruses from blood and also biological fluids at very low cost.

Transformed *E. coli* cells with pTOL recombinant plasmids were cultured in 3 litres LB triple medium supplemented with 100 µg/ml ampicillin at 37 °C in bioreactor. When the optical density at 600 nm IPTG (Isopropyl β- D -1-thiogalactopyranoside) was added to a final concentration of 1 mM in order to express *Pfu* DNA Polymerase, *Taq* DNA Polymerase and MMLV Reverse Transcriptase. After 5 hours, the cells were harvested by centrifugation. Cell pellets were suspended in lysis buffer and disrupted by sonication. Soluble protein was collected using ultra-centrifugation. Hexa histidine tag on the N-terminus of proteins were used for purification of recombinant enzymes. The expression levels of proteins was assessed using 10% (w/v) SDS-PAGE and UV spectroscopy. Enzymatic activities of the produced DNA polymerase and MMLV reverse transcriptase enzymes were tested by PCR and RT PCR reactions using specific primers for Hepatitis B and C viruses.

Rapid, highly sensitive and Nucleic acid based diagnostic kits for hepatitis pathogen detection were developed in this research, which specifically responds to Hepatitis B and Hepatitis C viruses will be useful in detecting and monitoring infections from blood and biofluids. Production of these molecular diagnostic kits that are based entirely on using domestically produced enzymes are fully intended to reduce the dependence of our country abroad on this sector.

Reference: Isa Gokce, Gregor Anderluh, Jeremy H Lakey, Patent, "Fusion proteins" 2005 US20050130269 A1

Keywords: *Diagnostic kits, Enzymes, Protein Expression*

Hareket Planlamada Keskin Virajların Akıllı Nesnelere Algoritması İle Yumuşatılması

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Özet

Günümüzde robotlar, kendilerine verilen görevleri hızlı ve güvenli bir şekilde yapabilmeleri kabiliyeti ile hayatın her alanına adapte edilmeye çalışılmaktadır. Robotların, kendilerine verilen görevleri güvenli bir şekilde icra etmesi için engelden uzak yol belirlemek gerekmektedir. Sonrasında robotların başlangıç noktasından bitiş noktasına doğru, en hızlı sürede hareket etmesi sağlanmalıdır.

Hareket planlama algoritmalarının belirlediği engelden uzak yol, hareketi kısıtlayan keskin dönüşlere sahip olabilmektedir. Bu keskin kenarlı dönüşlerin, güvenli bir şekilde alınabilmesi ve kendisine verilen yörüngeden çıkmaması için robotun bu kısımlarda hareketini yavaşlatması gerekmektedir. Hareketin yavaşlaması, robotun görevini daha uzun sürede icra etmesi anlamına gelmektedir. Belirlenen yoldaki keskin kenarların yumuşatılması, robotun dönüşleri daha yüksek hızlarda almasını sağlayacaktır. Bu amaçla literatüre yeni giren akıllı nesnelere algoritması kullanılarak, keskin kenarlar yumuşatılmıştır.

Sonuç olarak, hareket planlama çalışmasında kullanılan akıllı nesnelere keskin kenara sahip bölgelerde, eğri uydurma yöntemleri ile yerleri değiştirilerek keskin kenarlar yumuşatılmıştır.

Anahtar kelimeler: Hareket planlama, yol düzleştirme, eğri uydurma

Smoothing Sharp Edges with Intelligent Objects Algorithm in Motion Planning

Abstract

Nowadays robots are trying to be adapted to every field of life with the ability to do their assigned tasks quickly and safely. In order for robots to perform their assigned tasks in a secure way, it is necessary to determine a path away from obstacles. It should be ensured that the robots move from the start point to the end point in the fastest time.

The path away from obstacles determined by motion planning algorithms can have sharp turns that restrict movement. In order to ensure that these sharp-edged turns can be taken safely and not to come out of the given orbit, the robot has to slow down its movement in these areas. The slowing down of the motion means that the robot will perform its task longer. Softening the sharp edges on the specified path will allow the robot to take turns at higher speeds. Smoothing the sharp edges on the specified path will allow the robot to take turns at higher speeds. For this purpose, the sharp edges are smoothed by using the intelligent objects algorithm which is new in the literature.

Intelligent objects used in motion planning work have smoothed sharp edges by replacing them with curve fitting methods in areas with sharp edges.

Keywords: Motion planning, path smoothing, curve fitting

Çiftlik Tipi Günlük 500kg Kapasiteli Otomasyon ve Ortak Manifold Tüpü Vakum Barometrik Kondense Özellikli Transterifikasyon Yöntemiyle Biyodizel Üretiminde Yenilikçi Prosesin Tasarlanması

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Özet

Dünya da standartlara uygun biyodizel, yenilenebilir sürdürülebilir ve çevreci yakıt olarak içten yanmalı dizel motorlarda güvenle kullanılmaktadır. Ülkemizde içten yanmalı motor teknolojisine biyodizel standardı TS EN 14214 Genel ısıtma için(Brülör yakıtı) için TS EN 14212 standardı belirlenmiştir. Biyodizel; Kanola, Ayçiçek, Soya, Pamuk yağı, çekirdeği gibi endüstriyel yağ bitkilerinden elde edilen bir üründür. Endüstriyel yağ bitkilerinin bünyesinde % 40 gibi ham yağ bulunurken kalan %60 lık kısım yüksek protein kaynağı içeren kıymetli hayvan yemidir. Bu çalışmada; Çiftlik iş akışını engellemeyecek, otomasyon(Akıllı role) kontrollü, kullanımda profesyonel destek gerektirmeyen, günlük 500kg/gün kapasiteli içten yanmalı motor teknolojisine uygun ve TS EN 14214 Genel ısıtma için(Brülör yakıtı) için TS EN 14212 standardında transterifikasyon üretim yöntemiyle biyodizel üreten yenilikçi proses tasarımı amaçlanmaktadır.

Tasarımda yağ bitkisi çekirdeği mini ekstraksiyon tekniğiyle elde edilen ham yağ kullanılmaktadır. Bu sistemde yağ bitkisi çekirdeği bünyesinde bulunan ortalama %40 ham yağ ayrılır bu ürün tasarımı yapılan ortak manifold vakum barometrik kondense özellikli çiftlik tipi prosese gönderilir. Çekirdekten kalan posa yem amaçlı kullanılır. Tasarımı yapılan otomasyon kontrollü ortak manifold tüpü vakum barometrik kondense özellikli proses; Biyodizelin dünyada en çok kullanılan üretim yöntemi olan transterifikasyon üretim yöntemini kullanmaktadır. Tüm aşamalar otomasyonla uygundur. Transterifikasyon yöntemiyle biyodizel üretimi için ham yağın FFI serbest yağ asitlerinin otomasyonla ölçülmesiyle katalizör alkol miktarı belirlenir. Stabil reaksiyon ısısı, ham yağın sisteme alınması, Ham yağın 100 mikron hassasiyetinde filtre edilmesi, ölçülen FFI oranı nispetinde tespit edilen sodyum hidroksil miktarı belirlenmesi, reaksiyon ısısı, Reaksiyon süresi, Reaksiyon süresi, dinlendirme, metil esterin ayrılması, elde edilen biyodizelin alkol su gibi kaliteyi bozan maddelerden ayrılması dolayısıyla berraklığın artırılması gibi aşamalar otomasyonla işlem akış sırasına göre yapılacaktır.

Tasarım tarım sektöründeki bileşenlerin enerjiye daha ucuz çabuk kolay ulaşması, endüstriyel yağ yem bitkilerinin ekiminin özendirilmesi. Sürdürülebilir çevresel etki enerji talebi ve hayvan yemi ihtiyacı açısından tasarlanmış akıllı bir prosestir.

Anahtar Kelimeler: Biyodizel, akıllı biyodizel üretimi, çevreci yaklaşım için biyodizel, enerji ve yem arzı

Innovative Process Design in Biodiesel Production with Farm Type, Daily 500 kg Capacity Automation and Common Manifold Tube Vacuum Barometric Condense Transterification

Abstract

Biodiesel is used safely in internal combustion diesel engines as a renewable, sustainable and environmentally friendly fuel. Biodiesel is a product obtained from industrial oil plants such as canola, sunflower, soybean, cottonseed oil, and seed oil. Therefore, biodiesel is the energy that comes out of the field. Industrial oil plants contain 40% crude oil, while the remaining 60% are valuable animal feed containing high protein sources. In this study, it is aimed to design an innovative process which does not obstruct the farm work flow, is controlled by automation, does not require professional support, meets daily internal combustion engine technology of 500kg / day capacity and produces biodiesel by transterification production method.

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In the design, crude oil obtained from miniature extraction technique of oil plant kernel is used. In this system, an average 40% crude oil in the oil field of the oil plant is separated and sent to the farm-type process with common manifold vacuum barometric condensation. The pulp remaining from the seed is used for feed purpose. Designed automation controlled common manifold tube uses vacuum barometric condensed process transesterification production method. The amount of catalyst alcohol is determined by measuring FFI free fatty acids of crude oil for biodiesel production by transesterification method. The steps such as stable reaction heat, removal of crude oil in the system, filtration of the crude oil to a sensitivity of 100 microns, determination of the amount of sodium hydroxyl determined relative to the measured FFI ratio, reaction heat, reaction time, the separation of the obtained biodiesel from the impurities such as alcohol, and thus the clarity, is realized by automation.

Design is an intelligent process that is designed in terms of the need for quick and easy access to the energy components of the agriculture sector, the promotion of industrial oil feed plants, sustainable environmental impact energy demand and animal feed.

Keywords: *Biodiesel, intelligent biodiesel production, energy and feed supply*

Resim Yapıların Veritabanı Olarak Kullanılması

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Özet

Otomasyon programlarının önemli bir parçası verilerin saklandığı veri tabanlarıdır. Veritabanı sistemleri, verilerin paylaşılması, işlenmesi, hızlı arama, sorgulamaya imkan vermesi, veri güvenliği, yedekleme gibi konularda birçok avantaja sahiptir. Buna karşın veri tabanlarının otomasyon uygulamalarında ihtiyaç duyduğu sistem gereksinimleri, veritabanı yönetim bileşenlerinin yerleşik olarak hafızada kalmaları, fiyatları, her yerden ulaşılabilen olası açıkların ve kötü amaçlı programların varlığı, güvenlik gereksinimleri ve zamansız veritabanı hataları gibi nedenler hazır veritabanı kullanımının birçok boyutta risk ve maliyetle kullanıcıyı karşı karşıya getirmektedir.

Veritabanının dezavantajlarına bir çözüm olarak bu çalışmada veriler resim yapı içerisine saklanmıştır. Resmin pikselleri içerisine veriler önceden belirlenen bir düzenle yerleştirilerek arayüz hazırlanmıştır. Amaç maliyetsiz, kendine özgü, sabit büyüklükte ve üçüncü kişiler için verilerin elde ve yorumlanması daha zor, sistem gereksinimi ve arka planda sisteme yük olmayan farklı bir veritabanı yapısı oluşturmaktır. Bu amaçla uygulama olarak trampolin ve şişme oyun parkı otomasyonu programı resim yapıda hazırlanan veritabanı kullanılarak yapılmıştır. Veritabanı olarak kullanılan resim bitmap tabanlı olup, 775x121 piksel boyutlarda ve diskte 275KB büyüklükte bir bmp tabanlı resim kullanılmıştır. Bu veritabanına her gün her saat faaliyette olacak şekilde 10 yıllık veri kaydedilebilir. Resmin aynı satırdaki pikselleri bir aylık veriyi tutmak için ayrılmıştır. Resmin en son satırı arama tablosu olarak kullanılmış olup değişen fiyat ve faaliyetler ile program giriş şifresi gibi bilgiler bu satıra kodlanmıştır.

Yapılan uygulamada veriler resim yapıya kaydedilmiş olup veri kaydedildiğinde ise resmin boyutunun değişmediği, sabit kaldığı gözlenmiştir. Veritabanının yedeklenmesi kolay, üçüncü kişiler tarafından ele geçirilip veriler üzerinde oynanması/değiştirilmesi daha zor, sistem gereksinimi daha düşük olduğu ve olası veritabanı hataları ile karşılaşmadığı gözlenmiştir. Verilerin resim içerisine saklanması beraberinde birtakım bazı kısıtları da getirmiştir. Bu kısıtlar göz önüne alınarak işletmedeki ürün sayısı ve hareket sayıları dikkate alınması gerekliliği görülmüştür. Bu tip uygulamalar az sayıda hizmet ve ürün ile faaliyet gösteren restoran, lokanta, çay ocağı, oyun parkları, oyun salonları gibi işletmeler için gerekli otomasyon programlarında güvenli bir şekilde kullanılabilir.

Keywords: resim, veritabanı, otomasyon programları.

Usage of Image Structures as Database

Abstract

An important part of the automation programs is the databases where the data are stored. Database systems have many advantages in terms of data sharing, processing, speed dialing, querying, data security, and backup. However, the system requirements that databases require for automation applications have disadvantages such as built-in memory management components in memory, prices, availability of potentially exploitable and malicious programs everywhere, security requirements, and untimely database errors. Such disadvantages lead users to face the risk and cost of using the ready-made database in many dimensions.

As a solution to the disadvantages of the database, the image in this work is stored in the image structure. The interface is prepared by placing a given order in the pixels of the picture. The goal is to create a different database structure that is free of cost, unique, fixed size and difficult for third parties to get and interpret the data, system requirement and background load. For this purpose, trampolin and inflatable game park automation program was implemented using database prepared in picture structure. The image used as the database is bitmap-based and has a 775x121 pixel size and a bmp-based image with a size of 275KB on the disk. 10 years of data can be recorded in this database as 24/7 activity

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every day. The image is reserved for keeping a month's worth of pixels on the same line. The picture has been used as the last line lookup table and the information such as the changing price and activities and the program entry code is encoded in this line.

In the created application, the data is recorded in the image structure and when the data is saved, the size of the image remains unchanged and remains constant. It is easy to back up the database, it is harder for third parties to get it and to change it on the data, the system requirement is lower, and possible database errors are not encountered. The saving of the data in the picture also brought some restrictions. Considering these constraints, it is necessary to take into account the number of products and number of movements. Such applications can be used safely in automation programs for restaurants, cafeteria, game parks, game arcade, etc., which operate with a small number of services and products.

Keywords: *image, database, automation programs.*

Tarımda Etkin İlaçlama İçin Bilgisayar Destekli Bir Sistemin Geliştirilmesi

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Abstract

Günümüzde tarımda zararlılarla mücadelede her ne kadar zararları bilinse de kimyasal ilaçlar sıklıkla kullanılmaktadır. Tarım ilaçlarının hastalığa göre seçilmesi zararlılarla mücadelede tek başına etkin bir mücadele için yeterli değildir. Hastalığa göre ilaç miktarının ayarlanması ve ilacın hedefe yeterli miktarda ulaşması da gerekmektedir. Etkin ilaçlamada damla çapları ve hedef alandaki dağılımı önemlidir. Bir bölgede yoğunlaşmış damlalar doğru bir ilaçlamada olmaması gerekir. Ayrıca ilaçlama yaparken, büyük damla seçimi ilacın yaprak yüzeyinden aşağı kaymasına neden olacak ve toprak kirliliğine yol açacaktır. Küçük damla çapları ise damlaların hedefe gitmeyiip istenmeyen komşu bitki veya boş toprak alanların gereksiz ilaçlanmasına neden olup hem çevre kirliliğine hem de gereksiz ilaç tüketimine yol açacaktır.

Bu amaçla görüntü işleme tabanlı bir program hazırlanarak, birim alandaki damla sayısı, kaplama oranı, ortalama damla çapı, damla spektrumu gibi parametreler bulunmuştur. Çalışmada öncelikle ilaçlama yapılacak bitkinin yaprak yüzeylerine, suya duyarlı kağıtlar yerleştirilerek örnekler alınmıştır. Bu kağıtlar tarayıcı ya da çözünürlüğü yüksek kameralarla bilgisayara aktarılarak filtrasyon işlemlerinden sonra görüntü işleme tekniklerinden, çoklu bant eşik değer yöntemiyle hassas bir şekilde iki renge indirgenmiştir. Elde edilen bu resimde sadece damlalar bulunmakta olup ilaç kaplama oranı hesaplanmıştır. Ardından floodfill algoritmasıyla damlaların sayısı belirlenerek, sırayla damlaların çapları, yuvarlaklık katsayıları, ortalama damla çapları ve damla spektrumu çıkartılmıştır.

Zararlılarla mücadelede ilaçlama damlalarına ait verilerin çıkartılması ile uygun damla büyüklüğünün seçilmesi için pülverizatörlerin ayarı, uygun ilaç çözeltilerinin hazırlanması, çevresel şartlara göre ilaçlama zamanının ve ilaç püskürtme doğrultusu ve açısının belirlenmesine katkı sağlanmıştır. Zararlılarla mücadele ederken uygun damla büyüklüğünde yapılan ilaçlama, ilaç tüketimini azaltarak daha ekonomik bir ilaçlama sağlayacaktır. Damlaların yaprak yüzeyine düzgün dağılımı zararlılarla mücadeleyi daha etkin kılacaktır. Bunun yanında, yaprak yüzeyinde kalıp, toprağa karışmayan damlalar çevreye zarar vermeyecektir.

Anahtar kelimeler: damla çapı, damla büyüklüğü, görüntü işleme, suya duyarlı kağıt, spreyl kaplama

Development of a Computer Aided System for Effective Agricultural Spraying

Abstract

Nowadays, chemical drugs are frequently used for fighting diseases in agriculture although their damage is known. The selection of agricultural medicines according to the disease is not sufficient for an effective struggle alone with the harmful struggle. It is also necessary to adjust the amount of the drug according to the disease and to reach the target in a sufficient amount. In good medicine, drop diameters and distribution in the target area are important. Droplets concentrated in a region should not be in a proper spray. In addition, when spraying, the large drop selection will cause the drug to slide down the leaf surface and cause soil contamination. Small droplet diameters will lead to unnecessary spraying of undesirable neighboring plants or empty soil areas and will lead to both environmental pollution and unnecessary drug consumption.

For this purpose, an image processing based program was prepared and parameters such as number of droplets, coating ratio, average drop diameter, drop spectrum were found in the unit of area. In the study, samples were taken by placing water sensitive papers on the leaf surfaces of the plant to be sprayed first. These papers are loaded through a scanner or a high-resolution camera to the computer for image filtration. Subsequently, this image has been reduced into two color by image processing techniques using the multi-band threshold method. In this picture, only drops are present and the drug coverage rate is calculated. Then, the number of droplets is determined by the floodFill algorithm, and the diameters of the droplets, the roundness coefficients, the average droplet diameters and the drop spectrum are obtained.

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It is aimed to make more effective spraying by obtaining the data belonging to drug drops in the fight against diseases in agriculture. Selection of the appropriate drop size has contributed to setting of sprayers, preparation of suitable drug mixtures, time of spraying according to environmental conditions, and determination of the direction and angle of spraying of the drug have been contributed. The appropriate drop size in agricultural spraying will reduce drug consumption and provide a more economical treatment. Proper distribution of the droplets on the leaf surface will make the struggle more harmful. On the other hand, drips that stay on the leaf surface and do not interfere with the soil will not damage the environment.

Keywords: *Droplet diameter, droplet size, image processing, water sensitive paper, spray coverage*

${}^7\text{Li}+{}^{232}\text{Th}$ Elastic Scattering Reaction-Re-examination

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Abstract

The main purpose of this study is to define the new and more consistent potential parameters for the elastic scattering reaction ${}^7\text{Li}+{}^{232}\text{Th}$ with phenomenological model with 6 free parameters within the framework of the optical model calculations.

The elastic scattering is the most common and known type of reaction mechanism. In this situation, the total kinetic energy of system is not changed in the centre-of-mass or laboratory frame, that is internal dynamiques of projectile and target are always the same. The angular distribution of elastic scattering is researched via different theoretical methods. The optical model (OM) is deemed as one of the simplest and the most successful models of nuclear physics in the explanation the elastic scattering. The OM describes the interaction between the projectile and the target using a complex potential (real+imaginary parts). The real part of the potential is the sum of a Coulomb term, a centrifugal term and a nuclear term. The real part is responsible for scattering, while the imaginary part is responsible for lost flux from the elastic one.

In this study, the elastic scattering of the ${}^7\text{Li}+{}^{232}\text{Th}$ system has been examined using phenomenological model potentials within the framework of the optical model at seven different energies (24, 26, 30, 32, 35, 40 and 44 MeV) close to the Coulomb barrier energy. In the calculations, we have used the new parameters to explain the reaction mechanism. As a result ; we have seen that our potential parameters are very good for elastic scattering cross section values. This potential parameters can be used similar nuclei, and can also be extended to describe the scattering observables of other weakly bound nuclei.

Keywords: *elastic scattering, optical model, phenomenology*

Double Folding Model for ${}^6\text{Li}+{}^{232}\text{Th}$ Elastic Scattering Reaction

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Abstract

${}^6\text{Li}$ is one of the weakly bounded nuclei studied quite a lot in theoretical and experimental nuclear physics. So we have decided to work on the ${}^6\text{Li} + {}^{232}\text{Th}$ reaction. In this study, we have aimed to re-examine the elastic scattering of ${}^6\text{Li}+{}^{232}\text{Th}$ reaction within the optical model with double folding model and new different potential parameters.

The analysis of the experimental data is carried out by using the double folding model with an effective nucleon-nucleon interaction by means of the known densities of ${}^6\text{Li}$ (projectile nuclei) and ${}^{232}\text{Th}$ (target nuclei) within the framework of the optical model. Double folding model or microscopic model is the most known process for analyzing experimental cross section and other observables of stable, weakly bound and halo nuclei. In this model, there is fewer free parameters which responsible for imaginary part.

The microscopic real potential has been produced by using the Gaussian density distribution of ${}^6\text{Li}$. The imaginary potential parameters used in our calculations are taken Wood-Saxon volume form. It has been seen that the theoretical results obtained for the Gaussian density distribution of ${}^6\text{Li}$ are in good agreement with the experimental data, so the free parameters are very few, however the agreement of the theoretical calculations with the data is highly acceptable. Additionally, volume integrals of used potentials have been calculated and evaluated.

Keywords: *elastic scattering, gaussian distribution, double folding*

Laser induced broad anti- Stokes white emission from $\text{La}_2\text{Ti}_2\text{O}_7$ activated with RE^{3+} ions

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Abstract

The current studies interested in understanding of white light generation under infrared laser excitation. Upconversion process, generally, the emission at a shorter wavelength than excitation wavelength, provided by two or more photon absorption. In this study we focused on investigation white emission from the Re^{3+} : (Yb^{3+} , $\text{Yb}^{3+}/\text{Er}^{3+}$, $\text{Yb}^{3+}/\text{Er}^{3+}/\text{Tm}^{3+}$) doped $\text{La}_2\text{Ti}_2\text{O}_7$ under infrared-laser excitation.

RE^{3+} doped $\text{La}_2\text{Ti}_2\text{O}_7$ phosphors were synthesized by solid-state reaction method. La_2O_3 , TiO_2 , Yb_2O_3 , Er_2O_3 , Tm_2O_3 powders were well mixed in the appropriate proportions. Powders were mixed using ball-milling for 20 h, followed by calcination of the resulting mixture at 180°C (2 h). The samples were heated at a constant heating rate of 300°C/h to 1350°C. The concentration of Yb^{3+} ion was fixed at 2 mol% while the concentration of Er^{3+} ion was varied 0.5 mol%, 1 mol%, 1.5 mol% for co-doped phosphors. For tri-doped phosphors, the concentration of Yb^{3+} and Tm^{3+} ions were fixed at 2 mol% and 1 mol%, respectively, while the concentration of Er^{3+} ion was varied 0.5 mol%, 1 mol%, 1.5 mol%. All diffraction peaks from the XRD results are well indexed to the monoclinic phase of $\text{La}_2\text{Ti}_2\text{O}_7$ structure with JCPDS#028-051. The spectral properties of $\text{La}_2\text{Ti}_2\text{O}_7$ phosphors were investigated in the range of 400-850 nm wavelength under 975 nm laser excitation for various pumping power at room temperature.

The strong visible emission were observed from the $\text{La}_2\text{Ti}_2\text{O}_7$ phosphors in the green and red spectral regions which are localized at around 523 nm, 550 nm, 658 nm, and 801 nm associated with the $^2\text{H}_{11/2} \rightarrow ^4\text{I}_{15/2}$, $^4\text{S}_{3/2} \rightarrow ^4\text{I}_{15/2}$, $^4\text{F}_{9/2} \rightarrow ^4\text{I}_{15/2}$, and $^4\text{I}_{9/2} \rightarrow ^4\text{I}_{15/2}$ transitions of Er^{3+} , respectively. Increasing excitation power to above 1W, the green emission intensity from Er^{3+} disappeared and a bright yellowish anti-Stokes white emission appeared. A detailed characterization of the white emission intensity as a function of the laser pumping power reveal that the intensity of white emission increased with increasing pumping power.

Keywords: Anti-Stokes emission, Up-conversion, Lanthanum dititanate,

The effect of substrate on physical properties of CdCr₂S₄ thin films

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Abstract

The rising demand on technological applications brings new hopes for researching and understanding the behaviours of new materials. For recent years, chromium and related chalcospinels CCS, with expanding variety of application in various areas such as, red shift of the optical absorption edge, non-linear optical detectors, photo-refractive devices, photovoltaic solar cells and optical storage media have acquired continual interest [1, 2]. In the spinel group, Cr-based semiconductors ACr₂S₄ offer a variety of fascinating physical properties like colossal magnetoresistance, multiferroic behaviour, and ferromagnetic (FM) property with transition temperature of 85K.

Conducting cadmium chromium sulphide (CdCr₂S₄) thin films with 0.2 M precursor molarity have been deposited onto Glass, Si (001), and LiNbO₃ (100) substrates by simple chemical bath deposition (CBD) process. The deposited samples were characterized by using X-ray diffraction (XRD), atomic force microscope (AFM), scanning electron microscope (SEM), energy dispersive X-ray analysis (EDX), and optical absorption techniques respectively.

The substrate effects on film quality and on physical properties have been revealed. The reasonably crystalline cubic structure from thin film X-ray diffraction measurements was observed. Substrate-roughness dependence was established by atomic force microscope (AFM) measurements. The crystallites sizes of the thin films are influenced by substrate type of the thin films. From the optical measurement the possible band gap energy shifts were revealed.

Keywords: Chalcospinels, Cadmium chromium sulphide, ferromagnetic

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Ortamdaki Nem Miktarının Isı Yalıtımı Üzerine Etkisi

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Özet

Günümüzde ısı yalıtımı, gerek konutlarda gerek birçok sanayi uygulamalarındaki ısıl proseslerde yaygın olarak kullanılmaktadır. Öngörülebileceği gibi bu uygulamalar değişken hava ve ortam şartlarında çalışabilmekte ve buna bağlı olarak yalıtım malzemeleri bu koşullardan olumlu ya da olumsuz etkilenebilmektedir. Yalıtım malzemelerinin performansını etkileyen en önemli parametrelerden biri mevcut ortamın nem koşullarıdır. Bu çalışmada, ortamın nem durumuna bağlı olarak yalıtım malzemesinin absorbe ettiği nem miktarının yalıtım performansına etkisi deneysel olarak incelenmiştir.

Yürütülen deneysel çalışma için su dolu konik bir kap dondurularak etrafı cam yünü ile kaplanmıştır. Deneyler sırasında kap içerisinden sıcaklık ölçümleri alınmış ve birim zamanda eriyen buz miktarı belirlenmiştir. Konik kap tercih edilmesinin sebebi, Buzun sürekli olarak yüzeye temasını sağlamaktır.

Bu veri ve yapılan ölçümler neticesinde yüzeyin birleşik ısı transfer katsayısının, değişen nem miktarlarıyla nasıl etkilendiği incelenmiştir. Sonuçlar nem miktarı arttıkça yüzeyin birleşik ısı transfer katsayısının azaldığını göstermiştir.

Anahtar Kelimeler: Nem, Isı transfer katsayısı, Cam yünü, Yalıtım

The Effect of Ambient Humidity on Thermal Isolation

Abstract

Today, thermal insulation is widely used in thermal processes in residential and industrial applications. As may be foreseen, these applications can be found in the environment of varying weather and ambient conditions and according to that the insulation materials may be affected positively or negatively by the ambient conditions. One of the most important parameters affecting the performance of insulating materials is the humidity conditions of the current environment. In this study, the effect of the amount of moisture absorbed by the insulation material depending on the humidity condition of the working environment on the insulation performance was investigated experimentally.

For the experimental work done, a conical container filled with water was frozen and covered with insulating material. The tests were carried out with temperature measurements and the unit for the amount of ice melt was measured. A conical container is preferred because it is in constant contact with the ice surface.

As a result of this data and the measurements made, how the combined heat transfer coefficient of the surface is affected by varying moisture quantities is examined. The results show that as the amount of moisture increases, the combined heat transfer coefficient of the surface decreases.

Keywords: Moisture, Heat transfer coefficient, Glass wool, Insulation

**Morphology and Broad White Light Emission Properties of Yb³⁺/Er³⁺/Tm³⁺:
Y₂Si₂O₇**Ramazan Samur^{1*}, Murat Erdem², Gönül Eryürek³¹Department of Metallurgy and Material Eng., Marmara University 34722, Istanbul, Turkey²Department of Physics, Marmara University 34722, Istanbul, Turkey³Department of Physics Eng., Istanbul Technical University, 34469, Istanbul, Turkey*rsamur@marmara.edu.tr

Abstract

The yttriumdisilicate (Y₂Si₂O₇) host media with rare earth combinations has potential interest in both the generation of white light via up-conversion mechanism and its practical usages as sensors, lighting, infrared detection, lasers, and displays [1-6]. The current studies interested in understanding of white light generation with up-conversion mechanism (UC) and its origin with double or triple combinations of RE³⁺ doped nano-powders aswell.

Yb³⁺/Er³⁺/Tm³⁺: Y₂Si₂O₇ nano-powders were fabricated by sol-gel method and annealed at 1450 °C temperature conditions. XRD patterns and SEM images were taken for the structural analysis of the powders. Room temperature diffuse reflectance spectra of the powders were obtained in the spectral range of 200–1100 nm using a Perkin Elmer Model Lambda 35 UV–Vis spectrophotometer to identify the absorption lines of RE³⁺ ions. The UC spectra of the RE³⁺ doped Y₂Si₂O₇ powders were measured using a diode laser (Laser Drive Inc. LDI-820) with a wavelength of 975 nm to excite a powder from the ground state of the RE³⁺ ions (Yb³⁺: ²F_{7/2}) to the higher (Yb³⁺: ²F_{5/2}) excited state.

X-ray diffraction patterns (XRD) of all powders revealed that most of the intensity lines were in good harmony with the standard card of β-Y₂Si₂O₇ (JCPDS:98-08-1313). The TEM image of the powders consist of nearly spherical nanoparticles with an average size of around 200 nm. Diffuse reflections spectra of YSYET exhibited varying number of transitions depending on the dopant element in all powders in the range of 400-1050 nm. Spectral properties of the powders were detailed to sort out for possible broad white up-conversion (UC) emission mechanism. A detailed spectral analysis of the powders revealed to growth of white light emission in the range between 420 - 800 nm with increasing excitation power under atmospheric environment.

Keywords: *Phosphors, White light, Up-conversion, Sol-gel*

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Analitik Hiyerarşi Sürecinin (AHP) Mobil Uygulama Tasarımı ve Kullanılabilirliği

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Özet

Son yıllarda her kesimden insanın kullandığı akıllı telefonlar insanların vazgeçilmezi olmuştur. Telefon görüşmesi ve kısa mesaj gönderme özelliğine ek olarak artık telefonlarda işlemciler, büyük bellekler ve işletim sistemleri bulunmaktadır. Geçmişte uzun zaman alan birçok iş, artık akıllı telefonlar aracılığı ile kısa süreler içerisinde yapılabilmektedir. Bu düşünceden yola çıkarak insanların karar verme anında yanlarında olmak ve onlara bilimsel veriler sunarak en doğru olan seçimi yaptırmak istiyoruz. Örneğin, taşınacağınız semte karar verirken, cep telefonu ya da araba satın alacakken ve buna benzer birçok alanda karar verirken, bilimsel verilere dayanarak karar vermeyi kim istemez ki?

Bu çalışmada, çok kriterli karar verme yaklaşımı olan Analitik Hiyerarşi Süreci'nin (AHP) mobil uygulama tasarımı ve kullanılabilirliği anlatılmıştır. Öncelikle seçim yapılması istenen alternatifler (marka, model, taşınılacak semt isimleri, seçilecek okul, vb.) belirlendi. Daha sonra her bir alternatif için alt kriterler (faktör, özellik) belirlendi. Bu aşamada kullanıcı, kriterlere ve alternatiflere kendi önem sırasına göre puan vermesi sağlandı. Bu puanlama sonucunda veriler Analitik Hiyerarşi Sürecinde işlendi ve kullanıcı için anlamlı olacak şekilde alternatifler arasında öncelik sıralaması yapıldı.

Mobil uygulama mağazalarından (Google Play, AppStore vb.) indirip kurabileceğiniz, tamamen bilimsel verilere dayanarak, çok alternatifli ve çok kriterli durumlar ile karşılaşıldığında, kullanıcıya yardımcı olabilecek bir mobil uygulama tasarımının hazırlanması ve kullanıcıya sunulması anlatılmıştır.

Anahtar Kelimeler: *Analitik Hiyerarşi Süreci, Mobil Uygulama, AHP*

Analytic Hierarchy Process (AHP) Mobile Application Design and Availability

Abstract

In recent years, people from all walks of life have become indispensable for smartphones. In addition to the phone call and text messaging feature, phones now have processors, large memory and operating systems. Many jobs that have taken a long time in the past can now be done in a short time via smartphones. We would like to go out on this path and make people choose the right choice by presenting them with scientific data at the moment of decision making. For example, who decides to make a decision based on scientific evidence when deciding to move, deciding on a seminar, buying a mobile phone or a car, and many other places to decide?

In this study, mobile application design and usability of Analytic Hierarchy Process (AHP), which is a multi-criteria decision making approach, are explained. First, the alternatives (brand, model, name of the neighborhood to be moved, school to be selected, etc.) were determined. Sub-criteria (factor, property) were then determined for each alternative. At this stage, the user was given the opportunity to score criteria and alternatives according to their importance. As a result of this scoring, the data was processed in the Analytic Hierarchy Process and priority ranking was made among alternatives that would be meaningful to the user.

Based on the pure scientific evidence that you can download and install from mobile application stores (Google Play, AppStore, etc.), it is explained how to prepare and present a mobile application design that can help the user when many alternative and very criteria are encountered.

Keywords: *Analytic Hierarchy Process, Mobile App, AHP*

Purification of Recombinant Subtilisin Enzyme

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Abstract

Getting pure subtilisin protein which was produced by recombinant DNA technology. Subtilisin enzyme (E.C. 3.4.21.62) of *Bacillus subtilis* was cloned into pET28b vector and this system was transferred to pLysE cells (1). Protein production was begun and induced with IPTG (Isopropyl β -D-1-thiogalactopyranoside) (2). Protein was visualized by SDS-PAGE followed by purification by affinity chromatography (3). By affinity chromatography, high-selectivity separation of biomolecules can be achieved through their specific interactions. During affinity chromatography, the interacting partner of the biomolecule is immobilised on a chromatographic resin. For purification of recombinant subtilisin was used Ni-NTA agarose (Qiagen) as a resin. Because of having affinity for nickel of histidine, subtilisin was get quite purely (Figure 1.).

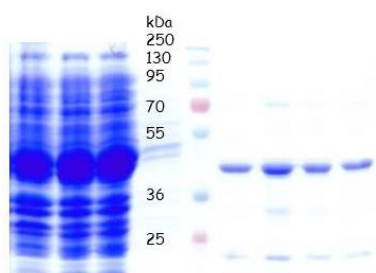


Figure 1. SDS-PAGE gel image of the production of subtilisin enzyme with pET28b system

Keywords: recombinant protein, subtilisin, affinity chromatography

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Ekstrüzyonla Pişirme Tekniği ile Diyet Gıda Üretimi

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Özet

Beslenme insanların gelişme, büyüme, sağlıklı ve aktif olarak uzun zaman yaşaması için gereken maddeleri gerektiği kadar alması ve vücudunda kullanmasıdır. Ancak aşırı ve dengesiz beslenme şişmanlık ve obezite sorunlarına yol açmaktadır. Bu durumlarda insanlar diyet gıdalara ihtiyaç duyarlar.

Diyet lifi, ince bağırsakta sindirilemeyen, buna karşılık kalın bağırsakta fermente olan, sağlık için gerekli bir grup gıda bileşenidir. Bitki hücre duvarında bulunan lignin; kutin, mum, suberin gibi lignin türevleri selüloz, hemiselüloz, pektin gibi yapı polisakkaritleri, inülin ve oligofruktoz gibi oligosakkaritler diyet lifi olarak tanımlanmaktadır. Ekstrüzyon; uygun nem içeriği ve irmik boyutuna getirilmiş nişasta ve protein içeren karışımların, silindir bir kanal içerisinde dönen sonsuz vida yardımıyla oluşturulan mekanik kayma gerilimi, yüksek basınç ve sıcaklık altında pişirilerek şekil verilmesi işlemidir. Ekstrüzyon işlemi için kullanılan ekstrüderler tek bir işlemde karıştırma, homojenizasyon, şekil verme ve pişirme gibi birçok fonksiyonu aynı anda gerçekleştirebilirler. Düşük üretim maliyeti, yüksek verimlilik ve farklı ürünlerin üretilmesine imkân vermesi gibi avantajları ile gıda ekstrüzyonunun önemi son yıllarda artmaktadır. Diyet gıdaların üretilmesinde ekstrüzyon teknolojisinin kullanımı, diğer metotlara göre bazı avantajlar sağlamaktadır. Üretim esnasında yağ kullanma zorunluluğu olmaması, nişastanın jelatinize olması ve degradasyona uğraması nedeni ile tat koku ve yapı avantajı, hızlı ve kolay üretim, düşük üretim maliyeti, düşük işgücü kullanımı, gibi avantajları vardır.

Yapılan çalışmada mısır irmiği, buğday kepeği, pirinç irmiği, karabuğday unu, karabuğday kepeği, kavrulmuş kepekli tahin, fındık ununun çeşitli kombinasyonları ile dört farklı reçete oluşturularak üretim yapılmıştır. Yapılan kimyasal ve duyu test sonuçlarına göre insanların beğenerek yiyebileceği ve satın alabileceği diyet ürün üretildiği sonucuna ulaşılmıştır.

Anahtar Kelimeler: ekstrüzyon, beslenme, diyet tahıl ürünleri, lif

Gaziosmanpaşa Üniversitesi Taşlıçiftlik Yerleşkesinde Bisikletli Ulaşım Altyapısı Oluşturulması

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Özet

Bütün dünyada olduğu gibi Türkiye'de de ulaşım ile ilgili problemler hızla artmaktadır. Bu problemlerden başlıcaları; trafik sıkışıklıklarına bağlı zaman kayıpları ve stres, fosil yakıtlardan kaynaklanan hava, su ve toprak kirliliği, motordan ve tekerleklerden kaynaklanan gürültü kirliliği, trafik kazaları ve park yeri sorunu olarak sayılabilir. Bu problemlerin çözümünün toplu taşıma sistemlerinin ve motorsuz ulaşım türlerinin kullanılması/yaygınlaştırılması olduğu son yıllarda genel kabul görmektedir. Bu bağlamda, kent içi ulaşım sorunlarının pek çoğuna çözüm olan bisikletli ulaşım önemli bir seçenek olarak karşımıza çıkmaktadır.

Bu çalışmada, Tokat Gaziosmanpaşa Üniversitesi Taşlıçiftlik Yerleşkesi'nde bisikletli ulaşım altyapısının oluşturulması için bir proje yapılmıştır. Hazırlanan proje, "Şehir İçi Yollarda Bisiklet Yolları, Bisiklet İstasyonları ve Bisiklet Park Yerleri Tasarımına ve Yapımına Dair Yönetmelik" ile uyumlu olarak hazırlanmıştır. Proje kapsamında belirlenen bisiklet yolu 9 ayrı güzergahtan oluşmakta olup, yolun toplam uzunluğu yaklaşık 7206 m.'dir. Güzergah belirlenirken hem çevresel hem de ekonomik faktörler dikkate alınmıştır. Bisiklet yoluyla beraber, yerleşkenin ulaşım ihtiyacının fazla olduğu noktalarında 9 adet bisiklet park yeri yapılması ve 100 adet bisiklet alınarak öğrencilerin kullanımına sunulması planlanmıştır.

Çalışma sonunda, bisikletli ulaşımın yaygınlaştırılmasının sağlayacağı faydalar özetlenerek, özellikle üniversite yerleşkelerinde bisikletli ulaşım altyapısı kurulmasının kent içi yollara göre avantajları belirtilmiş, ayrıca üniversite yerleşkelerinde bisikletli ulaşım altyapısı kurulmasının gerekliliği ve faydaları vurgulanmıştır.

Anahtar Kelimeler – *Bisiklet, Sürdürülebilir ulaşım, Üniversite yerleşkeleri*

The creation of Bicycle Transportation Infrastructure in Gaziosmanpaşa University Taşlıçiftlik Campus

Abstract

Transportation related problems are rapidly increasing in Turkey, as it is in the world. The main problems are; traffic congestion related time wastes and stress, air, water and soil pollutions resulted from fossil fuels, noise pollution emerging from tyres and engines, traffic accidents and parking problems. It is widely accepted in recent years that solution of these problems are widely use of public transport systems and non motorized transportation modes. In this context, bicycle transportation is an important alternative.

In this study, a project was prepared about creating bicycle transportation infrastructure in Gaziosmanpaşa University Taşlıçiftlik Campus. Project is prepared in accordance with the "The regulation on design and construction of bicycle roads, bicycle stations and bicycle parks in urban areas". The determined bicycle route is composed of 9 sections and is totally 7206 m. Both environmental and economical factors were taken into consideration in the determination of the route. It was also planned to construct 9 bicycle parks in central areas and serve 100 bicycles to public use.

At the end of the study, advantages of bicycle transportation was summarized, the advantages of university campus areas with respect to city centers from the ease of bicycle construction point of view was put forward, and the necessity and advantages of construction of bicycle transportation infrastructure was emphasized...

Keywords – *Bicycle, Sustainable transportation, University campuses*

Çevre Yollarının İşlevleri ve Tokat Çevre Yolu'nun Değerlendirilmesi

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Özet

Hızla artmakta olan motorlu taşıt sayısı ile birlikte kentsel alanlarda trafikten kaynaklanan pek çok problem ortaya çıkmıştır. Bu problemlerden başlıcaları olarak; trafik sıkışıklıkları, hava kirliliği, gürültü kirliliği sayılabilir. Kentsel alanlardaki trafiğin rahatlatılması amacıyla sıkça başvurulan Recommendanegativities. yöntemlerden birisi çevre yolları yapımıdır. Çevre yollarının esas işlevi, şehirlerarası transit trafiği şehir içi trafiğinden ayırmaktır. Şehrin dış ve uzak kesimleri arasındaki ulaşımı şehir içerisine girmeden sağlamaları da çevre yollarından beklenen işlevlerdendir. Bununla birlikte çevre yolları şehrin arazi kullanımını etkileyerek büyümesini yönlendirme özelliğine de sahiptirler.

Tokat Çevre Yolu, yaklaşık 8.2 km uzunluğunda, 2X2 kesitinde bir bölünmüş yoldur. Yol; Tokat il merkezinin doğusundan geçmekte, Tokat-Turhal Karayolundaki (D180) Eski Sigara Fabrikası yanından başlamakta, Organize Sanayi içerisinden geçerek Derbent Boğazı, Erenler Mezarlığı bölgesi ve Büyükbeybağı Mahallesi'nden geçerek Tokat-Sivas Karayoluna (D850) bağlanmaktadır. Yapımı 8 yıl gibi uzun bir süre alan Tokat Çevre Yolu, ilki açılmasından 5 ay sonra olmak üzere çeşitli defalar üzerinde meydana gelen heyelan ve göçmeler nedeniyle trafiğe kapatılarak onarım görmek durumunda kalmıştır.

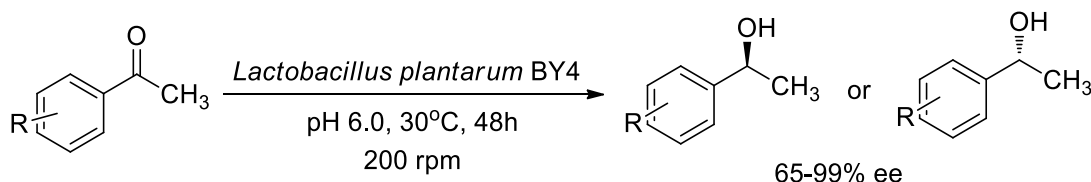
Bu çalışmada; ilk olarak çevre yollarının işlevleri ve taşınması gereken özellikler özetlenmiş; daha sonra, yapımından önceki kamulaştırma aşamalarından itibaren kamuoyunda tartışılabilen, yapımının uzun sürmesi, şehirle bağlantısının zayıf olması, açılmasından kısa zaman sonra hasar görmesi ve bu durumun sonraları da tekrarlanması gibi sebeplerle halkın bir bölümünden tepki alan Tokat Çevre Yolu çeşitli açılardan (gerekliklik, işlev, topoğrafya, jeolojik yapı, mühendislik özellikleri, ekonomi ve trafik güvenliği) değerlendirilmiştir. Tespit edilen olumsuzlukların tekrarlanmaması/düzeltilmesi için yapılması gerekenler konusunda önerilerde bulunulmuştur.

Anahtar Kelimeler – Çevre yolları, Tokat Çevre Yolu, Ulaşım

Lactobacillus plantarum ile Asetofenon Türevlerinin Enantiyoseçici İndirgenmesiEngin Şahin^{1*}¹Department of Food Engineering, Faculty of Engineering, Bayburt University, Bayburt, Turkey
*esahin@bayburt.edu.tr**Özet**

Kiral feniletanol, farmasötik maddeler, zirai ilaçlar ve doğal ürünler üretimi için çok kullanışlı kiral yapı taşlarıdır. Biyokataliz son zamanlarda yüksek enantiyoseçicilik, ılımlı reaksiyon koşulları ve çevresel uygunluk nedeniyle enantiyosaf bileşiklerinin hazırlanması için artan bir önem kazandı. Bunun ışığında, istenen etkinliğe sahip yeni enzimlerin ve yeni biyokatalizörlerin bulunması sürekli olarak gereklidir. Enantioselektif indirgemelerde biyokatalizörler olarak izole enzimler ve tüm hücreler kullanılır. Çalışmamızda, enzim saflaştırma ve kofaktör ilavesi veya rejenerasyonundan yapmadan indirgeme için izole edilmiş enzimler yerine bütün hücreler kullanılarak asetofenon türevlerinin asimetrik indirgenmesi gerçekleştirilmiştir.

Bu çalışmada kullanılan yöntem ekonomik olarak avantajlıdır ve saflaştırılmış enzimlere kıyasla çok daha ucuzdur. Asetofenon ve türevleri, biyokatalizör ile indirgenmede en çok tercih edilen substratlardır. On *Lactobacillus plantarum* suşu asetofenonların asimetrik indirgenmesinde biyokatalizör olarak değerlendirilmiştir. Asimetrik indirgenmede en iyi türün tespiti için model substrat olarak asetofenon seçtik. *Lactobacillus plantarum* BY4 suşu, ketonun ilgili alkole indirgenmesinde en verimli katalizör olduğu bulunmuştur. Reaksiyon süresi, pH, sıcaklık ve çalkalama hızı gibi reaksiyon koşulları *Lactobacillus plantarum* BY4 kullanılarak standart koşullar altında optimize edildi. Reaksiyon koşulları başarılı bir şekilde optimize ettikten sonra, süstitü asetofenonların biokatalitik indirgenmeleri gerçekleştirildi. Benzen halkası üzerinde farklı pozisyonda klor, brom, metil, metoksi ve fenil grupları içeren asetofenon türevleri, keton işlevselliğinin biyolojik indirgenmesinin etkinliğini ve stereoseçiciliğini değerlendirmek için seçildi.



Sonuç olarak para ve orto süstitü asetofenonlar, *Lactobacillus plantarum* BY4'ün tüm hücreleri tarafından yüksek enantiomerik aşırılıkta (% 99'a kadar) ilgili kiral alkollere indirgenmiştir. Gözlemlenen Prelog ve anti-Prelog enantioselektivitesi, benzen halkasındaki süstitü grupların konumuna bağlıdır. Mevcut biyolojik indirgeme protokolü, bazı enantiomerik olarak saf alkollerin üretimi için uygundur. Seçiciliğinin organik sentezde değerli olduğuna inanıyoruz. Bu nedenle, reaksiyon koşullarını ve mikroorganizmaları değiştirerek asetofenon türevlerinin indirgenmesinin yüksek seçiciliği için ayrıntılı bir mekanizma laboratuvarımızda araştırılmaktadır.

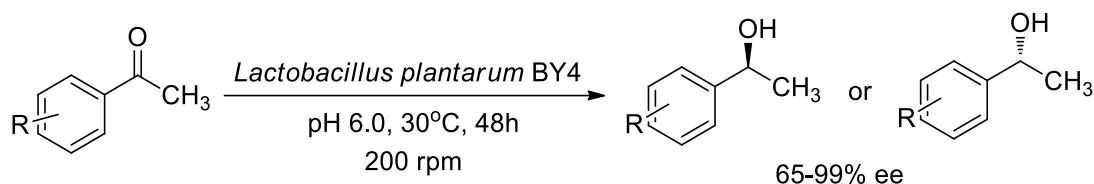
Anahtar kelimeler: : Biyokatalizör, asimetrik indirgenme, *Lactobacillus plantarum*, biyodönüşüm

Enantioselective reduction of substituted acetophenones by *Lactobacillus plantarum***Abstract**

Chiral phenylethanols are very useful chiral building blocks for the production of pharmaceuticals, agrochemicals and natural products. Biocatalysis has recently gained increasing importance for the preparation of enantiopure compounds due to their high enantioselectivity, mild reaction conditions and environmental compatibility. In the light of this, the discovery of novel enzymes and new biocatalysts with the desired activity is constantly needed. Isolated enzymes as well as whole cells are used as biocatalysts in enantioselective reductions. In our work, asymmetric reduction of

acetophenone derivatives was performed using all cells instead of enzymes isolated and enzymes for degradation without enzyme purification and cofactor addition or regeneration.

The method is used in this study is economically advantageous and much less expensive than using purified enzymes. Acetophenone and its derivatives are the most preferred substrates for the biocatalyst mediated reduction. Ten *Lactobacillus plantarum* strains have been evaluated as a biocatalyst in the asymmetric reduction of acetophenones. We chose acetophenone as the model substrate for identifying the best species for our asymmetric reductions. The isolate *Lactobacillus plantarum* BY4 was found to be the most successful at reducing the ketone to the corresponding alcohol. The reaction conditions such as reaction time, pH, temperature and agitation speed were optimized using *Lactobacillus plantarum* BY4 under the standard conditions. After successfully optimizing the reaction conditions, we performed to the biocatalytic reduction of substituted acetophenones. Acetophenone derivatives with different substituents (chlorine, bromine, methyl, methoxy and phenyl groups) on the benzene ring were selected to assess the efficiency and stereoselectivity of the ketone functionality bioreduction.



In conclusion, the *para*- and *ortho*-substituted acetophenones are reduced by whole cells of the *Lactobacillus plantarum* BY4 to the corresponding chiral alcohols with high enantiomeric excess (up to 99%). The observed Prelog and anti-Prelog enantioselectivity depends on the substituents position in the benzene ring. The present bioreduction protocol would be applicable to the production of some enantiomerically pure alcohols. We believe that selectivity is valuable in organic synthesis. Therefore, a detailed mechanism for the high selectivity of the reduction of acetophenone derivatives by altering the reaction conditions and microorganisms is under investigation in our laboratory.

Keywords: : biocatalyst, asymmetric reduction, *Lactobacillus plantarum*, biotransformations

Double Cage Rotor Bar Structure Influences on Performance of the Single Phase Induction Motor

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Abstract

The single phase induction motors are widely used in the low power applications and household appliances. Rotor cage structures influenced on performance significantly in this motors. Especially double cage rotor structure is used for improving starting performance in the induction motors. Double cage structure consists of two bars as top and bottom for each slot. Rotor bar bridge is a part between top and bottom bars. In this study, bar bridge structure is examined effects of the motor performance. The proposed model of single phase induction motor has mono phase, 2 poles, 100 W shaft power. It consist of main and auxiliary windings. Auxiliary winding is connected to 5uF run capacitor serially. Motor is operated under the 50 Hz, 220V AC network. Proposed model is designed as double cage rotor and analyzed with 2D finite element method (FEM). The analysis are carried out for three bridge structures for full load operation. All of the models have same stator and same double cage rotor slot geometry. The main differences are bridge structure and materials which are air, lamination steel and cast aluminum. Electrical performance characteristics such as speed, phase current, torque, efficiency and power factor (PF) are obtained from FEM analysis solutions. Magnetically flux density (B) in cores, flux lines and current density on bars are demonstrated visually. From the analysis it is clear that changes in the material of the rotor bar bridge has an essential influence in the electromagnetics characteristics of the motor. The simulation results shows that the motor performance is better when the bridge material is lamination steel under the same mechanical load.

Keywords: *Finite Element Method (FEM), Single Phase Induction Motor, Optimal slot geometry, Rotor bar structure, Double cage rotor*

Otomobillerde Klima Kullanımının Motor Titreşimine Etkisi

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Özet

Otomobillerde klima kompresörünün çalışması motor tarafından sağlanmakta olup motor üretmiş olduğu gücün belirli bir miktarını klima kompresörünü döndürmek için kullanmaktadır. Klima kompresörünün çalışması tekerleklere aktarılan motor gücünün azalmasına sebep olmakta ve motor yeterli gücü üretebilmek için daha fazla yakıt kullanmaktadır. Düşük güçteki motorlarda klima kompresörünün aktif olması motorun çalışma düzenini etkilemektedir. Özellikle rölanti devrinde klimanın çalıştırılması, motoru oldukça zorlamakta ve titreşimi artırmaktadır. Bu çalışmada, klima kompresörünün çalışmasının motor titreşimine etkileri incelenmiştir. Sonuçların bir kısmı değerlendirildiğinde; rölanti devrinde (800 dev/dk) ortalama titreşim değeri klima kapalı 1.60g iken, klima açık ölçüm yapıldığında ortalama titreşim değeri 1.64g ölçülmüştür. Yüksek devirlerde (5000 dev/dk) ortalama titreşim değerleri klima kapalı iken 4.73g ve klima açık durumda 5.24g ölçülmüştür. Genel olarak değerlendirildiğinde minimum ve maksimum devirlerde (800 dev/dk-5000 dev/dk) klima açıkken motor titreşiminde artma görülmüştür. Ara devirlerde ise (2000-3000-4000 dev/dk) klimanın açık olması motor titreşimini azalttığı tespit edilmiştir.

Anahtar kelimeler: Klima, motor devri, titreşim.

The Effect of Use of Air Conditioner on Engine Vibration in Automobiles

Abstract

In automobiles, the air conditioning compressor is directly powered via the engine. The use of the compressor causes a decrease in the power supplied from engine to wheels; therefore, the engine consumes much fuel to generate the sufficient power. The use of the air conditioning compressor in the low-powered engines explicitly affects the running performance of the engine. Activating the air conditioner in particular at the idle speed of engine leads for the engine to be overloaded, and thus causes for more vibration on it. In this work, the effects of the use of air conditioning compressor on engine vibration are investigated. According to the experimentally obtained results, the average vibration levels when the air conditioner is not activated and when it is activated at the idle speed (800 rev/s) are separately measured to be 1.60g and 1.64 g respectively. At higher speeds (nearly 5000 rev/s) these average vibration levels are measured to be 4.73g and 5.24 g respectively. In other words, an increase in the vibration is observed at minimum and maximum speeds (800 rev/s and 5000 rev/s) while the conditioner is running. On the other hand, at the other speeds (2000-3000-4000 rev/s) a decrease in the engine vibration is observed while the conditioner is running.

Keywords: Aircondition, engine revolution, vibration.

Kinect Kamera İle Gerçek Zamanlı Karakter Kontrolü

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Özet

Son zamanlarda insan vücudunun hareketlerini algılayabilen ve dijital ortama aktaran teknolojiler giderek artmaktadır. Bu yeni teknolojilerle beraber vücut hareketleri, kullanılabilir veriler haline gelmiştir. Bu alandaki en güncel teknolojilerden biri de Kinect algılayıcıdır. Microsoft tarafından ticari olarak üretilen Kinect, başlangıçta oyun amacıyla kullanılsa da zamanla bilimsel çalışmalarda da kendine yer bulmuştur. Bu çalışmada hareket halindeki insanların gerçek zamanlı dijital görüntülerinin yakalanması, bu görüntülerin kaydedilmesi ve düzenlenmesi konuları ele alınmış ve örnek bir uygulama ile desteklenmiştir. Böylece pahalı ve karmaşık ekipmanları kullanmadan alternatif bir hareket algılama sisteminin kullanılması amaçlanmıştır.

Kinect algılayıcısının üreticisi Microsoft bu ürünü "insanların sesleri, buldukları konumları ve hareketlerini algılayabilen, derinlik algı gücü olan, renkli kamera özelliği olan, kızılötesi yayıcısı bulunan ve içinde bir dizi mikrofon içeren fiziksel bir cihaz" olarak tanımlamıştır (Microsoft, 2016). Kinect, insandaki 24 adet eklem pozisyonları ve uzaklıkları takip ederek vücut hareketlerini üç boyutlu şekilde yakalamakta, yüz tanıma ve ses algılama imkânı da sunmaktadır. Kinect, çalıştığında önce görüş alanında insan olup olmadığını kontrol etmek için kızıl ötesi ışınlar yaymaya başlar. Daha sonra Kinect kamera görüş alanındaki insan iskeletini algılayarak hareket tanımlama işlemini yapar. Bu durumda Kinect, sistem belleğinde kayıtlı hareket örüntüleri ile örtüşen hareketleri sisteme iletir. En temel özelliği insan vücudunun hareketlerini algılayıp, onları temassız bir şekilde bilgisayar ortamına aktarmak olan Kinect teknolojisinin, başta eğlence sektörü olmak üzere eğitim sağlık, robotik ve güvenlik gibi alanlarda da kullanımı bulunmaktadır.

Bu çalışmada kullanıcıların hareketlerinin algılanması için Kinect yeteneklerinden faydalanılmıştır. Kinect kamera kullanımı hareket yakalama ve sanal gerçeklik uygulamalarında yeni fikirler akla getirmektedir. Günümüzde farklı hareket yakalama yöntemleri kullanılsa da bu yöntemler yüksek maliyet ve özel çalışma cihazları ve ortamları gerektirmektedir. Ancak Kinect algılayıcısı kullanılarak düşük maliyetli ve pratik olarak 3 boyutlu animasyonlar hazırlanabilir.

Anahtar Kelimeler: Kinect, Hareket Algılama, Animasyon, Sanal Gerçeklik

Real-Time Character Control with Kinect Camera

Abstract

Recently, the technology that can perceive the movements of the human body and transmit it to the digital environment is increasing. Body movements with these new technologies have become available data. One of the most up-to-date technologies in this area is the Kinect sensors. Kinect, commercially produced by Microsoft, was originally used for gaming purposes, but over time it has also found its place in scientific work. In this study, the capture of real-time digital images of people in motion, the recording and editing of these images were handled and supported by a sample application. Thus, it is aimed to use an alternative motion detection system without using expensive and complicated equipment.

The maker of the Kinect sensor Microsoft has defined this product as "a physical device capable of perceiving people's voices, their positions and movements, having depth perception, a color camera feature, an infrared emitter, and a series of microphones." (Microsoft, 2016). Kinect offers body recognition, face recognition, and voice recognition by capturing body movements in three dimensions by following the positions and distances of 24 joints on the human body.

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When working, Kinect begins to emit infrared rays to check for human presence in the field of vision. Then the Kinect camera detects the human skeleton in the field of view and performs motion recognition. In this case, Kinect transmits the movements overlapping the motion patterns registered in the system memory to the system. One of the most fundamental features of Kinect technology is the ability to perceive the movements of the human body and transfer them to the computer environment in a non-contact manner, especially in the entertainment sector, education, healthcare, robotics and security.

In this study, Kinect abilities were utilized to detect the movement of users. The use of Kinect cameras brings new ideas to motion capture and virtual reality applications. Although different motion capture methods are used today, these methods require high cost and special working devices and environments. However, using the Kinect sensor, low-cost and practical 3D animations can be prepared.

Keywords: *Kinect, Motion Detection, Animation, Virtual Reality*

Dual Carrier Modulation Ultra-wideband Communication in Body Area Network Channel

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Abstract

Reliability of data transfer is crucial especially in the communication between body sensors. Ultra-wideband (UWB) communication is one of the proposed physical layers in IEEE 802.15.6, because of its high bandwidth and low power properties. Orthogonal frequency-division multiplexing (OFDM) is commonly used in wireless transmission because of its preventive effect to the multipath dispersion. Dual carrier modulation (DCM) using with OFDM improves the performance in multipath fading channels. In this study, performance of DCM and OFDM is analyzed in wireless body area network channels based on bit error rate (BER) – signal to noise ratio (SNR) graphs.

The study is held by computer simulations. Random data bits are created and modulated, and then BAN channel applied and additive white Gaussian noise (AWGN) is added. At the receiver, demodulations are done as seen in Figure 1(a).

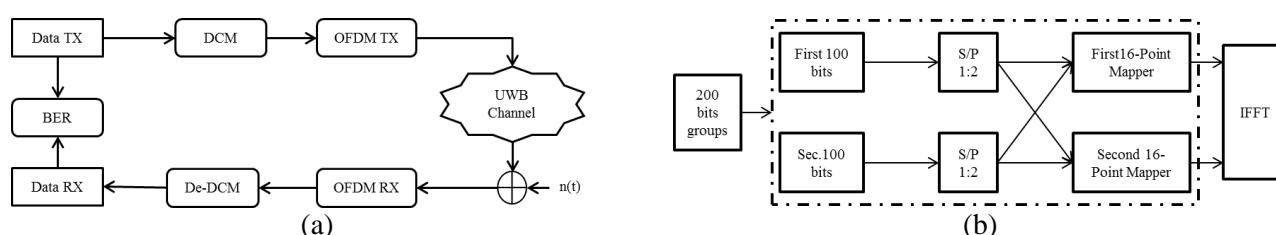


Figure 1. (a) Block diagram of the simulation, (b) Block diagram of DCM

In dual carrier modulation, as seen in Figure 1(b), data splits into 200 bits length groups. These bits are divided into 4 groups with different order which are dependent to equation ($I[g(k)], I[g(k+1)], I[g(k)+50], I[g(k+1)+50]$). 200 bits data transforms to 50 symbols twice and 100 symbols are obtained. $1/\sqrt{10}$ factor is multiplied with the symbols to normalize the amplitude. First and second 100 bits are divided to 50 bits and 4 bits groups comes from first and second 100 bits groups are combined in the constellations diagrams and two times 50 symbols are obtained. Then, IFFT is applied to perform OFDM.

Among the four BAN channel, channel models 2 and 4 are used in the simulations. Sensor transmitters and hub are both in body in channel model 2 (CM2) and on-body and out of body in the channel model 4 (CM4). Zero forcing filter is used in the receiver.

In the simulations total subcarriers is 1024, pilot symbols number is kept 224 and 424 for DCM and 224 and 512 for OFDM simulations. For the BAN channels, 16-QAM OFDM performance is not sufficient with zero forcing filter receiver, even though pilot quantity is increased. Applying the DCM-OFDM with zero forcing filter receiver showed an apparent performance improvement.

Keywords: Wireless body area network (WBAN) channel, orthogonal frequency-division multiplexing (OFDM), Dual carrier modulation (DCM).

Experimental Setup for Analyzing Electromagnetic Radiation Effect on Bees and Bee Products

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Abstract

Widespread of wireless communication has caused an increase of electromagnetic radiation in the environment. This situation may affect ecological life. For this reason, an experimental setup is established to analyze the effect of electromagnetic radiation over bees and bee products.

Electromagnetic radiation consists of oscillation of electric and magnetic fields. It is also called non-ionizing radiation. Frequencies of non-ionizing radiation waves are much lower than ionizing. Non-ionizing is not harmful as ionizing radiation. It has a thermal effect on living tissues. There are non-thermal effects of non-ionizing radiation but they are not proven. Most common non-ionizing radiations in the environment are high voltage power lines in 50 Hz, GSM signals at 900 MHz, 1800 MHz and 2400 MHz.

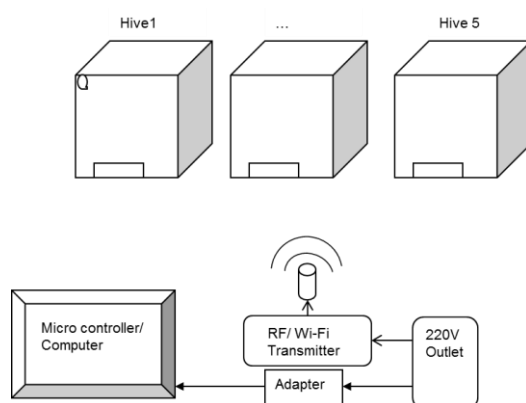


Figure 1. Experimental Setup

To analyze the electromagnetic radiation effect on bees, the electromagnetic setup is placed in front of the beehives. Figure 1 shows the experimental setup with beehives. An RF/WiFi transmitter is used as the electromagnetic source. A micro controller or a computer is used to control the transmitter. In our setup, a Raspberry Pi computer was used as the controller and a Wi-Fi adapter was used as the electromagnetic source.

The electromagnetic radiation setup was formed and applied to beehives. Three groups were created. The first group was kept as the control group, and the electromagnetic source was not placed near this group. The second group has been exposed to electromagnetic radiation for 12 hours, and the third group has been exposed to the source for almost 24 hours. Bad temper, incubation production activity, and honey production have been examined for these three groups.

Keywords: electromagnetic radiation, micro controller, bee.

Yönetici Pozisyonundaki Lider Davranışları ile Örgütsel Sinizm ve Örgütsel Sapma Arasındaki İlişki⁺

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Özet

Bu çalışma örgütsel sapma ve örgütsel sinizm davranışlarının sağlık sektöründe ne derece mevcut olduğunu, yönetici pozisyonundaki liderlerin davranışlarının ise bu kavramları etkileyip etkilemediğini araştırmak amacıyla hazırlanmıştır. Özellikle örgütsel sapma ve negatif lider davranışları üzerine olan çalışmaların azlığı, doktora tezi için bu kavramları araştırmakta olmamızdan dolayı bizleri, öncesinde nitel bir araştırma yapmaya sevk etmiştir.

Araştırma kapsamında Samsun ilinde bir kamu hastanesinde hekimler, hemşireler ve sağlık memurlarından oluşan katılımcılara açık ve kapalı uçlu sorular içeren yarı yapılandırılmış görüşme formları kullanılarak yüz yüze mülakatlar yapılmıştır. Katılımcılar kolayda örnekleme yöntemi ile gönüllülük esasına dayanılarak seçilmiştir. Görüşme konuları hassas cevaplar içerebileceği için yüz yüze görüşme yöntemi kullanılmış ayrıca lider veya yönetici kişiler ile ilgili sorular mevcut olduğundan dolayı yukarıda sayılan pozisyona sahip bile olsalar yönetici olarak görev yapan kişiler çalışmaya dahil edilmemiştir. Toplamda bir haftalık bir veri toplama sürecini bulan ve yaklaşık olarak 30-40 dakika süren bu görüşmelerde katılımcılara 17 ana soru ve açık uçlu sorulara verilen cevaplara göre sorulan alt sorular ile birlikte yaklaşık 30 soru yöneltilmiştir.

Elde edilen bulgular incelendiğinde ise otuz beş katılımcıda örgütsel sinizmin bilişsel, duyuşsal ve davranışsal boyutlarından en az birinin mevcut olduğu tespit edilmiştir. Benzer şekilde örgütsel sapma davranışlarının örgüte yönelik boyutu (üretim karşıtı boyut) ile ilgili çıkarımlar da göstermiştir ki hastane genelinde örgüte yönelik bir sapma davranışı mevcuttur. Bireylerarası sapma boyutu açısından bakıldığında diğer boyuttakinin tam tersine sapma davranışlarının yok denecek kadar az olduğu kanısına varılmıştır. Lider ve yönetici ile ilgili sorular analiz edildiğinde ise otuz bir katılımcı ile oldukça yüksek bir oranda çalışanların lider olarak hastanenin en üst amiri olan başhekimini gördükleri gözlemlenmiştir. Yaklaşık olarak yarı yarıya lider ve davranışları ile ilgili olumlu ve olumsuz düşünceler olmakla beraber, yönetici pozisyonundaki liderin ise çalışanlara göre sık sık yanlış kararlar verdiği ve bu durumda çalışanların genellikle sorun yaşamamak adına sessiz kaldıkları sonucuna ulaşılmıştır. Bu durum irdelenecek olursa liderin negatif tutum ve davranışlarının örgütsel sapma ve özellikle örgütsel sinizme yol açtığı düşünülmektedir.

Anahtar Kelimeler: Lider, Yönetici, Örgütsel Sinizm, Örgütsel Sapma

The Relationship between Leader Behaviors in Managerial Position and Organizational Cynicism and Organizational Deviation⁺

Abstract

This study was designed to investigate the extent which organizational deviance and organizational cynicism behaviors are present in the health sector; besides, whether the behaviors of managing leaders influence these notions. Particularly the lack of studies on organizational deviation and negative leader behaviors have led us carry out a qualitative research as a start before we investigate these notions for doctorate thesis.

Within the context of present study, face-to-face interviews were conducted; using semi-structured forms with open and closed questionnaires; with physicians, nurses and health officers in a public hospital in Samsun. Participants were detected on the basis of volunteerism with convenience sampling method. Since the interview topics could contain sensitive answers, face-to-face interview method was used. Besides leaders and executives were not included in the study because of the presence of questions about them; even though, they had the positions which mentioned above.

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The participants were asked 17 main questions which were pre-prepared. With sub-questions asked simultaneously according to the given answers to the open-ended questions, to sum up, nearly 30 questions are in these interviews. These interviews took a one week data collection period and each elapsed approximately 30-40 minutes.

As we examine the findings, it was determined that at least one of the cognitive, emotional and behavioral dimensions of organizational cynicism exists in thirty-five participants. Similarly, the implications about the organizational deviation behaviors of organizational dimension (anti-production dimension) indicate that, there is a deviation tendency towards the organization throughout the hospital. When we consider the interpersonal deviance dimension, it has been concluded that the deflection behaviors are scarcely any, on the contrary of the other dimension. As we analyze the questions about leader and manager, it was observed that thirty one participant, which is a very high-ranking, regard the chief of medicine as the leader of the hospital. There are approximately similar shares of positive and negative thoughts about the leaders and their behaviors. On the other hand, according to the employees, leader in the managerial position often makes wrong decisions and in that case the employees do not make a sound in order not to get into trouble. If we scrutinize this case, it is well-understood that the leader's negative attitudes and behaviors cause organizational deviance and especially organizational cynicism.

Keywords: *Leader, Manager, Organizational Cynicism, Organizational Deviance*

⁺*Bu çalışma Ondokuz Mayıs Üniversitesi Sosyal Bilimler Enstitüsü İşletme A.B.D.'da devam eden tez çalışmasından türetilmiştir (This work is derived from the ongoing thesis study at Ondokuz Mayıs University, Institute of Social Sciences, Business Administration.).*

Dar Dinamik Aralıklı Resimler için Yeni Bir Kenar Belirleme Filtreleme Yöntemi

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Özet

Kenar belirleme, çeşitli amaçlarda birçok alanda kullanıldığı için günümüz görüntü işleme uygulamalarının ana konusudur. Kenar belirleme için çok sayıda metot ve filtre günümüzde kullanılmaktadır. Işıktaki değişim, kötü odaklanma, yetersiz kamera özellikleri, resmin dar dinamik aralıkta olması gibi çeşitli zorluklarla kenar belirleme zor bir iştir. Hem bu zorluklardan en düşük seviyede etkilenmek hem de daha iyi bir kenar belirleme filtresi elde edebilmek için retinal görüntülerden etkili özellik çıkarımı konusu bu çalışmada ele alınmıştır.

Bu çalışmada görüntü matrisinin özdeğer ve özvektörlerini kullanarak filtreleme metodu oluşturuldu. Metodu diğer kenar belirleme filtreleriyle karşılaştırmak için dar dinamik aralıklı görüntülerde uygulamalar yapıldı. Bu metodun performansını ölçmek için ise çok sayıda dijital retinal görüntüyü içinde bulunduran Drive veri tabanı kullanıldı.

Çalışmanın sonunda kenar belirlemede kullanılan diğer çoğu metottan dar dinamik aralıklı görüntülerde daha iyi sonuç verdiği görülmüştür. Bu çalışmadan elde edilen sonuçlar ışığında bu metodun bütün resimler üzerinde kullanılıp kullanılmayacağı konusunda çalışılmaktadır.

Anahtar kelimeler: görüntü işleme, tıbbi görüntü işleme, filtre, retinal görüntüler.

A New Edge Detection Filter Method for Narrow Dynamic Range Images

Abstract

Edge detection is an essential issue in modern-day image process applications because it can be used in many areas for many purposes. Many methods and filters have been proposed for edge detection. It is a difficult struggle because of the variations in lighting, bad focusing, insufficient camera features, narrow dynamic range of the images, etc. Both to be affected by these difficulties at the minimum level and to obtain a better edge detection filter, we have worked on effective feature extraction from images.

In this paper, we provide filtering method from eigenvalues and eigenvectors of the image matrix. We apply this method to edge detection from narrow dynamic range images and comparable to other edge detection filters.. We used Drive database, which includes a lot of digital retinal images since test the performance of this method.

We have seen that our method works better than most of the other methods. Based on this method, we are discussing whether it can be used for all the images.

Keywords: image process, medical image process, filter, retinal image.

The Application of Linear Switched Reluctance Motor on Automatic Slidings Doors

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Abstract

Automatic sliding doors are now widely used in electromechanical systems. Because there are many mechanisms in these systems, cost and failure risk is high and it requires periodical maintenance. In this study the mechanisms are removed and sliding doors are driven with the envisaged linear actuator system.

A 3-phase, active stator, passive translator, single-sided Linear Switched Reluctance Motor (LSRM) with a transverse flux 6/4 pole ratio, which can be used as an actuator in automatic door systems, had preferred. A PIC microcontroller is used for control. LSRM was coupled as a door drive system, and electronic driver design and application were realized.

In the design of the driver card, a classic type converter with 2 switches in each phase was selected and MOSFETs were used as the switching element. MOSFETs had controlled by a microcontroller with the help of transistors. The driving of the MOSFETs is achieved by sequentially switching the signals sent from the microcontroller to each phase. Separate H bridges were designed for all phase coils to provide complete control and separate drivers were used. Pulse width modulation signals (PWM) are used in the H bridge to provide current control and to limit the current if necessary. At that time, the closed loop control of the LSRM is provided by switching the relevant phase according to the position information from the sensors.

As a result, it has been seen that in the tests made with the LSRM applied to the automatic door system, a force of about 30 N with a force of 176 W under a voltage of 34 V and a current of 5.2 A was applied to the wing of the door. It is possible to implement and commercialize this new drive system with automatic doors.

Keywords: *linear actuator, automatic sliding door, linear SRM*

Jeoistatistiksel Analiz Yöntemleriyle Hava Kirliliği Parametrelerinin İncelenmesi

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Özet

Kentlerde meydana gelen yoğun nüfus artışı, hızlı sanayileşme ve çarpık yapılaşma çevresel sorunların ortaya çıkmasına neden olmaktadır. Hızlı kentleşmeyle birlikte hava kalitesi bozulmaya ve insan sağlığı açısından tehlikeli olmaya başlamıştır. Toplum sağlığı açısından riskli durumlar oluşturan hava kalitesinin izlenmesi, problemlerin tespit edilmesi ve çözüm önerilerinin ortaya konması bilim insanları açısından önem arz etmektedir. Hava kirliliği partikül maddeler (PM₁₀), karbon monoksit (CO), kükürt dioksit (SO₂), azot dioksit (NO₂), ozon (O₃) vb. gibi kirleticilerin atmosferdeki oranının insan sağlığı açısından tehlikeli seviyeye ulaşmasıdır. Çalışmamızın amacı Tokat ilinin 2016 yılı hava kirlilik verilerinin CBS ve mekânsal istatistik yöntemleri kullanılarak irdelenmesi amaçlanmıştır.

Çalışmada Tokat ilinde bulunan 4 hava gözlem istasyonunun 2016 yılına ait verileri kullanılmıştır. Ülkemizde bulunan Ulusal Hava Kalitesi İndeksi sayesinde kirleticiler için hava kalitesi indeksi hesaplanmaktadır. 4 hava gözlem istasyonundan ikisi Tokat merkezde, diğer ikisi Turhal ve Erbaa ilçelerinde bulunmaktadır. Kirleticilere ait verilerle CBS de veri tabanı hazırlanarak mekânsal kirlilik analizi yapılmıştır. Coğrafi bağımlılığın söz konusu olduğu durumlarda klasik istatistik yöntemleri yetersiz kalmaktadır. Bunun yerine jeoistatistik yöntemler kullanılarak gözlem yapılmayan noktaların değerlerinin tahmin edilmesinde daha doğru sonuçlar vermektedir. İlk yapılan jeoistatistiksel analiz Kriging analizidir. Kriging analizi semivariogram hesapları ile elde edilen örnekler arasındaki konumsal yapıdan faydalanarak gözlem yapılmamış noktaların tahmin edilmesinde kullanılan bir yöntemdir. Uyguladığımız diğer bir jeoistatistiksel yöntem ise ters mesafe ağırlıklı ortalama yöntemidir. Bu yöntem kestirim noktalarındaki yüzey değeri bilinen noktadaki değerlerin ağırlıklandırılmış ortalamalarının alınmasıyla hesaplanır. Kestirim noktasına yakın olan noktaların etkisi daha fazla olurken, uzaktaki noktaların etkisi daha az olmaktadır. İncelenen özelliğin yönsel bir eğilim gösterip göstermediğini belirlemek için semivariogram incelemesi yapılmıştır. Semivariogram analizi belli bir mesafe içinde birbirinden ayrılan örnek nokta çiftlerinin arasındaki varyansın mesafeyle olan ilişkisini göstermektedir.

Yapılan analizler sonucunda aylık hava kirlilik değerleri ve mevsimsel farklılıklar ortaya çıkarılmıştır. Kirletici seviyesinin özellikle PM₁₀ yoğunluğunun sonbahar ve kış döneminde en yüksek seviyede olduğu gözlemlenmiştir. Kirletici seviyesindeki değişimin katı yakıt kullanımı, mevcut sanayii bölgelerine olan yakınlıkla ilişkili olarak değişkenlik gösterdiği gözlemlenmiştir. Kriging ve ters mesafe ağırlıklı konumsal analiz yöntemleriyle hava kirliliğine ait dağılım haritası ortaya çıkarılmıştır. Elde edilen sonuçlardan Ters Ağırlıklı Mesafe yönteminin local değişimlere daha duyarlı olduğu görülmüştür.

Anahtar Sözcükler: Konumsal Analiz, Kükürt Dioksit, Kriging, Partiküler Madde, Ters Ağırlıklı Mesafe

Investigation of Air Pollution Parameters by Geostatistical Analysis Methods

Abstract

The intense population increase, rapid industrialization and unplanned settlements in the cities cause environmental problems. With rapid urbanization, the air quality deteriorates and becomes dangerous in terms of human health. It is important for scientists to monitor air quality, identify problems and propose solutions for risky situations in terms of community health. Air pollution is defined as the presence of pollutants such as particulate matter (PM₁₀), carbon monoxide (CO), sulfur dioxide (SO₂), nitrogen dioxide (NO₂) and ozone (O₃) in the atmosphere at levels that endanger human health. The purpose of our study is to analyze the air data of Tokat province in 2016 using GIS and spatial statistical methods.

In the study, the data of 4 air observation stations in Tokat province were used. The air quality index for pollutants is calculated by the National Air Quality Index in our country. Two of the 4 air observation stations are located in the Tokat center and the other two are located in the districts of Turhal and Erbaa. By using data belonging to the pollutants, the database was prepared in Geographical Information System and spatial pollution analysis was done. In cases where geographical dependency is the case, classical statistical methods are inadequate. Instead, using geostatistics methods gives more accurate results when estimating the values of the points made observations. The first, Kriging geostatistical analysis was applied. Kriging analysis is a method used to estimate the unobserved points by taking advantage of the spatial structure between the samples obtained with the semivariogram calculations. Another geostatistical method we apply is the Inverse Distance Weighted(IDW) method. This method is calculated by taking the weighted mean of the values at known points at the predicted points. Estimated predicted points are more likely to be affected by nearby points, while less affected by distant points. The semivariogram examination was performed to determine whether to show the characteristic of a directional trend. Semivariogram analysis shows the relationship between variance of sample points and distance.

Monthly air pollution values and seasonal differences were revealed as a result of the analyzes made. It has been observed that the level of pollutant, especially PM10, is highest in autumn and winter. It has been observed that the change in pollutant level varies with the use of solid fuels and proximity to existing industrial zones. Air pollution distribution map was revealed by Kriging and inverse distance weighting analysis methods. From the results obtained, it has been observed that the IDW method is more sensitive to local changes.

Keywords: *Spatial Analysis, Sulfur Dioxide, Kriging, Particulate Matter, Inverse Weighted Distance*

Polyphenoloxidase Activity and Microbial Quality of Ready to Eat Apple Slices Covered with Sodium Alginate and Stevia Combinations

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Abstract

It was aimed to investigate changes in the polyphenoloxidase activity and microbiological quality of ready to eat apple slices coated with sodium alginate and stevia combinations under MAP (polypropylene-PP, 30µm) storage at ±1 °C for 3 days.

Amasya apple varieties were used as raw material. For production of edible films; sodium alginate (2.000 cP, 2%, Sigma), dried Stevia leaves and ascorbic acid were used. Also PP packaging material was used for MAP storage. The Amasya apples were cube-shaped and divided into three groups named as Control (C, without any coating film), SA (dipped into film mixture consisting of 1.25% sodium alginate, 10% glycerol and 2% ascorbic acid for 30 min) and SAS (dipped into film mixture consisting 1.25% sodium alginate, 10% glycerol and 2% ascorbic acid and 2.5% stevia). Following the coating stage groups were dried for 120 minutes, and stored in PP packages for 3 days (+1 °C). Polyphenoloxidase activity and microbiological (total yeast, mold-TYM and total psychrophilic aerobic bacteria-TPAB, total mesophilic aerobic bacteria-TMAB) analyzes were performed in 24 hours period.

Although the initial enzyme activity of the control group was lower than the initial activity of the sodium alginate (SA) group, SA group samples showed lower enzyme activity when the end of storage period was taken into account. The utilizing SA coating mixture resulted in suppression on enzyme activity. The results showed that SAS coating significantly limited the enzyme activity in comparison with SA coating.

According to the microbiological evaluation, while the TYM counts were obtained from SA group throughout the storage period, it was counted in control group only on the 3rd day. TPAB was not found in all samples during the storage period. Although TMAB counts showed increases in SA and SAS at the end of the storage, there was no significant increase in TMAB counts of control group throughout the storage period. As conclusion; SA and SAS film combinations limited the polyphenol-oxidase activity and this film combinations could be effectively used for stabilizing the color of sliced ready to eat apple slices during storage.

Keywords: *Apple, Edible Film, Microbial Quality, Polyphenoloxidase, Sodium Alginate, Stevia*

Classifier Success Rates in Speech Emotion Recognition Studies

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Abstract

The communication ability, converting the sound to the form of the speech, is the most important property that distinguishes the human from other living human beings. Speech which is a complex function occurs via audio path processing [1]. Sound, apart from being a communication tool, it is also an indicator for the person's identity, mental state and physical health issues. There are various studies available about people recognition, emotion detection, sentence and word recognition through human voices. Audio recordings used in this study is an analog signal and analyzed through digital signal processing (DSP) methods. It is used effectively in a lot of fields such as improving the quality of the DSP audio on sound signals, noise removal, people recognition, feature extraction, and communication. Objective and subjective methods are used for psychological diagnosis, emotion detection and human recognition. Perceptual evaluation, which is subjective evaluation method, is an interpretation of sound records by experts, varying from person to person. Objective evaluation methods are used to overcome this problem. [2].

It is included in the concept of DSP acoustic analysis and used objectively to evaluate voice disorders, and various acoustic parameters are obtained via the sound. Acoustic analysis is an inexpensive method, which provides objective, noninvasive data in a short time, and the softwares used for analysis are available [3]. Acoustic parameters obtained by acoustic analysis are used as feature vectors for classifier in speech emotion recognition (SER) studies.

When emotional speech recognition studies are examined, there are various studies using different classifiers, different feature extraction methods and their combinations. When the performances of the most used SVM, GMM, HMM, k-NN and Bayesian classifiers in the studies are compared according to the data collection method and feature extraction methods used;

- As a result of using the same classifier and different property selection methods on the same database, the highest achievement for feature extraction was obtained by wavelet transform [4, 5].
- Classification accuracy affects the database used [6].
- The highest classification accuracy was obtained with GMM on EMO-DB [7].
- The Fisher property selection method is superior to PCA [8].
- Bayesian Logistic Regression based Binary Decision Tree method on IEMOCAP database provided higher success than traditional Bayesian Logistic Regression, SVM and HMM [9].
- The accuracy of the GMM classifier is higher than that of HMM and SVM [7, 10].
- The accuracy of SVM classifier is higher than HMM [11].
- The accuracy of the SVM-RBF classifier is higher than that of Bayesian [12].
- When comparing SVM and ANN performance on the BHUDES database, the SVM accuracy rate is higher than ANN [8].

GMM and SVM classifiers are used extensively when working towards this information. The HMM classifier has higher success than the GMM and SVM according to the emotional state and number used, so it should be considered in the emotional situations in selecting the classifier.

Keywords: *speech emotion recognition, classifier, speech analysis*

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Gıda Endüstrisinde Ekstrüzyon Prosesi

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Özet

Bu çalışmada, gıda endüstrisinde farklı kullanım alanlarına sahip ekstrüzyon prosesi ve prosese etki eden faktörler ele alınmıştır. Ekstrüzyon prosesi, yüksek sıcaklıkta kısa süre uygulanan termo-mekanik ısı işlem uygulanmayan mekanik bir prosestir. Ekstrüzyon teknolojisi, atıştırmalık çerezler ve kahvaltılık gevrekler de dâhil olmak üzere çok çeşitli ürünlerin üretiminde kullanılmaktadır. Üretimde ekstrüzyon işleminin kullanıldığı en eski gıda maddelerinden biri olan makarnanın yanı sıra çerezler, kuru çorba karışımları, şekerleme mamulleri, bebek mamaları, nişasta türevleri, kahvaltılık tahıllar, et analogları, içecek tozları gibi ürünlerin de üretimi ekstrüzyon prosesi ile yapılmaktadır. Proses esnasında tek bir aşamada karıştırma, homojenizasyon, şekil verme ve pişirme gibi birçok işlem aynı anda gerçekleştirilebilmektedir. Üretimde kullanılan değişik parametreler (besleme hızı, vida hızı, vida tipi, kovan sıcaklığı, hammadde bileşimi, nem içeriği) prosesi ve son ürünün tekstürünü etkilemektedir. Çalışma sonucunda değeri düşük hammaddelerden ekstrüzyon prosesi ile yüksek değere sahip ürünler elde edilebilmektedir.

Ahtar kelimeler: Ekstrüzyon, çerez tahıllar, kahvaltılık gevrekler, ekstrüzyon parametreleri.

Extrusion Process in Food Industry

Abstract

In this study, the extrusion process and the factors affecting the process are considered in the food industry. The extrusion process is a mechanical process that does not involve thermo-mechanical heat treatment applied at high temperature for a short time. Extrusion technology is used in the production of a wide variety of products, including snack snacks and breakfast cereals. In addition to pasta, which is one of the oldest foodstuffs used in the production process, products such as cookies, dry soup mixes, confectionery products, baby foods, starch derivatives, breakfast cereals, meat analogues, beverage powders are also produced by the production extrusion process. During the process, many processes such as mixing, homogenization, shaping and baking can be performed at the same time. The various parameters used in production (feed rate, screw speed, screw type, shell temperature, raw material composition, moisture content) affect the process of the process and final product. As a result of the study, products with high value can be obtained by the process of extrusion from low raw materials.

Keywords: Extrusion, snack cereals, breakfast cereals, extrusion parameters

Tasarım Stüdyosunda Yaratıcılık Eğitimi ve Multidisipliner Bir Eğitim Önerisi: Ürün Tasarımından Mekan Organizasyonuna Geçiş Süreci

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Özet

Bu çalışmanın amacı 2003-2007 eğitim – öğretim yılları arasında verilmiş olan ürün tasarımı, mobilya tasarımı ve donatı tasarımı derslerinde gerçekleştirilmiş olan çalışmaları irdelemek ve bu derslerde kullanılan yöntemleri, ders sürecinde diğer disiplinler ile oluşturulan ve ortaya konulan tasarımları, tasarımcı adaylarının dönemsel yaklaşımlarını tanımlayarak derslerin verimliliğini irdelemektir.

Tasarım eğitimini özelleştiren ve diğer benzer disiplinlere farklı kılan en belirgin özelliklerden birisi form, doku, malzeme seçimine dikkat edilmesi ve uygulama safhasına geçmeden önce oluşturulan prototipler yardımı ile ortaya konulan ürünün test edilmesidir. Lisans eğitimi sürecinde temel amaç bireyin yaratıcı potansiyellerini, yaratıcı düşünce ve tutumlarını geliştirmek ve tasarımcı adayının öngörü kazanarak ilerleyen safhalarda doğabilecek sorunları minimum değere indirgeyebilmesi için pratik çözümler üretebilmesini sağlamaktır. Bu bağlam da çalışma da doküman analizi yöntemine başvurulmuş ve 2003 – 2007 eğitim öğretim döneminde İç Mimarlık ve Çevre Tasarımı Bölümünde “Ürün Tasarımı – Mobilya Tasarımı – Donatı Tasarımı” derslerini almış olan toplam 170 tasarımcı adayının ortaya çıkardığı tasarımlar diğer benzer disiplinler de verilen benzer derslerin işleri ile karşılaştırılmıştır. İncelemesi gerçekleştirilen dört yıllık eğitim sürecinde üründen donatıya ortaya çıkan tasarımlar da, tasarlanan şey’ in ebatlarından dolayı oluşan ölçek farklılıkları ve bu farklılıklara getirilmeye çalışılan çözüm önerilerinin tasarımcı adayları tarafından analitik ve deneysel anlamda irdelenme şekilleri fotoğraflar ile belgelenmiştir.

Tasarım düşüncesini destekleyen metotlardan bazıları temelde tasarımcı adaylarının yaratıcı düşüncelerini geliştirmeyi amaçlamakla birlikte bazıları da öğrencilerin 3 boyutlu düşünme ve form yaratma becerilerini geliştirmeyi hedefler. Bu kapsamda öğrencilere dört yıllık eğitim sürecinde verilen tasarım dersleri günlük yaşamlarında sıklıkla karşılarına çıkabilecek problemleri de kolaylıkla karşılayıp çözüm üretebilmelerini amaçlamaktadır. Ancak birbirine benzer içerikte olan, alt başlıklar ile (ergonomi, antropometri, bilgisayar destekli tasarım v.b. dersler ile tasarım dersleri desteklenmektedir) desteklenen derslerde genel anlamda öğrencilerin ölçek bağlamında çözüm önerileri getirirken yanlışlıklar yaptıkları ve problemin ilk safhası olan inceleme, ön izleme, problemi bulma bölümünde haftalarca süren araştırmalar gerçekleştirdikleri görülmüştür. Bunun yanı sıra dersi alan öğrencilerin yaklaşık %8 lik diliminin derslerden başarısız olduğu ve %3 lük bölümünün de dersin 4. haftasında dersten çekildiği bulgular arasında yer almaktadır. Ayrıca bir kısım tasarımcı adayları öğrenci destekleyici diğer derslerin yanı sıra bilgisayar destekli başka programlar öğrenmek içinde gerek kurslara gerek üst dönem derslerine başvurarak gelişimlerini desteklemişlerdir. Ders kapsamında ortaya çıkan en önemli sonuçlardan biri olarak bir öğrencinin gerçekleştirmiş olduğu patent başvurusu da şuan ön başvuru sürecini tamamlamış bulunmaktadır.

Anahtar kelimeler: ürün tasarımı, mobilya tasarımı, donatı tasarımı, disiplinler arası eğitim, tasarım eğitimi

Creativity Education in a Design Studio and a Suggestion for Multidisciplinary Education: Transition Process from Product Design to Space Design

Abstract

This paper aims to analyse the works, teaching methods, interdisciplinary characteristics of designs that realised at the courses of product design, furniture design and accessory design between the years 2003 and 2007.

The difference of design education relies on the accuracy of form, texture and material selection and testing with the help of prototypes before the executing process. The main objective of undergraduate education is to develop the creative potentials and attitudes of students and helps them to provide practical solutions for reducing further problems. Through

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this context in the research the method of document analyse has been used and designs of 170 Interior and Environmental Design students realised at the courses of Product Design, Furniture Design and Accessory Design between the years 2003 and 2007 have been compared with the works of other close disciplines. The proposal of the students to solve the differences of scale due to difference from the dimensions of the 'designed object' and their analytical and experimental attitudes have been documented by photographs.

Some methods supporting the design philosophy aims to develop the creative thinking of candidate designers while some of them focuses on 3- dimensional understanding and the ability of improving form. Through these methods 4 years of design courses aim to produce solutions for problems in practical life. It is determined at the courses (involving ergonomics, anthropometry, computer- aided design etc.) that students fail to produce solutions for scale problem. They have to spend too much time for the early phase of analysing, preview and finding the problem. The 8 percent of attendant students have been failed and 3 percent of them have been retreated from the courses while some of the candidate designers developed themselves by studying other computer- aided programs. One of the most important result of the course has been a successful patent process of a student.

Keywords: *product design, furniture design, accessory design, multidisciplinary education, design education*

Physical Properties of Fe doped $\text{Cu}_{12}\text{Sb}_4\text{S}_{13}$

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Abstract

Tetrahedrites in the thermoelectric technologies have an important place in the family of reusable energy materials since they are cheap and easily synthesizable. In this present work, the parent tetrahedrite ($\text{Cu}_{12}\text{Sb}_4\text{S}_{13}$) doped with gradually increasing Fe element were synthesized using solid state reaction and annealed by a step furnace using a special cycle. The amount of x in $\text{Cu}_{12-x}\text{Fe}_x\text{Sb}_4\text{S}_{13}$ compound was varied for x= 0, 1, 1.5, 2, 2.5 dopant ratios. The X-ray diffraction (XRD) along with Rietveld analysis of the samples showed almost single phase with ignorable secondary peaks belongs to Antimony phase. A dense Scanning Electron Microscope (SEM) images were obtained for all compositions. Elemental compositions of the samples were determined by an in-situ attach Energy Dispersive Spectroscopy (EDS) to a Real-time SEM and provided the required stoichiometry. Magnetic field-dependent amplitude measurements were performed using Electron Paramagnetic Resonance Technique (EPR).

Keywords: tetrahedrites, Thermoelectric Technologies, Special sintering root

Silk fibroin-based antimicrobial nanoparticles as a reinforcing additive for acrylate based denture resinsTuğba Özdemir^{1*}, Yeliz Hayran² and Ali Aydın³¹*Department of Genetics and Bioengineering/Gaziosmanpaşa University, Tokat, Turkey*²*Department of Restorative Dentistry/Gaziosmanpaşa University, Tokat, Turkey*³*Department of Medicine/Gaziosmanpaşa University, Tokat, Turkey***tugba.ozdemir@gop.edu.tr*

Abstract

One of the important problem experienced by mature adults over 75 is, loss of their teeth and supporting dental structures which leads to inability to chew food and bacterial infections. Dentures has been used since ancient egypt to address this problem. Over history the materials used for denture base has changed from wood to acrylic polymers. Currently almost 90% of all dentures are acrylic base, however acrylic resins are hard and brittle materials and they can easily form bacterial biofilms. In this study, we propose to build a silk-based core shell nanoparticle structure that serves both as a resin reinforcing material as well as antibacterial additive.

Silk cocoons from *bombyx bori* type silkworms were purchased and chopped into smaller pieces. Silk fibroin is separated from sericin by boiling silk pieces in Na₂CO₃ for 60 minutes. Resulting fibroin mesh was solubilized in a ternary system composed of CaCl₂:H₂O:C₂H₅OH at 90 °C for 2 hours. Dissolved fibroin solution then dialyzed against DI water for 3 days to remove salts. The fibroin concentration was calculated after the dialysis with a UV spectrophotometer and adjusted to 10 % w/vol before the nanoparticle production step. The fibroin nanoparticles are fabricated as follows; 10 % w/vol fibroin solution is mixed with Acetone at a 1:9 vol/vol ratio while homogenizing at 10000 rpm for 30 mins. Once a milky fibroin solution is achieved the particles were allowed to interact with polyethyleneimine (PEI) solution and further homogenized for 40 minutes. The particle size was measured with mastersizer. The produced fibroin based particles were mixed into acrylic resins for further mechanical and antibacterial testing.

Our initial results show the 80% w of the initial silk cocoons were composed of fibroin protein. Fibroin extraction and solubilization method is subject to severe protein aggregation. Our initial results indicate that the dialysis time and number of water exchange play important roles in preventing protein aggregation. We also tested denaturing and renaturing using gradual urea dialysis method. Although literature suggests this method is best at recovering fibroin without/minor aggregation we came across higher aggregation than DI water dialysis. Initial particle preparation using acetone has led to a wider particle size distribution in addition to producing two particle peaks one being around 50 µm and the second one being around 120 µm. Inclusion of PEI decreased the average particle size into 23 µm. The particles added into denture resins initially did not prevented the polymerization of acrylic materials.

Keywords: *fibroin, polyethyleneimine, denture resin, acrylic, antibacterial, flexural strength.*

Derin Kriyojenik İşlemin AISI D3 Takım Çeliğinin Önemli Özellikleri ve Çekme Dayanımı Üzerine Etkisi

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Özet

Son zamanlarda çeşitli çelik bileşenlerinin mekanik tepkisini geliştirmek için derin kriyojenik işlem gerçekleştirilmektedir. Genellikle bir malzemenin mekanik özelliklerini geliştirmek için kriyojenik işlem kullanılır. Özellikle takım çeliklerinde geniş ölçüde aşınma direncini artırmanın bir yöntemi olarak bilinmektedir. Ayrıca, kriyojenik işlem zehirli olmayan ve patlamayan bir çevre dostu uygulamadır. Malzemelerin mekanik özelliklerinden olan çekme dayanımı ve aşınma yakın ilişkilidir. AISI D3 takım çeliğinin çekme mukavemeti üzerine derin kriyojenik işlemin etkisinin araştırılması amacıyla D3 takım çeliği numunelerine -145 °C'de 24 ve 36 saat kriyojenik işlem yapılmıştır.

Bu çalışma, geleneksel ısıtma sonrası sıvı azot sıcaklığında (-145 °C) derin kriyojenik işlem sırasında (24 saat, 36 saat) soğutma sürelerinin AISI D3 takım çeliği numunelerinin mekanik özelliklerine etkisiyle ilgilenecektir. Çalışma başlangıcında, D3 takım çeliği numuneleri, D3-0: referans, D3-1: geleneksel ısıtma işlemi, D3-2: -145 °C'de 24 saat kriyojenik işlem ve D3-3: -145 °C'de 36 saat kriyojenik işlem olarak dört farklı grupta işlendi. Kriyojenik işlemde kaynaklanan mikroyapıda meydana gelen değişiklikleri belirlemek için SEM, EDX, XRD analizleri yapılmıştır. Metalografik analiz için örnekler metalografik kurallara göre önceden hazırlanmıştır. Kriyojenik işlemde kaynaklanan mekanik özelliklerin değişimini belirlemek için makro ve mikro sertlik, çekme mukavemeti analizleri yapılmıştır. Sertlik ölçümleri için Rockwell sertlik test cihazı kullanıldı. Numuneler, test standartlarına göre hazırlanmış ve Hoytom 1003 test makinesi kullanılarak AISI D3 takım çeliği malzemesinin değerlendirilmesinde Rockwell sertlik (HRC) ölçeği kullanılmıştır. Numunelerin mikrosertlik derecesi, DUROLINE-M mikrosertlik test cihazı ile belirlenmiştir. Çekme mukavemeti analizi için TS 138 EN 10002-1 test standartlarına göre önceden yapılmış numuneler uygulanmıştır.

AISI D3 takım çeliğinin kriyojenik işlemi onların özelliklerinde önemli iyileşme göstermiştir. Bu iyileşmeler, karbür partiküllerin düzgün dağılımını arttırmış, kalıntı östeniti azaltmış, sertliği artırmış, çekme mukavemetinde artış sağlamıştır. D3 takım çeliğinin analizleri değerlendirildiğinde, 36 saat derin kriyojenik işlemin tavsiye edilen bir uygulama olduğu ve çekme mukavemetinde yaklaşık %29,52 artış olduğu sonucuna varılmıştır.

Anahtar Kelimeler: Kriyojenik işlem, Çekme mukavemeti, AISI D3, Mikroyapı, Sertlik

Effect of Deep Cryogenic Treatment on the Significant Properties and Tensile Strength of AISI D3 Tool Steel

Abstract

Recently deep cryogenic treatment is performed to improve the mechanical response of various steel components. Usually cryogenic treatment is used to improve the mechanical properties of a material. Especially it has been widely acknowledged as a means of improving wear resistance of tool steels. Moreover, cryogenic treatment is application an eco-friendly, nontoxic and nonexplosive. Tensile strength which is the mechanical properties of the materials and the

wear are closely related. The investigation of the effect of the deep cryogenic treatment on the tensile strength of AISI D3 tool steel and for this purpose the D3 tool steel specimens in 24 and 36 hours were treated in cryogenic at -145 °C.

This study concerns of the effect of soaking times (24 hr, 36 hr) at liquid nitrogen temperature (-145 °C) during the deep cryogenic treatment after conventional heat treatment on the mechanical properties of AISI D3 tool steel specimens. At the beginning of study, the D3 tool steel specimens were treated in four different groups such as D3-0: referans, D3-1: conventional heat treatment, D3-2: cryogenic process at -145 °C for 24h and D3-3: cryogenic process at -145 °C for 36h. SEM, EDX, XRD analyses were made in order to determine the changes in the microstructure caused by cryogenic treatment. For the metallographic analysis, the samples were pre-pared according to the metallographic rules. Macro and micro hardness, tensile strength analyses were made in order to determine the changes in the mechanical properties caused by cryogenic treatment. For the hardness measurements, a Rockwell hardness tester was used. The samples were prepared according to the test standards, and the Hoytom 1003 testing machine was used to evaluate the AISI D3 tool steel material on the Rockwell hardness (HRC) scale. The microhardness of the samples was established by the DUROLINE-M microhardness tester. For the tensile strength analysis, the pre-pared samples were applied according to the TS 138 EN 10002-1 test standards rules.

Cryogenic treatment of AISI D3 tool steel has shown significant improvement in their properties. This improvement enhanced uniform distribution of carbide particles, reduces retained austenite, increase in hardness, increase in tensile strength. It is concluded that analyzes evaluated of the D3 tool steel, it is an advisable application of 36 hr deep cryogenic treatment and approximately 29,52% increased in tensile strength.

Keywords: *Cryogenic treatment, Tensile strength, AISI D3, Microstructure, Hardness*

Preparation, Growth, Microstructure and Optical Properties of Nonvacuum Y Doped ZnO Thin Films

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Abstract

Preparation, growth, and microstructure Y doped ZnO thin films were studied. Zn_{1-x}YxO (x=0.0, 0.01, 0.02, 0.04, and 0.05) precursor solutions were prepared by sol-gel synthesis using Zn, and Y based alkoxide which were dissolved into solvent and chelating agent. Y-doped ZnO films have been deposited onto glass substrate by using sol-gel dip coating system. The thin films were annealed at various temperatures and times, were tried to observe the doping ratio, temperature, and time effect on microstructure and optical properties. The crystal structures and surface morphology of the Y-doped ZnO thin films were characterized using 2θ-θ x-ray diffraction (XRD) and Scanning Electron Microscope (SEM). Optical properties of the Y-doped ZnO thin films were investigated by UV-Vis. Spectrometer. The microstructure and optical properties of different doping ratio, temperature and time of annealing process are presented.

Keywords: ZnO based materials, Sol Gel Method, Optical Properties

Acknowledgement

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Otomotiv Endüstrisinde Yaygın Kullanılan DIN 1.2379 Takım Çeliğine Kriyojenik İşlemin Etkilerinin Araştırılması

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Özet

Genellikle DIN 1.2379 takım çeliği, otomotiv endüstrisinde kalıp malzemesi olarak kullanılır. Bu çeliklerin mekanik özelliklerinin özellikle aşınmalara karşı iyi olması arzu edilir. Son zamanlarda çeşitli çelik bileşenlerinin mekanik tepkisini geliştirmek için kriyojenik işlem gerçekleştirilmektedir. Takım çeliklerinde geniş ölçüde aşınma direncini arttırmanın bir yöntemi olarak bilinmektedir. Özellikle bir malzemenin mekanik özelliklerini geliştirmek için kriyojenik proses kullanılır. Buna ek olarak, çevre dostu, zehirli ve patlayıcı olmayan bir uygulamadır. Kriyojenik işlemin DIN 1.2379 takım çeliği üzerindeki etkisinin araştırılması için, 2379 takım çeliği numuneleri, - 145 °C'de kriyojenik işlem yapıldı.

Bu çalışma, geleneksel ısıl işlem sonrası sıvı azot sıcaklığında (-145 °C) derin kriyojenik işlem sırasında (36 saat) soğutma süresinin DIN 1.2379 takım çeliği numunelerinin mekanik özelliklerine etkisiyle ilgilenmektedir. Çalışma başlangıcında, 2379 takım çeliği numuneleri, referans, geleneksel ısıl işlem ve geleneksel ısıl işlem sonrası -145 °C'de 36 saat kriyojenik işlem olmak üzere üç farklı grupta işlendi. Kriyojenik işlemde kaynaklanan mikroyapıda meydana gelen değişiklikleri belirlemek için SEM, EDX, XRD (ASTM E975-00 standartlarına göre) analizleri yapılmıştır. Metalografik analiz için örnekler metalografik kurallara göre önceden hazırlanmıştır. Kriyojenik işlemde kaynaklanan mekanik özelliklerin değişimini belirlemek için makro ve mikro sertlik, çekme mukavemeti analizleri yapılmıştır. Makrosertlik ölçümleri için bir Rockwell sertlik test cihazı kullanıldı. Numuneler, test standartlarına göre hazırlanmış ve Hoytom 1003 test makinesi kullanılarak DIN 1.2379 takım çeliği malzemesinin değerlendirilmesi için Rockwell sertlik (HRC) ölçeği kullanılmıştır. Numunelerin mikrosertlik derecesi, DUROLINE-M mikrosertlik test cihazı ile belirlenmiştir. Çekme mukavemeti analizi için TS 138 EN 10002-1 test standartlarına göre önceden yapılmış numuneler uygulanmıştır.

2379 takım çeliğinin analizleri değerlendirildiğinde, 36 saat derin kriyojenik işlemin tavsiye edilen bir uygulama olduğu ve çekme mukavemetinde yaklaşık %3,2 artış olduğu sonucuna varılmıştır. Takım çeliğinin makro ve mikro sertlik sonuçlarının, kriyojenik işlem yapılanlarda sırasıyla %1,2 HRC ve %2,7 HRC'lik artışı görülmüştür. Kriyojenik işlem numunesi, % 5'lik bir kalıntı östenitin fraksiyonu gösterdi. Bu, işlemsiz numunede gözlemlenen kalıntı östenitin hacimsel olarak %50'sinin pratik olarak kriyojenik işlem ile martensite dönüştürüldüğü anlamına gelir. DIN 1.2379 takım çeliğine yapılan kriyojenik işlem özelliklerinde önemli iyileşmeler göstermiştir. Bu iyileşmeler, karbür partiküllerin düzgün dağılımını arttırmış, kalıcı östeniti azaltmış, sertliği arttırmış, çekme mukavemetinde artış sağlamıştır. Kriyojenik işlemin 2379 takım çeliğinin özelliklerini önemli ölçüde geliştirdiğini görülmüştür. Sonuç olarak, kriyojenik muamele kullanımı takım çeliklerinde başarılı bir şekilde uygulanmasının ötesine geçmiştir. Üstelik çevre dostu bir uygulamadır.

Anahtar Kelimeler: Kriyojenik işlem, DIN 1.2379, Çekme mukavemeti, Sertlik, Mikroyapı, Kalıntı östeni

Investigation of the Effects of Cryogenic Treatment on the DIN 1.2379 Tool Steel of Commonly Used in the Automotive Industry

Abstract

Commonly DIN 1.2379 tool steel is used to die material in the automotive industry. It is desirable that the mechanical properties of these metals are good, especially against wear. Recently cryogenic treatment is performed to improve the mechanical response of various steel components. It has been widely acknowledged as a means of improving wear resistance of tool steels. Especially cryogenic process is used to improve the mechanical properties of a material. In addition, it is an environmentally friendly, non-toxic and non-explosive application. To investigate the effect of the cryogenic process on DIN 1.2379 tool steel, 2379 tool steel samples were cryogenically treated at 145 °C.

This study concerns of the effect of soaking time (36 hr) at liquid nitrogen temperature (-145 °C) during the deep cryogenic treatment after conventional heat treatment on the mechanical properties of DIN 1.2379 tool steel specimens. At the beginning of study, the 2379 tool steel specimens were treated in three different groups such as referans, conventional heat treatment and cryogenic process at -145 °C for 36h after conventional heat treatment. SEM, EDX, XRD (in accordance with ASTM standard E975-00) analyses were made in order to determine the changes in the microstructure caused by cryogenic treatment. For the metallographic analysis, the samples were pre-prepared according to the metallographic rules. Macro and micro hardness, tensile strength analyses were made in order to determine the changes in the mechanical properties caused by cryogenic treatment. For the macrohardness measurements, a Rockwell hardness tester was used. The samples were prepared according to the test standards, and the Hoytom 1003 testing machine was used to evaluate the DIN 1.2379 tool steel material on the Rockwell hardness (HRC) scale. The microhardness of the samples was established by the DUROLINE-M microhardness tester. For the tensile strength analysis, the pre-prepared samples were applied according to the TS 138 EN 10002-1 test standards rules.

It is concluded that analyzes evaluated of the 2379 tool steel, it is an advisable application of 36 hr deep cryogenic treatment and approximately 5% increased in tensile strength. The hardness results show that the cryogenic treatment increased the macro and micro hardness of the tool steel by 1,2% HRC and 2.7% HRC, respectively. The cryogenic treatment sample showed a fraction to %5 of retained austenite. This means that practically the 50% in volume of the retained austenite observed in the untreated sample were transformed into martensite by the cryogenic treatment. Cryogenic treatment of DIN 1.2379 tool steel has shown significant improvement in their properties. This improvement enhanced uniform distribution of carbide particles, reduces retained austenite, increase in hardness, increase in tensile strength. It was shown that the cryogenic treatment significantly improved properties of the 2379 tool steel. Consequently, the use of cryogenic treatment has grown beyond its successful application on tool steels. It is also an eco-friendly.

Keywords: *Cryogenic treatment, DIN 1.2379, Tensile strength, Hardness, Microstructure, Retained austenite*

Biological Synthesis of Zinc Oxide Nanoparticles with *Veronica Multifida* Extract

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Abstract

The aim of the study is to synthesize Zinc Oxide (ZnO) nanoparticles using Zinc Acetate Dihydrate and the leaves extract of *Veronica Multifida*.

Soxhlet extractor was used to obtain the aqueous leaves extract of *Veronica multifida* that were used as capping and surface stabilizing agent for the synthesis of ZnO nanoparticles. Creamish-white colored precipitation was observed when ZnO nanoparticles were synthesized. ZnO nanoparticles were dried and stored for characterization. ZnO nanoparticles were characterized by using UV-vis spectrophotometer, zeta sizer, XRD and FTIR.

It was seen that pH level have an effect on the size of synthesized nanoparticles. XRD, UV-vis spectrophotometer, Zeta Sizer and FTIR analysis showed the formation of ZnO nanoparticles.

Keywords: Zinc Oxide, Nanoparticle, *Veronica multifida*, Green chemistry

Traditional and Modern Medical Uses and Biological Activities of *Caper*

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Abstract

The main objective of this study is to review the biological activities, phytochemistry, traditional and modern medicinal importance of *Caper*.

The LC-MS analysis revealed the existence of highly glycosylated flavonol, flavon glycosides and phenolic acid derivatives. *Caper* supports the nutritional quality and shelf life of foods by inhibiting lipid oxidation, decreasing rancidity, and eliminating toxic oxidative products. The fruits of *caper* are good sources of iron, zinc, copper, manganese, selenium, and chromium. Phenolic compounds provide antioxidant activity and resistance against pests and other species propagation. *Caper* has various biological activities such as immunostimulant and antitumoral, anti-diabetic, antibacterial, antifungal and antiparasital activities.

In this review discussed the biological activities of *Caper* beyond its phytochemistry, traditional and modern medicinal importance and to provide more efficient usage of pharmacogenomics and pharmacoproteomics work in the future.

Keywords: *Caper, Bioactivities, Antioxidant, Antitumoral, Phytochemistry*

Oscillation Theorems for Second-Order Nonlinear Differential Equations with Nonlinear Damping

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Abstract

We present new oscillation criteria for certain classes of second-order nonlinear differential equations with nonlinear damping term. The results obtained essentially generalize and extend some existing results. Several examples are also provided to show the importance of our results.

MSC 2000: 34C10

Keywords: *Oscillation, second-order, nonlinear differential equations, damping term.*

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New Oscillation Results for Second Order Nonlinear Differential Equations with Mixed Neutral Term

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Abstract

This study aims to investigate the oscillatory behavior of a certain class of second order nonlinear differential equations with mixed neutral term. By using a Riccati-type substitution, some new sufficient conditions that guarantees the oscillation of the considered equation are established. Examples are also provided to illustrate the applicability of the results.

MSC 2000: 34C10, 34K11, 34K40.

Keywords: Oscillation, second-order, neutral differential equations, mixed neutral term.

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Alkalilerle Aktive Edilmiş Puzolanik Harcın Bazı Fiziksel ve Mekanik Özelliklerinin İncelenmesiMurat Çavuş^{1*}, Hüseyin Başdemir¹ and Mustafa Dayı²¹ Civil Engineering, Faculty of Natural Sciences and Engineering, Gaziosmanpaşa University, Turkey² Civil Engineering, Faculty of Technology, Duzce University, Turkey*murat.cavus@gop.edu.tr

Özet

İnşaat sektöründe son yüzyılın malzemesi tartışmasız betondur. Betonun temel bileşeni olan çimento ise üretim maliyetleri ve çevreye verdiği zararlar açısından son yıllarda tartışılan bir ürün haline gelmiştir. Son yıllarda çimentonun yerini alabilecek alternatif malzemeler üzerinde çalışmalar devam etmektedir. Bunlardan en çok bilineni Jeopolimerlerdir. Bu çalışmada da demir çelik fabrikalarında açığa çıkan yüksek fırın cürufunun farklı oranlarda ve farklı kür sıcaklıklarında NaOH ile aktive edilerek elde edilen kompozit malzemenin bazı fiziksel ve mekanik özellikleri incelenmiştir. Bu yolla betona alternatif bir kompozit üretilmeye çalışılmıştır.

Çalışmada dolgu malzemesi olarak standart kum (CEM Kumu) kumu, Yüksek Fırın Cürufu, aktivatör olarak NaOH ve karışım için su kullanılmıştır. Karışım için 4 farklı alkali oranı kullanılmıştır. kür sıcaklığı için ise 50, 75 ve 100 C° leri seçilmiştir. Hazırlanan numuneler 24 saat boyunca daha önce belirtilen sıcaklıklarda etüvde bekletilmiştir. Numuneler etüvden çıkarıldıktan sonra laboratuvar koşullarında bekletilmiştir. Toplamda 12 seri numune üzerinde ölçümler yapılmıştır. Deneyler ve değerlendirmeler 1., 7. ve 28. gün olmak üzere üç farklı yaşlarda fiziksel ve mekanik özellikler açısından yapılmıştır. Fiziksel özellik olarak birim hacim ağırlığı, su emme ve yoğunluk kriterlerine göre yapılmıştır. Numuneler üzerinde ultrases geçiş hızı, eğilme ve basınç dayanımı tayini deneyleri yapılmıştır.

Yukarıda bahsedilen tüm karışımlar için yapılan deneyler sonucunda; Eğilme dayanımı sonuçları 1. gün için kür sıcaklığı 50,75 ve 100 C° için 1 ila 6 MPa arasında, 7. gün için 2 ila 8 MPa arasında ve 28. gün için yine 2 ila 8 MPa arasında ölçülmüştür. Basınç dayanımları için elde edilen en büyük dayanım 28. günde 75 C° de 35 MPa olarak belirlenmiştir.

Anahtar Kelimeler: Alkali Aktivasyon, Yüksek Fırın Cürufu, NaOH, Jeopolimer

Investigation of Some Physical and Mechanical Properties of Pozzolanik Mortar Activated with Alkalis**Abstract**

The material of the last century in construction sector is undoubtedly concrete. Cement, which is the basic component of concrete, has become a product that has been discussed in recent years in terms of production costs and damage to the environment. In recent years, work on alternatives to cement has been continuing. Geopolymers are the most known of these. In this study, some physical and mechanical properties of the composite material obtained by activating the blast furnace slag, which is exposed in iron and steel plants, at different ratios and at different curing temperatures with NaOH have been investigated. In this way, an attempt was made to produce an alternative composite of concrete.

In the study, standard sand (CEM Kumu) sand, Blast Furnace slag, NaOH as activator and water for mixture were used as filling material. Four different alkali proportions were used for the mixture. and 50, 75 and 100 ° C for the curing temperature. Prepared samples were allowed to stand in the same temperature for 24 hours. The samples were kept in laboratory conditions after removal from the oven. In total, measurements were made on 12 serial samples. Experiments and evaluations were made at three different ages, 1 st, 7 th and 28 th days, in terms of physical and mechanical properties. Physical properties were made according to unit volume weight, water absorption and density criteria. Ultrasonic velocity, bending and pressure resistance tests were performed on the samples.

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As a result of the experiments for all the above-mentioned mixtures, The bending strength results were measured between 1 and 6 MPa for curing temperature of 50,75 and 100 ° C for day 1, between 2 and 8 MPa for day 7 and again between 2 and 8 MPa for day 28. The maximum strength obtained for compressive strengths was determined to be 35 MPa at 75 ° C on the 28th day.

Keywords: *Alkali activation, Blast furnace slag, NaOH, Geopolymer*

Yapay Zeka Yöntemleri Kullanılarak EMG Tabanlı Temel El Hareketlerinin Sınıflandırılması

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Özet

Bu çalışmada, yapay zeka yöntemlerinden faydalanılarak, 6 temel el hareketinin tespit edilmesi ve farklı sınıflandırma yöntemlerinin performanslarının karşılaştırılması amaçlanmaktadır. Böylelikle farklı fiziksel aktiviteleri etkin şekilde ayırt edebilen protez el tasarımı çalışmalarına katkı sağlanarak, yapay uzvun işlevselliğinin artırılması hedeflenmektedir.

Çalışmada, Christos Sapsanis ve ark. tarafından oluşturulan temel el hareketler (silindir, palmar, lateral, küresel, kanca ve uç) için EMG (Elektromiyogram) veri tabanı (The UCI Machine Learning Repository sEMG for Basic Hand movements Data Set) kullanılmıştır. Veri tabanında bulunan iki farklı kanaldan elde edilen EMG işaretlerinden, literatürde yaygın olarak kullanılan özellikler çıkarılmıştır. Bu özellikler; ortalama, standart sapma, entropi ve sıfır geçiş oranıdır. Hesaplanan özellikler kullanılarak özellik kümesi oluşturulmuştur. Her bir temel harekete ait 50 örnek, en ağırlıklı üç temel bileşenin oluşturduğu düzleme yansıtılarak örnek uzay dağılımı elde edilmiştir. Özellik kümesi k-en yakın komşuluk algoritması (k-EYK) ve doğrusal diskriminant analizi (DDA) sınıflandırıcılarına uygulanmıştır. Sınıflandırıcı çıkışları ve örnek uzay dağılımları birlikte değerlendirilmiştir. Son olarak sınıflandırıcı başarımları karşılaştırılmıştır ve yorumlanmıştır.

Sınıflandırma sonuçları silindirik ve küresel el hareketlerinin diğer hareketlere göre daha yüksek duyarlılıkla tespit edildiğini göstermektedir. Sınıflandırıcılar en çok uç hareketini tespit etmekte zorlanmışlardır. Temel bileşen dağılımları sınıflandırıcı çıkışlarını desteklemektedir. Dağılımdan, küresel ve silindirik el hareketine ait örneklerin diğer örneklerden ayrıştığı görülmektedir. Uç hareketine ait örnekler büyük oranda diğer örneklerle girişim yapmıştır. K-EYK sınıflandırıcısı DDA sınıflandırıcısına göre daha başarılıdır. Bu sınıflandırma yöntemleri için sırasıyla % 82 ve % 75 doğruluk elde edilmiştir.

Anahtar Kelimeler: yapay zeka, sınıflandırma, elektromiyogram, protez el.

Classification of EMG-Based Basic Hand Movements Using Artificial Intelligence Methods

Abstract

In this study, it is aimed to detect six basic hand movements by using artificial intelligence methods and to compare the performances of different classification methods. Thus, it is aimed to increase the functionality of the artificial organ by contributing to the studies of the prosthetic hand design, which can distinguish different physical activities effectively.

In this paper, the EMG (Electromyogram) database for basic hand movements (cylinder, palmar, lateral, spherical, hook and tip) (The UCI Machine Learning Repository sEMG for Basic Hand movements Data Set) generated by Christos Sapsanis et al. is used. The features commonly used in the literature have been extracted from EMG signals obtained from two different channels in the database. These features are mean, standard deviation, entropy, hjorth mobility, hjorth complexity, zero cross rate and autoregressive coefficients. The feature set has been generated by using the calculated features. The sample space distribution is obtained by reflecting the 50 samples of each basic movement to the plane formed by the most weighted first three principal components. The feature set is applied to k-nearest neighborhood

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algorithm (k-NN) and linear discriminant analysis (LDA) classifiers. Classifier results and sample space distributions are evaluated together. Finally, classifier performances are compared and interpreted.

The classification results show that cylindrical and spherical hand movements are detected with higher sensitivity than other movements. Classifiers are most difficult to detect palmar movements. The principal component projection supports classifier results. From the principal component projections, it is seen that the samples belonging to spherical and cylindrical hand movements are separated from the other hand movements. The samples of palmar movement are largely interfered with other hand movement samples. The k-NN classifier is more successful than the LDA classifier. Accuracies for classification methods are 94,17% and 86,17% respectively.

Keywords: *Artificial Intelligence, Classification, Electromyogram, Prosthetic Hand.*

Analytical calculation of temperature dependency of resistive losses in electric motors by using Bloch-Gruneisen approximation

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Abstract

It is well known that the mathematical and physical evaluations of resistive losses in electric motors are very important in electric and electronic engineering. In this work the temperature dependence of motor resistive losses have been analytically evaluated by using Bloch-Gruneisen approximation. The motor resistive losses with respect to the temperature changes can be controlled by given method. The accuracy of proposed algorithm has been tested by constructing a new computer program. It is demonstrated that the new analytical method for the motor resistive losses will be useful in power electronics and motor systems.

Keywords: *Power losses, Cooper resistive losses, Bloch-Gruneisen method, Electric motor*

Use of binomial expansion theorem in analytical calculation of the Einstein Relation for Disordered Semiconductors

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Abstract

The accurate computation of Einstein relation for disordered semiconductors is important to the field of modern electronic devices including homojunction and heterojunction bipolar and field-effect transistors, and solar cells. The objective of this study is to present a new analytical formula for evaluation Einstein relation using the binomial expansion theorem. The obtained results are compared with those obtained with other numerical methods in which various simplifying assumptions are made in the calculation of the Einstein relation for disordered semiconductors.

Keywords: *Semiconductor device, Einstein relation, solar cells, binomial coefficients*

3B Yazıcıda Farklı Doluluk Oranlarının PET-G Malzemeden İmal Edilen Ürünlerin Mekanik Özelliklerine ve Yüzey Pürüzlülüğüne Etkisinin İncelenmesi

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Özet

Günümüzde üç boyutlu (3B) yazıcıların geliştirilmesi ve düşük maliyetle halka kolaylıkla ulaşması sağlanmıştır. Bu kapsamda, PET-G (Polietilen tereftalat glikol) malzeme en önemli mühendislik polimerleri arasında yer almakta olup, işlenebilirlik, renklendirilebilirlik ve mekanik özelliklerinden dolayı tercih edilen bir malzemedir. 3B ürünlerin mühendislik uygulamaları açısından daha faydalı olması için imal edilen ürünlerin mekanik özellikleri ve yüzey kalitesi hakkında fikir sahibi olmak gerekmektedir. Bu nedenle, bu çalışmada 3B yazıcıda doluluk oranlarının PET-G malzemeden imal edilen ürünlerin mekanik özelliklerine ve yüzey pürüzlülüğüne etkilerinin incelenmesi amaçlanmıştır.

3B yazıcıda farklı doluluk oranlarında (% 20, % 50 ve % 80), 2600 mm/s işleme hızında ve diğer çalışma parametreleri aynı koşullarda olmak üzere PET-G malzemeden ürünler imal edilmiştir.

İmal edilen ürünlerin tek eksenli çekme testleri, sertlik ölçümleri ve yüzey pürüzlülüğü ölçümleri gerçekleştirilmiştir. Testler sonucu elde edilen veriler üzerinden karşılaştırma yapılmış ve sonuçlar analiz edilmiştir.

Anahtar Kelimeler: 3B yazıcı, PET-G, Doluluk oranı, FDM.

Investigation of 3D Printing Occupancy Rates Effect on Mechanical Properties and Surface Roughness of PET-G Material Products

Abstract

Recent developments in 3D printing are attracting wide spread interest due to easily accesible with lower cost. The present paper aims to investigate printing occupancy rates effect on mechanical properties and surface roughness of PET-G G (Polietilen tereftalat glikol) material products. Pet-G material was preferred because of its malleability , colorability and mechanical properties.

PET-G products were printed at different printing occupancy rates (20%, 50% and 80%), at processing speed of 2600 mm/s and all other operating parameters fixed same conditions on 3D printer.

Uniaxial tensile tests, hardness measurements and surface roughness measurements of the printed products were carried out. The results were analyzed and compared.

Keywords –3 D Printer, PET-G, Printing Occupancy Rate, FDM.

Anadolu Selçuklularda Köprü Yapılarının Analizi

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Özet

Bu çalışmanın amacı Anadolu Selçuklu döneminde yapılan Köprü yapılarının mimari form , strüktür, malzeme,dekorasyon ve yapı tekniği açısından analiz edilmesi ve günümüzde yapılan köprülerin tasarımında bu tarihi mirasdan faydalanması için dikkat çekmektir. Yapılan çalışmada yöntem olarak literatür taraması ile bazı örnek köprü yapılarının yerinde incelenmesi yöntemi kullanılmıştır. Bilindiği gibi, köprünün fonksiyonu bir kıyıdan ötekine ulaşımı sağlamaktır. En ilkel şekliyle, içine girilemeyen suyun üzerine kurulan bir kemerden oluşur. Bu kemerin boyutları, üzerinden aşılın suyun genişliği ile büyür yada küçülür. En sade haliyle, ana kemerli köprülerin dik çıkış ve inişli görünümü, erken Anadolu köprülerinde en çok rastlanan şekildir. Genellikle, doğal engebelerin şekil verdiği köprüler, Anadolu'da esas unsurlarıyla birbirlerine benzerler sonucuna varabiliriz. Erken devir Türk köprülerinde, hakim olan kemer şekli, 'Sivri kemer'dir. Kitabeli olan ve dolayısıyla tarihlenmesi kesinlikle yapılabilen köprülerden bazılarında, ana göz sivri formda olmakla beraber, ikinci derecedeki boşaltma gözlerinin dairesel olarak yapıldıkları izlenir. Sivri kemerlerin yanı sıra, aynı yapıda, daha az önemli açıklıklarda, dairesel kemerlerin kullanılmasını, çeşitleme arzusu olarak niteleyebiliriz. Erken Devir Türk köprülerinde kullanılan sivri kemer, daha önce, özellikle doğu ve güneydoğu Anadolu'da Romalılar ve Bizanslılar tarafından yaptırılan köprülerde de görülmektedir. Memba tarafta genellikle üçgen prizmal burun, mansap tarafta ise yarı silindirik topuk Roma ve Bizans köprüleri için de söz konusudur. Anadolu Selçuklu köprülerinin, malzeme açısından çeşitlilik göstermediği bir gerçektir. Bazı köprülerde, yakın komşu geleneklerinin etkisi ile, taşın yanında tuğla da kullanılmıştır. Sayıları az olan bu örneklerin dışında, köprülerde kullanılan malzeme taştır. Taşların örülmesinde, genellikle iyi cins kireç harcı kullanılmış ve ayrıca gerektiği yerlerde de özellikle su altında kalan yapı kısımlarında Horasan harcı bağlayıcı olmuştur. Demirin ise çok az yerde kullanıldığı görülmektedir. Çok önemli yerlerde, harçlı bağlantıların yetmeyeceği düşünüldüğünden, demirli kelepçe bağlantıları yapılmıştır. Osmanlı öncesi Anadolu Türk Köprülerinden bulunan örnekler üzerinde, yapım tekniği açısından yapılacak bir inceleme bizi şu sonuçlara götürür: Köprü kemer fomlarını veren biçim, teknik açıdan en dayanıklı olan ve en az malzeme ile gerçekleştirilebilen biçimdir. Sivri kemer, Roma çağında kullanılan dairesel kemerlere göre, daha ileri bir teknik görüş olmaktadır. Aynı zamanda sivri kemeri kullanmakla, taşıyıcı kemerlerde, daha ince, daha narin çizgiler elde edilebilmiştir.

Ahtar Kelimeler: Köprü , Anadolu Selçuklu, Yapım Tekniği

Analysis of Bridge Structures in Anatolian Seljuks

Abstract

The aim of this study is to analyze the bridge constructions made during the Anatolian Seljuk period in terms of architectural form, structure, materials, decoration and building technique and to draw attention to the utilization of this historical heritage in the design of today's bridges. The method of this study is the literature review and analyze some samples of bridges on their area. As is known, the function of the bridge is to provide access from one coast to another. In its most primitive form, it is made up of a belt built on water that can not be penetrated. The dimensions of this belt grow smaller with the width of the water overflowing. In its simplest form, the steep ascending and descending view of the main arched bridges is the most common form of early Anatolian bridges. Generally, in the result bridges that are being formed by the natural roughness are similar to each other with the essential elements in Anatolia. In the early era Turkish bridge, the dominant arch shape is 'Pointed arch'. In some of the bridges that are with inscription and thus certainly definable, it is observed that the discharge ports on the second level are made circular, while the main eye is in a pointed form. In addition to the pointed arches, in the same structure, in less important spans, we may call the use of circular arches a desire for diversity. The pointed arch used for early age Turkish bridges is seen in bridges previously built by Romans and Byzantines especially in eastern and southeastern Anatolia. On the upstream side there is usually

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a triangular prismatic nose and on the downstream side there is a semi-cylindrical heel also for Roman and Byzantine bridges. It is a fact that the Anatolian Seljuk bridges do not vary in terms of materials. On some bridges, bricks were used in addition to the stone, with the influence of close neighboring traditions. Apart from these few examples, the material used for the bridges is stone. In the knitted stones, generally good lime mortar is used and also in places where it is necessary, especially in the parts of the structure that are under water, Khorassan mortar is binding. Its seen that iron is used in very few places. In very important places, ferrous clamp connections have been made since it is thought that the mortared connections are not enough. A review of the samples from the pre-Ottoman Anatolian Turkish Bridges in terms of construction technique leads us to the following conclusions: The form that gives the bridge arch forms is the one that is most durable from the technical point of view and can be realized with the least amount of material. The pointed arch is a more advanced technical view than the circular arches used in the Roman era. At the same time, by using pointed arches, thinner and more delicate lines could be obtained in bearing arches.

Keywords: *Bridge, Anatolian Seljuk, Construction Technique*

Robotik El Kontrolü

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Özet

Günümüzde insan hayatı korumak ve kolaylaştırmak için birçok robotik sistem ve elektronik çalışmalar mevcuttur. Bu alanda yapılan çalışmaların en önemlileri insan sağlığını koruyacak türde olanlardır. Bu amaç doğrultusunda gerçekleştirilen robotik el projesinde bir insanın yapamayacağı ve tehlike içeren işlerin yapılabilmesinde büyük hizmet sunacağı düşünülmektedir. İnsan vücuduna zarar verebilecek maddelerle yapılan deneyler, bomba imha gibi durumlar buna örnek olarak verilebilir. Ayrıca hareket hassasiyetinin önemli olduğu tıbbi operasyonlarda ve endüstriyel tutucularda da geliştirilen projenin kullanılması, yapılacak işlemlerin güvenli ve pratik bir şekilde gerçekleştirilebilmesine olanak sağlayabilir.

Robotik el, birçok parçadan oluşan elektro-mekanik bir sistemdir. Bu tip sistemlerde hareket, mekanik yapıyla tahrik ve kontrolü sağlayan elektrikli parçalarla sağlanır. Bu proje, insan elinin hareketleriyle mekatronik tabanlı robotik elin kontrol edilmesi esasına dayanmaktadır. Ahşap olarak tasarlanan maket elin her bir parmağına misinalar yardımıyla servo motorlar ve hareketi taklit edilecek ele giyilen eldivene de esneklik sensörleri yerleştirilmiştir. Giyilebilir herhangi bir eldivenin üzerine yerleştirilen esneklik sensörlerinden elde edilen konum bilgileri Arduino UNO R3 mikrodenetleyicisinde işlenerek, analog giriş değerleri pozisyon bilgilerine dönüştürülür ve servo motorları kontrol edebilmek için darbe genişlik modülasyonu PWM uygulanarak servo motorlara gönderilir. Bu kontrol sinyali parmaklara misinayla bağlanmış olan servo motorların açılma pozisyonunu belirler. Böylece insan elinin yaptığı anlık hareketler robotik ele aktarılır.

Elektronik gibi alanlarda yapılan çalışmaların en önemli önceliği insan sağlığını koruyacak ve kolaylaştıracak türde olanlardır. Bu düşünce ile gerçekleştirmiş olduğumuz proje başarıyla tamamlanmış ve istenilen amaca ulaşılmıştır. Yapılan testlerde esneklik algılayıcı sensörlerin, insan elinin hareketlerini sorunsuz bir şekilde ölçebildiği görülmüştür. Projede tasarlanan robot el, üzerinde esneklik sensörleri bulunan eldiveni giyen kişinin yaptığı el hareketlerini taklit edebilmektedir.

Anahtar Kelimeler: robotik el kontrolü, arduino uno, esneklik sensörü

Robotic Hand Control

Abstract

Nowadays, there are many robotic systems and electronic studies to protect and facilitate human life. The most important studies done within this scope are the ones that would protect human health. It is thought that the robotic hand project carried out towards this purpose would provide great facilities to perform the dangerous works that a person cannot do. Circumstances such as experiments made with materials that can be harmful for the human body, bomb disposal can be given as an example. Furthermore, the usage of this project could allow safe and practical operations at medical operations and industrial holders in which the motion precision is important.

The robotic hand is an electromechanical system composed of many parts. In such systems, motion is provided by electrical components that provide mechanical drive control and control. This project is based on the principle of mechatronics-based robotic hand control with human hand movements. It is inserted servo motors at the each finger of the model designed as wood with the help of nylon thread and also flexibility sensors on the hand-worn glove that will simulate the movement. The position information from the flexibility sensors placed on the wearable glove is processed in the Arduino UNO R3 microcontroller, the analog input values are converted into position information and the pulse width modulation (PWM) is applied to the servo motors to control the servo motors. This control signal determines the

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angular position of the servo motors connected to the fingers by nylon thread. Thus, instant movements made by the human hand are transferred to the robotic hand.

The most important priority of studies done in areas such as electronics is the ones that will protect and facilitate human health. The project realized within this idea has been successfully completed and reached the intended purpose. By means of the tests, it is observed that the flexibility sensors were able to measure the movements of the hand, smoothly. The robot hand designed within the project can mimic the hand movements of a person who wears this glove having flexibility sensors on it.

Keywords: *robotic hand control, arduino uno, flexibility sensor*

Korelasyon ve Regresyon Analizleri ile Bazı Yulaf Çeşitlerinin Verim ve Kalite Parametreleri Arasındaki İlişkinin Saptanmasıİsmail NANELİ^{1*}, Mehmet Ali SAKİN¹^{1*}Gaziosmanpaşa University, Faculty of Agricultural, Field Crops, Tokat, Turkey.* ismail.naneli@gop.edu.tr

Özet

Bu çalışma, 2015-2016 vejetasyon döneminde Tokat-Kazova lokasyonunda 15 yulaf çeşidi kullanılarak yürütülmüştür. Çalışmada korelasyon ve çoklu regresyon analizi yapılarak, incelenen parametrelerin verim ve kaliteye etki düzeylerinin belirlenmesi amaçlanmıştır.

Deneme, Tesadüf Blokları Deneme Desenine göre dört tekerrürlü olarak kurulmuştur. Araştırmada incelenen; salkım çıkarma süresi, bin tane ağırlığı, bitki boyu, salkımda tane sayısı, salkımda tane ağırlığı, hektolitreye ağırlığı, metrekarede salkım sayısı, protein miktarı, tane verimi ve hasat indeksi özellikleri incelenmiştir. Tane verimi ve protein miktarı ile doğrudan ve dolaylı etkileri Korelasyon ve Çoklu Regresyon analizleriyle belirlenmiştir.

Korelasyon analizine göre; tane verimi ile salkım çıkarma süresi ($r=0.391^{**}$), salkımda tane ağırlığı ($r=0.309^{*}$), salkımda tane sayısı ($r=0.289^{*}$), hasat indeksi ($r=0.609^{**}$) arasında önemli ilişkiler saptanmıştır. Kalite bakımından protein miktarı ile bin tane ağırlığı ($r=0.322^{*}$) arasında önemli ilişki saptanmıştır. Tane verimi ile salkım çıkarma süresi, salkımda tane ağırlığı, salkımda tane sayısı, hasat indeksi ve protein miktarı ile bin tane ağırlığı arasında Regresyon katsayısının 1'e yakın olduğu saptanmıştır. Elde edilen sonuçlara göre yapılacak ıslah çalışmalarında tane verimi ve kalite bakımından ebeveyn olarak salkım çıkarma süresi, salkımda tane ağırlığı, salkımda tane sayısı, hasat indeksi ve protein miktarı yüksek olan hatların seçilmesi başarıyı artıracaktır.

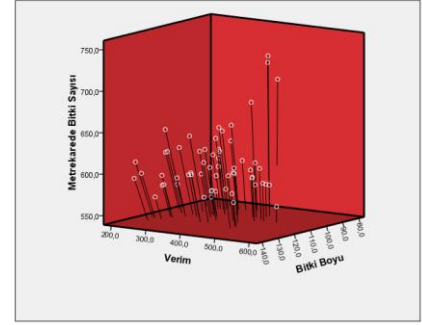
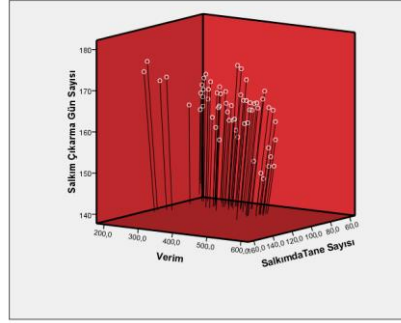
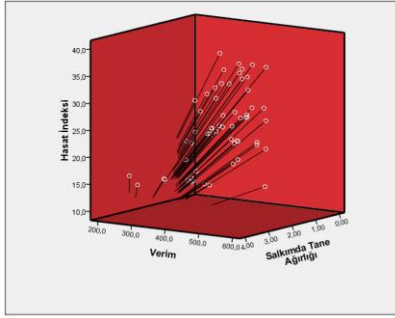
Anahtar Kelimeler: Yulaf, Verim, Kalite, Korelasyon, Regresyon.

Correlation and Regression Analysis with Determination of Relation between Yield and Quality Parameters of Some Oat Varieties**Abstract**

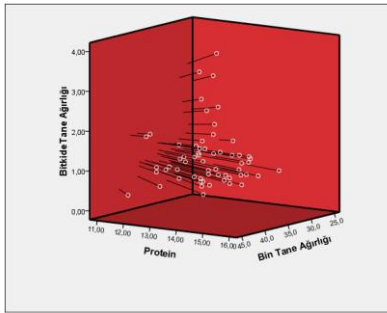
This study was carried out using 15 oat varieties in the Tokat-Kazova location during the 2015-2016 vegetation period. Correlation and multiple regression analysis were carried out in the study and it was aimed to determine the effect levels of the examined parameters on yield and quality. The trial was set up in four replications according to the randomized blocks trial design. In the research investigated parameters such as; days to heading, thousand grain weight, plant height, the number of grain per panicle, weight of grain per panicle, hectoliter weight, the number of panicles per square meter, protein content, grain yield, and harvest index. Direct and indirect effects on grain yield and protein content were determined by Correlation and Multiple Regression analyzes. According to the correlation analysis; Significant relationships were determined between grain yield, days to heading ($r = 0.391^{**}$), the number of grain per panicle ($r = 0.309^{*}$), the number of grain per panicle ($r = 0.289^{*}$) and harvest index ($r = 0.609^{**}$). In terms of quality, there was a significant relation between protein amount and thousand grain weight ($r = 0.322^{*}$). Regression coefficient was found to be close to 1 between grain yield and days to heading, the number of grain per panicle, weight of grain per panicle, harvest index and between protein quantity to thousand grain weight. According to the results obtained, selection of lines with high days to heading, the number of grain per panicle, weight of grain per panicle, harvest index and protein content as the parent in terms of yielding and quality in breeding works to be done will increase success.

Analyses

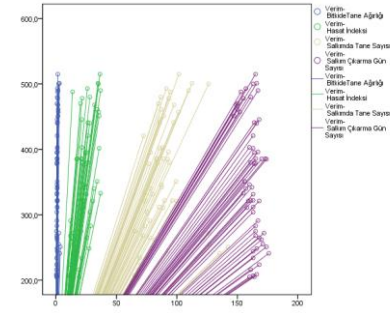
Regression



Quality Regression



Correlation



Keywords: Oat, Yield, Quality, Correlation, Regression.

Positive Contribution of Technological Developments to Economic Growth

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Abstract

It is worth noting the difference between the added value of technology and the savings and heavy industry industrialization.

In the study, the positive correlation between technology and economy was given through tables and graphs.

In classical economic understanding, technology that is not included in the basic components of GDP, Thanks to Solow's work, it was seen to be a much more important factor than the other items calculated within the GDP. In this study, it is concluded that economic growth and technology are the right proportion.

GDP is one of the indicators of the economic magnitude of a country. GDP means the value in terms of the currency of all final goods and services produced within a certain period of time within the borders of a country. In terms of production, GDP is seen as a collective variable, produced by capital, labor, and sometimes by human capital. However, Solow has calculated a factor generalized to all production factors with a calculated coefficient, and this remaining factor, called total factor productivity, is seen as the most influential factor in the long-term or potential growth rate of the economy.

In this study, it was concluded that increasing savings and industrialization based on heavy industrialization had less precautionary than making technological advances.

Keywords: *Technology, Savings, Industry, GDP*

Advantage of Competitive: Economy of Innovation

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Abstract

Innovation products are entered with standard products and they are not able to come out of the competition successfully.

The inter-company economy market was created through tablars and the production and profit phases of the innovation products against the standard products were shown and interpreted through the tables.

Innovation products entered the marketplace very quickly. As a result, there has been a rapid change in the current economy market. Innovation products have greatly changed the habits of people and companies. And innovation has been achieved as a result of a significant advantage among companies.

Today, creating competitive advantage; not by selling standard products to global markets, but by creating new products and services and making them marketable. Innovation economy can be defined as the whole of the economic activities that innovation-oriented competitive advantage, productivity increase and production relations become the basic dynamics. innovation covers all processes of science and technology effectiveness. The aim is that an idea is transformed into theory, action, and outcome, and this benefit is combined with a marketable, concrete output. In other words, innovation is not a simple meaningful renewal, but a process that starts with the theoretical phase of renewal and includes the product of innovation and accepts the ability to be marketed.

In this study, new innovation products that create competitive advantage are analyzed, and market scales held by innovation are analyzed. Ultimately, the economy market has reached the conclusion that it is under the control of companies that produce high innovation products.

Keywords: *Innovation, Production, Competition*

Sample Preparation Techniques of Si₃N₄-Ti Joints for SEM and TEM CharacterizationOrkun Tunçkan^{1*}

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Abstract

Some of the ceramic and metallic materials such as Si₃N₄ and Ti have several different advantages such as high strength to weight ratio, corrosion resistance and chemical inertness at elevated temperatures. After the evaluation of these advantages and industrial needs for both Si₃N₄ and Ti materials, reliable joining techniques can be utilised since they have complementary advanced properties. In this study, Si₃N₄ and Ti was joined using with capacitor discharge joining technique. Afterwards, SEM and TEM sample preparation techniques were applied to the joints for microscopic characterization.

The materials used in this study were commercial Ti foils (99.9% pure, Goodfellow Ltd) and Si₃N₄ pieces. Si₃N₄ ceramics were joined by using the capacitor discharge joining technique with 10 µm thick Ti foil as an interlayer. After joining, joints were cut perpendicular to the width of each joint for SEM investigations and mounted in bakelite. Then samples were prepared by polishing to start with the 9 µm diamond suspension down to 250 nm colloidal silica surface finish by using automatic polishing machine (STRUERS). For thin TEM sample preparation, the focused ion beam (FIB)-SEM (FEI-Nova 600 NanoLab DualBeam™) technique was used by selecting a region from the interface of the heat treated Si₃N₄-Ti joint on the SEM sample. Firstly, selected interface containing both Si₃N₄ and Ti was coated with a thin strip of protective platinum (Pt) layer. Then, surface was bombarded with gallium (Ga) ions from both sides of the protective layer. After, the sample was cut from the sides and bottom and lifted out by a microprobe and then soldered to the TEM grid for final milling.

Sample preparation techniques are crucial process for qualitative and quantitative SEM and TEM analysis. Otherwise, nature of chemical reactions that can occur at the interfaces and new phase formations can not be observed using with microscopic analysis. In this study, Si₃N₄ and Ti joints were successfully bonded by using a capacitor discharge technique and quality of joining and possible phase formation was investigated, Based on the back scattered electron image, Si₃N₄ was well bonded to Ti, also cracks and voids were not observed at the interlayer and into the ceramic part. In addition, SEM analysis showed that new phase formations were not detected at the interface and inner part of the Ti foil. However, according to TEM analyses that having a better spatial resolution together with quantification capabilities, a very thin reaction layer (50 nm) consisting of continuous Ti₃N₂ layer next to Si₃N₄ interface followed by dendritic Ti₃N particles isolated by Ti_xSi_yN phase was formed at the Ti interlayer.

Keywords: *Si₃N₄, Ti, Capacitor discharge joining, Sample preparation techniques, SEM and TEM investigation*

Onarım Harcında Atık Tuğlanın Agregata Olarak Kullanılabilirliğinin İncelenmesi

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Özet

Somut kültürel miraslarımızdan olan tarihi yapılarımızın koruma uygulamalarında çimento esaslı bağlayıcıların kullanılması son dönemlerde yaygınlaşmıştır. Tarihi yapı koruma uygulamalarında ağırlıklı olarak kireç harcı ve doğal puzolan takviyeli harçlar kullanılmalıdır. Bu harçların önemli kısmında tuğla tozu veya tuğla kırıkları harca katılarak puzolanik özellik göstermesi sağlanmaktadır. Bu çalışmada tarihi yapıların onarımında kullanılan kireç harcında dolgu malzemesi olarak kullanılan kumun farklı büyüklükleri tuğla kırıkları ile ikame edilerek harç dayanımına etkisi incelenmiştir.

Onarım harçlarının üretiminde 0-6 mm dere kumu, kırılarak 0-6 mm aralığa getirilen atık tuğla kırığı, bağlayıcı olarak kireç ve şehir şebeke suyu kullanılmıştır. Öncelikle onarım harcını oluşturan kum ve tuğla kırıkları için elek analizleri yapılarak granülometri eğrileri elde edilmiştir. Daha sonra karışıma girecek kum fraksiyonundan 0-1, 1-2 ve 2-4 mm olmak üzere üç elek aralığı seçilmiş ve yerine laboratuvarında kırılarak elde edilmiş tuğla kırıkları (Tuğla pirinci) ikame edilmiştir. Tuğla kırığı ikamesi %20, %40, %60, %80, %100 oranlarında seçilmiştir. Sadece dere kumu ve kireçten oluşan şahit harç serisiyle birlikte toplamda 16 seri harç üretilmiştir. Üretilen 16 seri onarım harcı üzerinde gerçekleştirilen deneylerle harçların fiziksel ve dayanım özellikleri belirlenmiştir. Değerlendirme 28, 56 ve 180 gün olmak üzere üç farklı yaşlarda fiziksel ve mekanik özellikler açısından yapılmıştır. Onarım harçları üzerinde birim hacim ağırlığı, su emme ve yoğunluk deneyleri yapılarak fiziksel özellikleri tespit edilmiştir. Onarım harçlarının dayanım özellikleri kapsamında da ultrases geçiş hızı, eğilme ve basınç dayanımı tayini deneyleri gerçekleştirilmiştir.

Yukarıda bahsedilen tüm karışımlar için yapılan deneyler sonucunda; Eğilme dayanımı değerlerinin 1MPa altında kaldığı, basınç dayanımı değerlerinin ise 2 MPa ile 5 MPa arasında olduğu tespit edilmiştir. En yüksek dayanım değerleri %40 ve %60 tuğla kırığı ikameli onarım harçlarında elde edilmiştir.

Anahtar Sözcükler: Tuğla kırığı, Onarım harcı, Kireç, Dere kumu

Examination of Usability of Waste Bricks as Aggregate for Repair Mortar

Abstract

The use of cement based binders in conservation practices of our historical structures, which are our tangible cultural heritage, has become widespread in recent years. Lime mortar and natural pozzolan reinforced mortars should be used predominantly in historical building conservation applications. Most of these mortars are provided with pozzolanic properties by adding brick dust or brick fragments. In this study, the effect of mortar on the mortar resistance was investigated by substituting different sizes of bricks for the use of lime mortar used in the repair of historic buildings.

0-6 mm river sand in the production of repair mortars, waste brick fragment broken to 0-6 mm range, lime as a binder and network water were used. First a sieve analysis for sand and broken bricks forming the repair mortar grading curve were obtained. Then the mixture will enter the sand fraction 0-1, 1-2 and 2-4 mm sieve aperture including three selected and obtained in the lab broken broken bricks (Bricks rice) substituted. Substitution of broken brick 20%, 40%, 60%, 80%, were selected on 100%. A total of 16 series of mortars have been produced with the witness series consisting of only river sand and lime. The physical and strength properties of the mortars were determined by experiments carried out on the 16 serial repair mortars produced. The evaluation was made at three different ages, 28, 56 and 180 days, in

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terms of physical and mechanical properties. Physical properties of the repair mortars were determined by carrying out bulk density, water absorption and density tests. Strength properties of the repair mortar under ultrasonic pulse rate, the determination of flexural and compressive strength tests were performed.

As a result of the experiments for all the above-mentioned mixtures, the flexural strength values were found to be less than 1 MPa and the compressive strength values were found to be between 2 MPa and 5 MPa. The highest strength values were obtained in repair mortars with 40% and 60% brick fragment.

Keywords: *Brick fragment, repair mortar, lime, river sand.*

RA-SMSM Tasarımı ve Mevcut Topolojilerin Karşılaştırılması

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Özet

Enerjinin verimli olarak kullanılması giderek önem kazanan bir konudur. Günümüzde tüketilen enerjinin büyük çoğunluğu elektrik motorları tarafından kullanılmakta ve bu elektrik motorlarının çoğunluğunu asenkron motorlar oluşturmaktadır. Sağlam, güvenilir ve verimli olmaları nedeni ile tercih nedeni olan bu motorlar verimliliklerine göre uluslararası kuruluşlar tarafından standardize edilmekte ve düşük verimli motorların kullanımı Avrupa'da yasaklanmış bulunmaktadır. Birçok büyük motor üreticisi standartlara göre düşük verimlilik sınıfında yer alan ürünlerinin üretimini durdurmuştur. Bilim, Sanayi ve Teknoloji Bakanlığı 2015 yılı verilerine göre Türkiye'de tüketilen elektriğin %36'sı elektrik motorları tarafından tüketilmektedir. Buda bize elektrik motorlarının verimindeki her %3'lük artışın, ülkenin enerji ihtiyacını %1 civarında azaltacağını göstermektedir. Bilim, Sanayi ve Teknoloji bakanlığı ülkemiz sanayisinde 15 milyon civarı verimsiz motor kullanıldığı belirlenmiş olup, bu motorların verimli motorlar ile değişimi konusunda 2015 yılında "Düşük Verimli Elektrik Motorlarının Dönüşümü Programı" nı hayata geçirilmiştir.

Günümüzde IE3 verimlilik sınıfı asenkron motorlar giderek endüstride yaygınlaşmaktadır. Buna ek olarak teknolojik ilerlemelerle beraber IE4 sınıfı Premium verimli motorlarda birçok motor üreticisinin katalogunda yer almaya başlamıştır.

IE4 verimlilik sınıfı elektrik motorları yapı olarak büyük oranda asenkron motorlar ile benzerlik göstermekle beraber kısa devre kafesli rotor gövdesinde sabit mıknatıslarda yer almaktadır. Bu hibrit yapısı ile asenkron motorlar gibi doğrudan şebekeden beslenerek kendi başına kalkış yapabilen bu motorlar, aynı zamanda asenkron motorlara göre daha yüksek güç yoğunluğuna sahiptirler. Dolayısı ile söz konusu motor yapısı ile motor gövdesinden daha fazla güç elde edilmesi söz konusudur. Diğer bir yandan bu motorlar kalkış sonrasında senkron motor gibi çalışarak kararlı bir çıkış devri sağlamaktadırlar.

Yapılan bu çalışma kalkış esnasında asenkron motor gibi şebekeye direkt bağlanarak yol alabilen, kalkış sonrasında ise rotor elektriksel ve mıknatıslanma kayıpları olmadan senkron hızda yüksek verimle çalışabilen hibrit tipteki RA-SMSM tasarımı ile ilgilidir. Çalışma kapsamında mevcut RA-SMSM topolojileri incelenmiş ve yaygın olarak tercih edilen tiplerinin tasarımı yapılarak performans karakteristikleri karşılaştırılmıştır. Tasarım sürecinde analitik yöntemler kullanmakla beraber performans testleri için motor tasarımları FEA yazılımı ortamında modellenerek analizleri yapılmıştır.

Anahtar kelimeler: Şebeke kalkışlı, Sabit mıknatıs, Senkron motor

LS-PMSM Design and Comparison of Existing Topologies

Abstract

The efficient use of energy is an increasingly important issue. Today, the vast majority of energy consumed is used by electric motors, and the majority of these electric motors are asynchronous motors. These motors, which are preferred due to their robustness, reliability and efficiency, are standardized by international organizations according to their efficiency and the use of low-efficiency motors are banned in Europe. Many major motor manufacturers have stopped production of products in the low efficiency class according to standards. According to the data of Ministry of Science, Industry and Technology for 2015, 36% of electricity consumed in Turkey is consumed by electric motors. And this shows us that every 3% increase in the efficiency of electric motors will reduce the energy requirement of the country by 1%. The Ministry of Science, Industry and Technology has determined that about 15 million unproductive motors

have been used in our country's industry and the "Transition Program of Low Efficiency Electric Motors" has been passed in 2015 regarding the exchange of these motors with more efficient ones.

In our day, asynchronous motors of the IE3 efficiency class are becoming increasingly used in industry. In addition, thanks to technological advances, IE4 class premium efficient motors also have begun to take place in the catalogs of many motor manufacturers.

The IE4 class premium efficient electric motors as the structure are similar to the asynchronous motors in many respects, but there are also permanent magnets on the rotor body with short circuit cage. With this hybrid structure, these motors, such as asynchronous motors, which can be directly driven from the line and start on their own, also have higher power density than the asynchronous motors. Therefore, it becomes possible to obtain more power from the motor body by the aforementioned motor structure. On the other hand, these motors operate as synchronous motors after start-up and thus provide a stable output rpm.

This study relates to the design of the LS-PMSM hybrid motors, which, during start-up, can be directly connected to the line like asynchronous motors and can be operated at high efficiency at a synchronous speed after start without electric and magnetic losses in the rotor. Within the scope of the study, the existing LS-PMSM topologies were examined and performance characteristics were compared by designing commonly preferred types. Along with the use of analytical methods in the design process, for performance tests, the motor designs was modeled and analyzed in the FEA software environment.

Keywords: *Line start, Permanent magnet, Synchronous Motor*

Test Tabanlı Yazılım Geliştirme Sürecinde Türkiye’de Selenium Kullanımı

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Özet

Araştırmanın Amacı : TDD, günümüzde Test First Development, Test Driven Design ve Test Driven Development şeklinde farklı isimlerle anılmaktadır. İlk olarak Kent Beck tarafından XP - Extreme Programming ile ortaya atılmış olması ile birlikte, günümüzde Çevik - Modern Yazılım olarak bilinen Agile Yazılım geliştirme süreçlerinin de göz bebeği olmuştur. Test denildiğinde ilk akla gelen, yazılımcıların geliştirmiş olduğu yazılımı test uzmanlarının kontrol etmesidir. Bunun amacı, geliştirilen yazılımın hatalardan arınmış ve daha performanslı bir şekilde çalışmasıdır. Test süreçlerini gerçekleştirmek adına piyasada bir çok yazılım ve araç bulunmaktadır. Bu çalışmanın amacı, açık kaynak kodlu test aracı olan Selenium’un günümüzde kullanım oranlarının Türkiye’deki kullanım oranları ile karşılaştırılması ve bu test aracının sahip olduğu performansın Türkiye’de nasıl artırılabilirliği tartışılmıştır.

Yazılım geliştirme döngüsünde kod kalitesini arttırmak, bütünlüğünü sağlamak ve okunabilirliği arttırmak için test süreçlerine ihtiyaç duyulmaktadır. Yazılım test süreçlerinde kullanılmak üzere geliştirilen ve Türkiye’de bilişim sektöründe yavaş yavaş kullanılmaya başlanılan bir test aracı olan Selenium, tamamen Web Tabanlı uygulamaların testlerinin Browser/Tarıyıcı üzerinden yapılmasını sağlayan bir araçtır. Test senaryolarını gerçekleştirebilmek için temel seviyede HTML bilgisi gerekmektedir. Aynı zamanda, bu senaryoları oluştururken senaryonun girdi ve gereksinimlerine ihtiyaç duyulmaktadır. Bu şekilde oluşturulan farklı senaryolar gelecekte kullanılmak üzere kaydedilebilir. Bu çalışmada öncelikle test senaryolarının nasıl oluşturulduğu, daha sonra bu tür senaryolarda kullanılacak bir test aracı olan Selenium’un yapısı ve son olarak bu test aracı ile birlikte örnek olabilecek bir uygulamanın adımları hakkında bilgi verilecek ve Türkiye için bu aracın kullanılabilirliği hakkında tartışılacaktır.

Bu çalışmada tüm web sitelerinin testlerinde kullanılacak olan açık kaynak kodlu bir test aracı olan Selenium’un uygulama desteği, programlama yeteneği, nesne tabanlı diller tarafından kullanılabilirliği gibi üstünlükleri anlatılmış, kullanımı hakkında örnekler verilmiş ve Türkiye’de Selenium kullanımının geleceği tartışılmıştır. Bu test aracının sahip olduğu güçlü yetenekleri sayesinde bir sonraki test senaryo çalışmalarında örnek olabilecektir.

Anahtar Kelimeler: Test Tabanlı Yazılım Geliştirme, TDD, Test Amaçlı Web Uygulamaları, Selenium.

The Use of Selenium in Turkey As Test Based Software Development

Abstract

TDD is in the form referred by different names like; Test First Development, Test Driven Design or Test Driven Development. It has been come up with XP - Extreme Programming by Kent Beck, Agile today known as Modern Software Agile software development processes has been the pupil of the eye. The first thing that comes to mind when talking about testing, software developers develop software, software testers test the software by using another software. Aim of this, the developed software is free from mistakes and works more efficiently. There are many software and tools on the market to carry out the testing processes. The aim of this study, Selenium, the open source code testing tool, is compared with the usage rates in Turkey today and how the performance of this test tool can be improved in Turkey.

Testing processes are needed to increase code quality, maintain integrity and improve readability in the software development cycle. Selenium, a test tool developed for use in software testing processes and gradually being used in the IT sector in Turkey, is a tool that allows you to test Web-based applications through the scanner. HTML knowledge is required at the basic level in order to be able to execute test scenarios. At the same time, the input and requirements of

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the scenarios are needed when creating this scenario. Different scenarios created in this way can be saved for future use. In this study, firstly, how test scenarios are constructed, then the structure of Selenium, a test tool that can be used in such scenarios and finally the steps of an application that can be an example with this test tool and the availability of this tool for Turkey.

In this study, Selenium which is an open source code test tool which can be used in the tests of all web sites is explained the advantages such as application support, programming ability, usability by object based languages, examples of its use and the future of the use of Selenium in Turkey has been discussed. Thanks to the powerful capabilities of this testing tool, it will be an example in the next test scenarios work.

Keywords: *Test Based Software Development, TDD, Test Driven Development, The Purpose Of Testing Web Application, Selenium.*

Kontrol Sistemleri Eğitiminde Tasarım Örneği: Akıllı Ev Uygulaması

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Özet

Hızla gelişen teknoloji ve nüfus artışları beraberinde tüketim ve rekabet gibi faktörlerin de artmasına neden olmaktadır. Meydana gelen değişimler insanoğlunu daha hızlı, daha kolay, daha ucuz nasıl üretebilirim gibi soruların cevaplarını aramaya yönelmektedir. Bu açıdan bakıldığında sistemlerin kontrolünün önemli bir yere sahip olduğu görülmektedir. Sistemlerin kontrolü dendiğinde akla ilk olarak programlanabilir cihazlar, algılayıcılar ve eyleyiciler gelmektedir. Teknik eğitim verilen kurumlarda bu sistemler ayrıntılı olarak anlatılmakla birlikte iş piyasasının bu konuları aktif olarak kullanabilen özellikte personele önem verdiği görülmektedir. Bunun için öğrencilerin öğrendiklerini laboratuvar uygulamaları ile pekiştirmeye ihtiyaçları vardır. Bu çalışma ile öğrencilerin bir akıllı ev tasarımları, programlama becerilerinin gelişmesi, motivasyonlarının ve özgüvenlerinin artması hedeflenmektedir.

Bu çalışma Kastamonu Üniversitesi Taşköprü Meslek Yüksekokulu Elektronik ve Otomasyon Bölümü Sistem Analizi ve Tasarımı dersinde bölüm laboratuvarlarında gerçekleştirilmiştir. Öğrenciler ile birlikte akıllı ev tasarımında programlanabilir cihaz olarak Arduino kullanılmasına karar verilmiştir. Akıllı evde bulunması istenen özellikler belirlenmiştir. Belirlenen özellikleri gerçekleştirmek için gerekli malzemeler tespit edilmiştir. Kullanılacak olan malzemeler ile istenen işleri yapacak olan arduino yazılımı bilgisayar ortamında hazırlanmıştır. Yazılımın doğru çalıştığı arduino'ya yüklenerek test edilmiştir. Proje laboratuvar ortamında gerçekleştirildiği için maket bir ev kullanımı tercih edilmiştir. Sistem maket ev üzerine kurularak gerçekleştirilmiştir. Yapılan çalışmanın öğrenciler üzerindeki etkisini belirlemek için yarı yapılandırılmış mülakat formu kullanılmış ve katılımcılar bütün sorulara gönüllü olarak cevap vermişlerdir.

Çalışmanın sonucunda maket ev üzerine akıllı ev tasarımı gerçekleştirilmiş ve çalıştırılmıştır. Derslerde programlanabilir denetleyicilerin kullanımı ile öğrenciler mesleklerine olan ilgilerinin arttığını, derslere olan ilgilerinin arttığını, dersin daha rahat anlaşıldığını, aldıkları eğitimi desteklediğini, kendilerine olan güvenlerinin arttığını, programlama ve problem çözme becerilerinin geliştiğini belirtilmiştir.

Anahtar Kelimeler: *Programlanabilir denetleyiciler, Kontrol sistemleri, Mesleki eğitim, Sistem analizi ve tasarımı.*

Design Example in Control Systems Education: An Application of Smart Home

Abstract

With the result of factors such as rapidly evolving technology and population growth, consumption and competition is increasing. End of changes that come to the square lead human to quest for answers to questions like how to produce faster, easier, cheaper. From this point of view it appears that control of the systems has an important place. Programmable devices, sensors and actuators has been came to mind when to saying controlling systems. These systems are explained in detail in the institutions that are given at technical training, and the labor market attaches importance to the personnel who can use these subjects actively. For this, students need to reinforce what they learn with laboratory practices. This study aims at designing a smart home for students, increasing the development of programming skills, motivation and self-confidence.

In this study, the project of smart home system design made out in department laboratories in System Analysis and Design lesson of Electronics and Automation Laboratory of Taşköprü Vocational School of Kastamonu University. An opinion and experience are presented about the effects of this project in education and the effects on students. With the participation of students, as a programmable device Arduino was decided to use for designing smart home project. The features required to be in a smart home have been identified. The materials have been identified that are necessary for

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to perform the specified features. The arduino software is prepared in computer environment that will do the required work with the materials to be used. The software was tested to perform correctly by loading arduino. Since the project was carried out in a laboratory environment, a model house was preferred. The system was built on the model of smart house. A semi-structured interview form was used to determine the impact of the work on the students, and participants voluntarily responded to all questions.

At the end of the work, a smart house design on model house was realized and run. It has been stated that the use of programmable controllers in the lessons increases the students' interest about the professions, increases the interest of lectures, improves the understanding of lesson, supports the education, increases their confidence and develops programming and problem solving skills.

Keywords: *Programmable controllers, Control systems, Vocational education, System analysis and design.*

Drought and Salinity Stresses in Cultivated Medicinal and Aromatic Plants after Being Collected From Nature

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Abstract

Detection sensing in plants that exposed salt stressed, by Spectral measurements

In this work, by applying the salt solution of 50 mM, 100 mM, 150 mM and 200 mM, cultivated comfrey (*Symphytum officinale* L.) plants were allowed to enter stress under greenhouse conditions for 6 weeks. Experiment were conducted as a randomized complete design method with three replicates. Depending on the stresses, the differences in spectral reflectance and absorption of the plants were measured with a spectroradiometer.

Between 400- 700 nanometers (Visible Region) and 720-800 nanometers (NIR Region), the spectral signature of the plants showed a regular variation due to the salt content. In other wavelength ranges, no linear behavior was observed due to the amount of salt.

Keywords: *Comfrey, enzyme, remote sensing, terrestrial spectral*

SiAlON/Ag/Cu/Ag/WC-Co Joints Bonded by Spark Plasma Sintering

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Abstract

Aim of this study is to obtain SiAlON/Ag/Cu/Ag/WC-Co joints by using spark plasma sintering (SPS) and characterize of the samples with scanning electron microscopy (SEM) techniques. SPS is a type of electric discharge sintering or pressure sintering method based on the high temperature plasma. Because of these properties SPS can be used as a joining different materials in different combination such as ceramics, metals and composites. This technique also makes joining time shorter in comparison to other techniques such as diffusion bonding or active metal brazing.

The materials used in this study were commercial Cu and Ag foil (99.9% pure, Goodfellow Ltd), WC-Co and SiAlON pieces. The specimens to be joined were cut into 6 mm x 12 mm tiles and 4 mm thickness from the bulk materials using a diamond wafering saw. Afterwards, the joining surfaces of the WC-Co and SiAlON samples were mounted in bakelite and the mounted specimens for SEM investigations were prepared by polishing to start with the 9 µm diamond suspension down to 250 nm colloidal silica surface finish by using automatic polishing machine (STRUERS). Before joining, the substrates and the foils were ultrasonically cleaned by using ethanol for 5 minutes to remove any contamination from the surface of both pieces. Then WC-Co and SiAlON was joined by SPS with 10 µm thick Ag and Cu foils as an interlayer at 950°C and 12 MPa under vacuum. After joining, joints were cut perpendicular to the width of each joint for SEM investigations then mounted in bakelite and surface finish was done by using automatic polishing with the same parameters prior to joining.

In this study, SiAlON/Ag/Cu/Ag/WC-Co joints were successfully bonded with 10 µm thick Ag and Cu foils by using SPS technique. Based on the back scattered electron image, cracks and voids were not observed along the interlayer and into the WC-Co and SiAlON parts. Also, some part of Ag and Cu metallic foil was diffused towards to WC-Co side. In addition, SEM analysis showed that new phase formations were not detected at the interface and inner part of the WC-Co or SiAlON side.

Keywords: SiAlON, WC-Co, Ag and Cu, Spark plasma sintering, SEM characterization

Yönlendirilmiş Hoparlör Tasarımı

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Özet

Akustik hüzmeye oluşturma yöntemlerinin son yıllardaki hızlı gelişimiyle, yönlü hoparlör sistemlerinin uygulama alanları da artmıştır. Söz konusu sistemler giyilebilir teknoloji ürünlerinde, tanıtım ve reklam çalışmalarında, askeri, sivil ve mühendislik uygulamaları gibi ses yönlendirilmesine ihtiyaç duyulan tüm alanlarda, ses kirliliğini de azaltmak amacıyla kullanılmaktadır.

Bu çalışmada, sesi geniş bir alana yaymak için tasarlanmış hoparlörlerin aksine, daha küçük bir alana yüksek yoğunlukta odaklanan bir ses sinyali yaratmak istenmektedir. Bu amaçla, insan kulağının duyamadığı frekanslarda üretilen bir sinyalin üzerine, duyabildiğimiz aralıktaki ses sinyali bindirilerek, ilgili hedefe gönderilmiştir. Tasarımda, havanın doğrusal olmayışı ve ultrasonik dalga boyları kullanılarak, 150 adetlik 40 kHz rezonans frekanslı ultrasonik dönüştürücülerden oluşan bir dizin ile dar hüzmeli bir ses sinyali elde edilmiştir.

Sonuç olarak, arzu edilen yönde ve şiddette, dar açıda ve yüksek doğrusallıkta çalışan yönlü bir hoparlör tasarımı gerçekleştirilmiştir.

Anahtar Kelimeler: Parametrik Hoparlör, Ultrasonik Dönüştürücü, Yönlendirilmiş Ses Sinyali.

Directional Speaker Design

Abstract

With the rapid development of acoustic beam forming methods in the recent years, the field of application of directional speaker systems has also increased. These systems are used for the purpose of reducing voice pollution in all areas where the sound directing is needed such as smart wear technology products, promotion and advertisement studies, military, civil and engineering applications.

In this study, unlike loudspeakers which are designed to spread the sound over a large area, it is desired to create an audio signal that focuses on a smaller area at high density. For this purpose, it has been forwarded to the target by adding an audio signal in the range we can hear onto a signal which is generated in the frequencies that the upper audible limit of human hearing. In the design, a narrow-beam audio signal is obtained with a sequence of 150 ultrasonic transducers with resonance frequency of 40 kHz using the nonlinear nature of the air and the ultrasonic wave length.

As a result, a directional loudspeaker design operating in the desired direction and volume and a narrow angle and high linearity has been created.

Keywords: Parametric Speaker, Ultrasonic Transducer, Directional Audio Signal.

Uçak Bakım Faaliyetlerinde Tahribatsız Muayene Uygulamaları

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Özet

Uçak bakım faaliyetleri bir uçağın, motorunun veya sisteminin uçuşa elverişli ve çalışır durumda tutulması için gerekli olan uygulamalar şeklinde tanımlanmaktadır. Tahribatsız muayene uygulamaları da uçak bakım faaliyetleri bünyesinde gerçekleştirilen uygulamalardan biridir. Tahribatsız muayene petrol, kimya sanayi, taşımacılık ve uçak bakım faaliyetleri gibi birçok alanda, malzeme ve sistemlerin yapılarına herhangi bir zarar verilmeden tahribatsız bir şekilde kontrol edilmesinde kullanılmaktadır. Bu çalışmada farklı uçak motor parçalarının sıvı penetrant ve manyetik parçacık yöntemleri gibi farklı tahribatsız muayene yöntemleri ile kontrol edilmesi incelenmiştir.

Uçak motor parçaları çalışmaları sırasında farklı yükleri taşıyan ve farklı malzemelerden üretilmişlerdir. Bu parçaların yapılarında bulunabilen hata veya süreksizlikler zamanla ilerleyerek arızalanmalarına, hasarlanmalarına yol açabilir. Bu yüzden hata veya süreksizliklerin belirli bir kritik boyuta ilerlemelerinden daha önce belirlenmeleri ve tespit edilmeleri gerekmektedir. Uçak bakım faaliyetlerinde bünyesinde gerçekleştirilen tahribatsız muayene uygulamaları ile bu hata ve süreksizlikler belirlenebilmektedir. Bu çalışmada farklı uçak motor parçaları, sıvı penetrant ve manyetik parçacık test yöntemleri uygulanarak kontrol edilmiştir. Uygulanacak olan tahribatsız muayene yönteminin seçilmesi çok önem arz etmektedir. Bunun nedeni malzeme ve hata özelliklerine bağlı olarak tahribatsız muayene yöntemlerinin etkinliklerinin ve hassasiyetlerinin birbirlerinden farklı olmasıdır. Çalışmada uygulanan sıvı penetrant ve manyetik parçacık muayene yöntemleri, uçak bakım faaliyetlerinde yaygın olarak kullanılan tahribatsız muayene yöntemlerinden ikisidir. Sıvı penetrant muayene yöntemi gözeneksiz malzemeler dışındaki tüm malzemelerdeki yüzeye açık olan süreksizliklerin belirlenmesinde uygulanabilir. Manyetik parçacık ile muayene yöntemi ise çelik gibi ferromanyetik özelliğe sahip malzemelerdeki yüzeye açık ve yüzeyin hemen altındaki süreksizliklerin belirlenmesinde uygulanabilir. Çalışmada bu iki yöntem kullanılarak farklı uçak motor parçaları kontrol edilmiş, uçak bakım el kitabı doğrultusunda incelemeler yapılmıştır.

Sıvı penetrant ve manyetik parçacık muayene uygulamaları ile gerçekleştirilen kontrol işlemlerinde motor parçalarında bazı süreksizler tespit edilmiş, yapılan inceleme işlemleri sonucunda bu süreksizliklerin korozyon ve küçük çatlaklar olduğu belirlenmiştir.

Anahtar kelimeler: uçak bakım, tahribatsız muayene yöntemi, sıvı penetrant yöntemi, manyetik parçacık yöntemi

Non-Destructive Testing Applications in Aircraft Maintenance

Abstract

Aircraft maintenance is defined as the actions required for restoring or maintaining an aircraft, aircraft engine or aircraft component in an airworthy and serviceable condition. Non-Destructive testing is one of the inspection methods performed on the aircraft maintenance operations. Non-Destructive testing is used to examine materials or components without destroying those materials or components throughout broad fields such as, transportation, petrochemical plants and aircraft maintenance etc. In this study, different aircraft engine parts were inspected by the different non-destructive testing methods such as liquid penetrant and magnetic particle testing and the observations obtained from inspection were evaluated.

The aircraft engine parts are made from different materials and carry different loads while their operation. Defects or discontinuities in the components may progress and cause failure of that components. Therefore, these defects or discontinuities must be detected before they reach a critical point. Defects or discontinuities can be detected by the use of non-destructive testing methods as in the aircraft maintenance operations. In this study, different aircraft engine parts were inspected by the liquid penetrant and magnetic particle testing method respectively. Selection and application of a non-destructive testing method is very important. Because the effectivity and sensitivity of non-destructive inspection

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methods are different depending on materials or defects. Liquid penetrant and magnetic particle testing methods were performed on the inspection of aircraft engine parts. Liquid penetrant testing method can be used for detecting surface discontinuities in all non-porous materials. Magnetic particle testing method can be used for detecting surface and near surface discontinuities in ferromagnetic materials such as iron and steel. Aircraft maintenance manuals were followed while performing inspections. After inspections, examinations were made in accordance with related aircraft maintenance manuals.

During the examination, some indications about defects were found by the use of both liquid penetrant and magnetic particle testing methods. Those indications were evaluated by repeating the procedure performed before. The indications found during the examination were determined as corrosion and small cracks.

Keywords: aircraft maintenance, non-destructive testing, liquid penetrant testing, magnetic particle testing

The Local Stability Analysis of a Delay General Nonlinear Discrete-time Population Model Including Predation and Allee Effect

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Abstract

In this study we consider a delay general nonlinear discrete-time population model including predation and Allee effect. We present the stability analysis of equilibrium point of the dynamics with and without Allee effects which happen at low population density. Then we compare the local stability of these two models. Finally obtained all theoretical results are supported by numerical simulations. The local stability analysis is made by using Schur-Cohn Criteria. Allee effect at times t and $t-1$ decreases the stability of the model.

Keywords: *Population Model, Local Stability Analysis, Allee Effect, Equilibrium Point.*

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Atherosclerosis Fuzzy Logic Based Software Algorithm

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Abstract

Atherosclerosis; is a narrowing of the arteries, which can significantly reduce the amount of blood given to the heart, brain and other vital organs. In atherosclerosis, when fat deposits called plaque occur, arteries contract. Plaques typically include low density lipoproteins (LDL), cholesterol, smooth muscle cells, and fibrous tissue, sometimes calcium. As a result, the blocked artery is starved for organ, blood and oxygen that need to be fed. Organ cells can either die or become irreversibly heavily damaged. Health professionals who are blamed for the deaths of more than 100,000 people per year have begun to be aware of the reduction of medical errors. The use of medical algorithms for this purpose is becoming popular. Today, these strategies are used for the delivery of care services. Medical algorithms eliminate some of the uncertainties in the medical decision-making process, and improve the effectiveness and accuracy of provider teams. The algorithms developed by programmers for providers are evidence-based data directors. The aim of the study is to investigate providers developed by programmers.

The variables used in the diagnosis of arteriosclerosis are determined. System response is assessed (how accurate it is to be evaluated). The weight of the different subsystems forming the final system is analyzed. As more information is entered into the system, the diagnostic accuracy of the system increases. More subsystems and more variables are available.

As a result of this study, a software is planned to facilitate the diagnosis of arteriosclerosis. In the software of this program, the patient's lipid change anomalies, increase in cholesterol and b lipoprotein amounts, relative changes in cholesterol phospholipids were determined as variables. As a result, this program will help to make correct and quick decisions in the diagnosis and treatment of atherosclerosis.

Keywords: *Atherosclerosis, Java, Cholesterol*

Polimer Kompozitlerde Elyaf Uzunluğunun Mekanik Özellikler Üzerindeki Etkilerin İncelenmesiİdris KARAGÖZ^{1*}, Mustafa ÖKSÜZ²¹Materials and Materials Processing Department / Yalova University, Turkey²Polymer Engineering Department / Yalova University, Turkey[*idris.karagoz@yalova.edu.tr](mailto: IDRIS.KARAGOZ@YALOVA.EDU.TR)

Özet

Polimer matris malzemesi içerisinde gömülü olarak bulunan lifler bir kuvvet dönüştürücüsü görevi yaparak malzeme üzerine etki eden gerilimi malzeme boyunca dağıtırlar. Elyaf takviyeli kompozit malzemelerde elyafların formu kısa, uzun ve sürekli olarak sınıflandırılmaktadır. Kullanılan elyafların türü ve formu kompozit malzemelerin mekanik özellikleri üzerinde oldukça önemli bir etkiye sahiptir. Elyafın kompozit malzemelerde istenen etkiyi göstermesi için kritik sınır olarak isimlendirilen minimum bir uzunluğa sahip olması gerekmektedir. Bu çalışmada elyafların uzunluğunun kritik uzunluğun altında ve üstünde polimer kompozitlerin mekanik özellikleri üzerindeki etkileri mevcut literatürden faydalanılarak incelenmiştir. Polimer kompozitlerde, elyaf uzunluğunun rijitlik, dayanım ve tokluk üzerindeki etkisinin belirlenmesi amaçlanmıştır.

Çalışmalarda, kompozit malzemelerde yaygın olarak kullanılan elyaf türleri ve elyaf takviyeli polimer kompozitler sınıflandırılmıştır. Sınıflandırma elyaf ve polimer matris malzemelerinin kombinasyonu ile sınırlı tutulmuştur. Karbon elyaf türleri, cam elyaf türleri ve aramid elyaf türleri mekanik özellikler açısından karşılaştırılmıştır. Yapısal ve yapısal olmayan uygulamalarda elyaf uzunluğunun mekanik özellikler üzerindeki etkisi, eş dağılımlı olarak uygulanan bir gerilme altında mevcut çalışmalardan derlenerek incelenmiştir.

Polimerlerin elyaf takviyesi ile güçlendirilmesi, polimerlerin mekanik özelliklerini önemli derecede arttırmaktadır. Elyafın matris malzemesi tarafından iyi iletilebilmesi, matris ve elyafların temas yüzeyinde kimyasal bir reaksiyonun olmaması ve elyafların iyi yüzey karakteristiklerine sahip olması polimer kompozitler için oldukça önemli bir özelliktir. Kompozit malzemelerde elyaf boylarının artmasıyla mekanik özelliklerin birçoğunda iyileşme görülmektedir. Kısa elyaf ve sürekli elyaf kullanılan polimer kompozitlerde rijitlik, dayanım ve tokluk özellikleri arasında oldukça büyük farklar gözlenmektedir. Elyaf boylarının kısalmasıyla bu özelliklerde bir düşüş meydana gelirken, elyaf uzunluklarının artmasıyla rijitlik, dayanım ve tokluk'ta artmaktadır. Elyaf takviyeli polimerik kompozitler, dayanım/hafiflik veya rijitlik/hafiflik oranlarının ve korozyon direncinin önemli olduğu tasarımlarda metal malzemelerin yerine tercih edilmektedir. Elyafın matris fazı içerisinde belirli doğrultularda yerleştirilebilmeleri, oluşturulan karma yapının, kullanılacağı uygulamalarda maruz kaldığı mekanik etkileri karşılayabilmesi açısından önemlidir. Kompozit malzeme içerisinde elyafların uygun geometri ve kesitlerde yerleştirilmesiyle oluşturulan karma yapı, çekme, eğilme ve burulmalı yüklemelerde farklı yönlerde farklı dirençler vermesi sağlanabilmektedir. Özellikle mekanik dayanım gerektiren yapısal uygulamalarda, kısa ve uzun cam elyafı ile takviyelendirilmiş malzemelere kıyasla, sürekli elyaf takviyesine sahip polimerik kompozitlerin daha yaygın olarak kullanıldığı tespit edilmiştir.

Anahtar Kelimeler: Kompozit malzemeler, polimer kompozitler, elyaf uzunluğu, cam elyaf, mekanik özellikler

Examination of the Effect of Fiber Length in Polymer Composites on Mechanical Characteristics

Abstract

The fibers embedded in the polymer matrix material function as a power converter and distribute the tension affecting the material throughout the material. The forms of fibers in fiber reinforced composite materials are classified as short, long and continuous. The type and form of the fiber used have a significant effect on the mechanical characteristics of composite materials. Fibers are required to have a minimum length called as a critical limit in order for them to exhibit the desired effect in composite materials. In this study, the effects of the fiber length on the mechanical characteristics

of polymer composites above and below the critical length were examined by using the current literature. It was aimed to determine the effect of the fiber length in polymer composites on rigidity, resistance and toughness.

In the studies, fiber types and fiber reinforced polymer composites frequently used in composite materials were classified. The classification was limited to the combination of fiber and polymer matrix materials. Carbon fiber types, glass fiber types and aramid fiber types were compared in terms of mechanical characteristics. The effect of the fiber length in structural and non-structural applications on mechanical characteristics was examined by compiling from the current studies under a tension applied uniformly.

The strengthening of polymers with fiber reinforcement significantly increases the mechanical characteristics of polymers. The fact that the fiber is well wetted by the matrix material, there is not a chemical reaction on the contact surface of matrix and fiber and the fiber has good surface characteristics are considerably important characteristics for polymer composites. There is an improvement observed in most of the mechanical characteristics with an increase in fiber lengths in composite materials. There are considerably big differences among rigidity, resistance and toughness in polymer composites in which short fiber and continuous fiber are used. While a decrease occurs in these characteristics with the shortening of fiber lengths, rigidity, resistance and toughness also increase with an increase in fiber lengths. Fiber reinforced polymeric composites are preferred instead of metal materials in designs in which resistance/lightness or rigidity/lightness rates and corrosion resistance are important. The fact that fibers can be placed in specific directions inside the matrix phase is important in terms of whether the composite structure created meets the mechanical effects to which it is exposed in the applications in which it will be used. It is possible to provide different resistances in tensile, bending and twisting loads and the composite structure created by placing fibers in the composite material to appropriate geometry and sections. Especially in the structural applications requiring mechanical resistance, it is determined that polymeric composites with continuous fiber reinforcement are more frequently used when compared to short and long glass fiber reinforced materials.

Keywords: *Composite, polymer composite, fiber length, fiberglass, mechanical characteristics*

Poliamid/Polipropilen (Pa/Pp) Cam Elyaf Katkılı Karışımlarının Sıcaklık Ve Zamana Bağlı Değişimlerinin İncelenmesi

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Özet

Poliamid 6 (PA 6), otomotiv, elektrik/elektronik, beyaz eşya, ev gereçleri, inşaat, mobilya, spor ekipmanlarından, güvenlik malzemeleri ve medikal sanayine kadar yoğun ve geniş bir kullanım alanına sahiptir. En kolay işlenen poliamid malzeme türü olan PA 6, en düşük kristalinite derecesine sahiptir. PA 6 ile farklı viskozite değerlerinde, cam elyaf, karbon elyaf vb. ile kuvvetlendirilerek, kauçuk ile modifiye edilerek, ısıl dayanımı yüksek mineral dolgular ve alev geciktiriciler kullanılarak farklı amaçlara uygun geniş bir yelpazede ürünler üretilebilmektedir. Bu çalışmada mühendislik polimeri olan Poliamid 6 ve PP-H polimerinin içerisine uygun katkı ve dolgular katılarak, karışımların sıcaklık ve zamana bağlı olarak değişimlerinin incelenmesi amaçlanmıştır.

Çalışmalarda, Domo firmasına ait, yoğunluğu 1,14 g/cm³, erime noktası 221 °C, relativ vizkozitesi 2,7 ve ticari adı Domamid 27 olan PA 6, katkı maddesi olarak, Lukoil firmasına ait yoğunluğu 0,90-0,91 g/cm³, MFI=3-5 g/10 dak., Izod darbe dayanımı 25 j/m, çekme mukavemeti 30 MPa olan homopolimer polipropilen (PP-H) ve cam ve diğer dolgu tiplerinde bağ oluşturması ve dolguyu kaplamasını sağlamak için Polyram firmasına ait Bondyram 1001 marka maleic anhidritli polipropilen (MA-PP) kullanılmıştır. Cam elyafı olarak, PPG firmasına ait PPGCS 3299 marka E-tipi 13,7 m çapında ve 3 mm uzunluğunda PP cam elyaf ve E-tipi 13,7 m çapında ve 4,5 mm uzunluğunda PA 6 cam elyaf kullanılmıştır. Bu amaca uygun olarak % 69,8 Poliamid 6 içerisine % 30 PP cam elyafı, ve % 9,8 PP-H içerisine % 30 PA 6 cam elyafı katılarak iki farklı karışım hazırlanmıştır. Ayrıca karışımlara % 0,1 antioksidant ve % 0,1 ısı stabilizatörü ilave edilmiştir. Karışımlar oda sıcaklığında 50 devir/dak. hızında, 15 Kg'lık mikser makinesinde 10 dakika süreyle karıştırılmış ve daha sonra Leistritz ZSE 27 marka çift vidalı ekstrüzyon makinesinde granül haline getirilmiştir. Granül halindeki karışımlar Nüve marka etüv cihazında 80 °C' de iki saat kurutulmuş ve Arburg Allrounder 320K marka enjeksiyon makinesinde test numunesi şeklinde basılmıştır.

Oda sıcaklığında yapılan testlerde cam elyaf katkılarının matris malzemesi ile kıyaslandığında karışımların çekme mukavemetini arttırdığı gözlemlenmiştir. Karışımlardan alınan test numuneleri 120 °C sıcaklıkta bir ve iki hafta süre ile yaşlandırılmıştır. Yaşlandırma sonrası her iki karışımında çekme mukavemetleri ve Izod darbe dayanımları oda sıcaklığında yapılan deneylerle karşılaştırılmıştır. Parçanın yapısal özelliklerinin ısı karşısında bozulmaya başlaması nedeniyle çekme mukavemetlerinin düştüğü, ısıl bozulmaya bağlı olarak parçaların yumuşaması ve yapıdaki bağların kırılmasını yitirerek darbe dayanımını arttırdığı tespit edilmiştir.

Anahtar Kelimeler: Poliamid 6 (PA 6), cam elyaf, takviye, karışım, sıcaklık ve zaman, katkı

Examination of the Changes in Polyamide/Polypropylene (Pa/Pp) Glass Fiber Reinforced Mixtures Depending On Temperature and Time

Abstract

Polyamide 6 (PA 6) has an intense and extensive usage area from automotive, electric/electronic, white appliances, home appliances, construction, furniture, sports equipment to security materials and medical industry. PA 6 which is the most easily processed polyamide material type has the lowest crystallinity level. The wide range of products appropriate for different purposes can be produced in different viscosity values with PA 6 by reinforcing with glass

fiber, carbon fiber, etc., by modifying with rubber, by using mineral fill materials with high thermal resistance and flame retardants. In this study, it was aimed to examine the changes in the mixtures depending on temperature and time by adding appropriate additives and fillings in Polyamide 6 and PP-H polymer, which are engineering polymers.

PA 6 of Domo company with the density of 1.14 g/cm³, melting point at the temperature of 221 °C, relative viscosity of 2.7 and with the commercial name of Domamid 27 was used as an additive, homopolymer polypropylene (PP-H) of Lukoil company with the density of 0.90-0.91 g/cm³, MFI=3-5 g/10 min, 25 j/m Izod impact strength and tensile strength of 30 MPa was used and maleic anhydride polypropylene (MA-PP) of Polyram company branded with Bondyram 1001 was used to ensure that it creates a connection in glass and other filling types and covers the filling. E-type PP glass fiber with PPGCS 3299 brand of PPG company 13.7 m in diameter and 3 mm in length and E-type PA 6 glass fiber 13.7 in diameter and 4.5 mm in length were used as a glass fiber. In accordance with this purpose, two different mixtures were prepared by adding 30% PP glass fiber in 69.8% PA 6 and 30% PA 6 glass fiber in 9.8% PP-H. Moreover, 0.1% antioxidant and 0.1% heat stabilizer were added to the mixtures. The mixtures were mixed in a 15 kg mixer machine at a rate of 50 revolutions per minute during 10 minutes at room temperature and then granulated in a double screw extrusion machine of Leistritz ZSE 27 brand. Granulated mixtures were dried at 80 °C in a drying oven of Nüve brand and pressed in the form of a test sample in an injection machine of Arburg Allrounder 320K brand.

It was observed in the tests conducted at room temperature that glass fiber additives increased the tensile strength of the mixtures when compared to the matrix material. The test samples obtained from the mixtures were aged for one and two weeks at the temperature of 120 °C. After aging, the tensile strengths and Izod impact resistance of both mixtures were compared with the experiments conducted at room temperature. It was determined that tensile strengths decreased due to the fact that the structural characteristics of the part started to deteriorate against heat, the parts became softer depending on thermal degradation, and the connections in the structure lost their fragility and increased the impact strength.

Keywords: *Polyamide 6 (PA 6), fiberglass, reinforced, mixtures, temperature and time, additive*

Characterization of High Temperature Materials for Aviation Applications

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Abstract

High temperature materials are used extensively in aviation industry. In the Aviation industry, lightness is also very important in addition to the high strength and corrosion resistance of materials. Due to the density of Ti-based alloys, it is much preferred in the aviation industry compared to alloys such as NiTi. In the present study, TiVAl alloys were produced by arc-melting technique. The effects of the fourth element addition and the heating rate on the transformation temperatures and microstructures were investigated.

Phase formations, micro-structures and transformation temperatures of Ti-V-Al alloys produced by arc-melting technique were characterized using XRD, SEM and DSC.

Decrease in transformation temperatures has been determined depending on the heating rate. Fourth element addition increases the transformation temperature and causes to the γ phase precipitation. As a result of the precipitation hardening, the strength of the material increases while the shape memory property decreases.

Keywords: *High Temperature, Shape Memory Alloys, Characterization*

Comparison of Some Inventive Problem Solving Methods

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Abstract

In this work, some problem solving methods which are intended to solve problems that cannot be solved by ordinary or classical methods are compared. These methods involves creativity and related to innovation. Brain storming, morphological analysis, six sigma, synectics and TRIZ methods are given birefly with their problem solving philosophy and compared via some problems.

For given problems, these methods are studied according to their metholodologyinorder to obtain solution.

Among problem solving methods studied in this work, TRIZ due to its inventive problem solving philosophy, systematic approach, methodology and incorporating different extensive knowledge gives solution in a more efficient and direct way.

Keywords: *Innovation, TRIZ, Brain storming, Morphological analysis, Six sigma, Synectics*

TR 83 Bölgesinde İnovasyona Dayalı Rekabet

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Özet

TR 83 bölgesinde yer alan illerde (Amasya, Çorum, Tokat ve Samsun) bulunan KOBİ'lerin inovasyona olan tutumları ve inovasyona dayalı rekabetin mevcut durumu üzerinde genel bir değerlendirme yapılmıştır. Bölgenin eğitim, sağlık, sosyo-ekonomik yapısı, küresel rekabet ve 2023 Türkiye vizyonu dikkate alınarak TR 83 bölgesinde inovasyona dayalı rekabet için TRIZ (Yaratıcı Problem Çözme Teorisi) yöntemi çerçevesinde bir strateji oluşturulmuştur.

Bu çalışmada kullanılan veriler OKA (Orta Karadeniz Kalkınma Ajansı) raporlarına dayanmaktadır.

TR 83 bölgesinde yer alan illerde (Amasya, Çorum, Tokat ve Samsun) bulunan KOBİ'lerin mevcut durumu ve inovasyon potansiyellerinin rekabete etkisi göz önüne serilmiştir. Ayrıca TR 83 bölesindeki kurum ve kuruluşlar için bir inovatif yöntem (TRIZ) eğitimi önerilmiştir. TRIZ, 50'li yıllarda mevcut olan 200.000 patentin incelenmesi ile ortaya çıkmıştır. TRIZ, mevcut yenilikçi problem çözme teorileri arasında sistematik bir yöntem olması nedeniyle ayrı bir öneme sahiptir. Bölgede az olan patent başvuru sayısı yenilikçilik gerektiren mevcut problemlere bu yöntemin uygulanmasıyla arttırabilir.

Anahtar Sözcükler: TR 83 Bölgesi, Rekabet, İnovasyon, TRIZ

Competition Based on Innovation in TR 83 Region

Abstract

In this work, we give a general view about the current status of TR 83 region for competitiveness, innovation and competitiveness based innovation. Considering the education, health, socio-economic structure, global competition and 2023 Turkey vision of the region, TRIZ (Creative Problem Solving Theory) method was established for the competition based on innovation in the TR 83 region.

In this work, the OKA's (Middle Black Sea Development Agency) datas are used.

The current situation of the SMEs located in the TR 83 region (Amasya, Çorum, Tokat and Samsun) and the competitiveness of the innovation potentials are highlighted. In addition, an innovative method (TRIZ) training has been proposed for institutions and organizations in TR 83 region. TRIZ stemmed from an examination of 200,000 patents that existed in the 50's. TRIZ has a discrete place among the existing innovative problem solving theories since it is a systematic method. The low number of patent applications in the region can be increased by applying this method to problems which need creativity.

Keywords: TR 83 region, competition, innovation, TRIZ

Kişisel Görüntülerde Göz Bölgesinin YSA İle Robust Tespiti

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Özet

Bu çalışmada tüm bilgisayar benzeri (bilgisayar, tablet, telefon, akıllı kamera, ATM vb.) teknolojik cihaz kullanıcılarına yönelik bakış açısı, bakış yönü, bakış noktası gibi verileri ve kişisel bilgileri içeren göz bölgesi görüntülerinin YSA ile kararlı bir şekilde tespit edilmesi amaçlanmaktadır. Görüntü içinde yüz/göz bölgesi bulmaya yönelik birçok çalışma bulunmaktadır. Çalışmalarda genel amaç yüz/göz bölgelerinin bulunması ile araştırmacıların üzerinde çalışmayı planladıkları alanın (ROI) en optimum boyutlarda elde edilmesi ve görüntü içindeki gereksiz kısımların atılmasıdır. Bu sebeple elde edilen görüntü içinde yüz/göz bölgesi bulunması yeterli olarak değerlendirilmekte başka bir ölçüt kullanılmamaktadır. Ancak öznitelikler çıkarılmadan görüntü içindeki piksel değerlerinin tamamı veri olarak kullanılmak istendiğinde bu görüntülerin kullanılması uygun olmayacaktır. Çalışmada elde edilen görüntü içindeki tüm piksel değerlerinin veri olarak kullanılabilir. Böylece elde edilen YSA, öznitelik çıkarımı yapmadan sadece piksel değerleri kullanılarak bakış açısı tespiti, bakılan nokta tespiti gibi kapsamlı çalışmalarda kullanılabilir.

Günümüzde bilgisayarlı görü alanında birçok çalışma yapılmaktadır. Bu çalışmaların bazıları bakış açısı tespiti, bakış noktası tespiti, bakış yönü tespitine yöneliktir. Böylece kullanıcının göz hareketlerinin takibi ile bazı uygulamaların geliştirilebileceği (imleç kontrolü, bazı özel programların kontrolü vb.) öngörülmektedir. Bazı çalışmalarda ise göz bölgesine ait veriler ile kişi tanıma yönelik uygulamalar geliştirilmektedir. Bu uygulamalar günümüzde personel takibi ve ya güvenlik sistemlerinin bir aşaması olarak kullanılabilir. Bakış açısı ve bakış yönü göz bölgesini içeren herhangi bir görüntü ile belirlenebilir. Ancak ekranda bakılan noktanın görüntü sahibinin o anki yeri ile ilişkili olması, bakış açısının bakılan yer tespitinde kullanılabilir olması ve kişi tespit uygulamalarında göz bölgesi görüntüsü içindeki tüm verilerin önem arz etmesi sebebi ile göz bölgesi tespitinin kararlı olarak yapılması önemlidir.

Çalışmada bahsedilen uygulamalarda kullanılmak üzere görüntü içinde göz bölgesinin kararlı olarak tespit edilmesi için YSA temelli bir yapı geliştirilmiştir. YSA modeli MATLAB ortamında ileri beslemeli ağ modeli kullanılarak gerçekleştirilmiştir. Eğitim seti internet ortamından rasgele toplanan 1000 görüntü kullanılarak oluşturulmuştur. Görüntüler seçilirken özellikle farklı ırk ve etnik kökenlere sahip örnekler yer verilmeye çalışılmıştır. Her bir görüntüden 1 adet doğru göz bölgesi 5 adet yanlış göz bölgesi olmak üzere 6 görüntü kırılmış, toplamda 6000 görüntü kullanılarak eğitim seti oluşturulmuştur. Ayrıca 100 görüntü internet ortamından rasgele toplanarak test seti oluşturulmuştur.

Yapılan çalışma sonucunda farklı ırk ve etnik gruplara mevcut 100 farklı insan görüntüsü ile yapılan test çalışmasında göz bölgesi 85 görüntüde kararlı bir şekilde tespit edilmiştir. 8 görüntüde göz bölgesi bulunamamıştır. 7 görüntüde ise tespit edilen görüntü içinde göz bölgesi olmasına rağmen göz bölgeleri istenen kararlılıkla bulunamamıştır. Kararsız olarak kabul edilen göz bölge görüntüleri de hatalı olarak kabul edildiğinde, geliştirilen YSA'nın göz bölgelerini kararlı olarak bulma oranı %85 olarak belirlenmiştir. Çalışma sonuçları değerlendirildiğinde eğitim setinde kullanılan örnek sayısının artırılması ile göz bölgelerinin kararlı bulunma oranının artırılabilir düşünlümlenmektedir. Böylece geliştirilecek yapı kişi tanıma, bakış açısının tespiti, bakış yönünün tespiti, bakış noktasının tespiti gibi çalışmalarda kullanılabilir.

Anahtar Kelimeler: Göz bölgesinin bulunması, bakış noktası tespiti, bakış yönü tespiti, bakış açısı tespiti

Robust Determination with ANN of Eye Region in Personal Images

Abstract

In this study, it is aimed to robustly determine with ANN the eyes region images with ANN including the angle of view, gaze direction, point of view on screen and personal information for all computer-like technological device users. (computer, tablet, phone, smart camera, ATM etc.) There are many studies on finding the face/eye region in the image. The general aim in these studies is to find the optimal region of interest (ROI) that the researchers plan to work on with the presence of face/eye regions and to take out unnecessary parts in the image. Therefore, the presence of a face/eye region in the image is considered sufficient and no other criteria is used. However, it is not appropriate to use these images when all the pixel values in the image are used as data before the attributes are extracted. All pixel values in the image obtained during the operation will be used as data. Thus, without using the obtained YSA, feature extraction, only the pixel values can be used for comprehensive studies such as gaze detection, point of view detection, and so on.

Today, there are many studies in the field of computer vision. Some of these studies are aimed at gaze direction, angle of view, point of view. Thus, it is foreseen that some applications will be developed (cursor control, control of some special programs, etc.) by following the eye movements of the user. In some studies, applications related to the person recognition with the data of the eye region are being developed. These applications now can be used as a stage of staffing and security systems. The viewing angle and viewing direction can be determined by any image including the eye region. However, it is important to determine the eye area in a stable manner, since the point of view on the screen is related to the location of the image owner, also these images can be used to the point of view and to determine the gaze point, and also in the eye region image are important for the person detection applications.

In the study, a YSA based structure was developed to determine the eye area in the image steadily for use in said applications. The YSA model was implemented using a forward feed network model in MATLAB environment. The training set was created using 1000 images collected randomly from the internet. When selecting the images, especially the examples with different races and ethnic origins have been tried to be included. 6 images were clipped, 1 correct eye region and 5 false eye regions from each image, and a training set was created using 6000 images in total. Furthermore, 100 images were randomly collected from the internet and a test set was created.

As a result of the study, the eye area was determined robustly at 85 images in a test run with 100 different personal images available to different races and ethnic groups. However, the eye region was not found in 8 personal images. In 7 personal images, although the eye region is within the detected image, the eye regions are not found with the desired robustness. When the eye region images considered as unstable were accepted as being incorrect, the rate of finding the determined YSA's eye regions as robust was determined as 85%. When the results of the study are evaluated, it is considered that increasing the number of samples used in the training set may increase the robustness of the eye regions. Thus, the structure to be developed can be used in studies such as person recognition, determination of gaze angle, determination of gaze direction, determination of gaze point.

Keywords: *Finding eye region, point of view, angle of view, gaze direction*

A New Method in SAP Noise 1

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Abstract

In this study, we first propose a new adaptive method called Different Applied Median Filter (DAMF) to remove the salt and pepper (SAP) noise. The method uses the 3×3 , 5×5 and 7×7 windows size and has strong aspects of the median filters and their derivatives. We then apply this method to some traditional images, and give the Peak Signal-to-Noise Ratio (PSNR) and Structural Similarity (SSIM) results of it. We finally show that DAMF can be successfully removed SAP noise at all noise densities.

Keywords: *Image denoising, impulse noise, salt and pepper noise, noise removal, low-pass filter*

Oscillatoria calcultensis'in Antikanser Aktivitesi

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Özet

Algler, tüm sucul ve nemli ortamlarda yaşayan mikroskobik ya da makroskobik büyüklükteki organizmalardır. Sularda besin zincirinin ilk halkasını teşkil ederler ve atmosferik oksijen miktarına büyük oranda katkıda bulunurlar. Bunun yanında algler, ekonomik olarak tıpta, eczacılıkta, kozmetikte, boya, inşaat, tekstil sanayisinde ve daha birçok alanda kullanılmaktadır. Tüm algler, farklı oranlarda karbonhidrat, protein ve lipid içerirler. Yapılarında mutlaka fotosentez için gerekli klorofiller mevcuttur. Hücrelerde üretilen sekonder metabolitler, alg türlerine göre farklılık gösterirler. Bu çalışma ile, tıbbi ve endüstriyel açıdan pek çok kullanım alanı bulunan alglerden biri olan *Oscillatoria calcultensis*'in antikanser aktivitesinin incelenmesi amaçlanmıştır.

Bu çalışmada, kültür şartlarında üretilen *Oscillatoria calcultensis* ekstraktlarının antikanser etkileri araştırılmıştır. Ekstraktlar, BrdU hücre proliferasyon ELISA yöntemi kullanılarak, Vero hücreleri (African green monkey kidney cells) ve HeLa hücreleri (Human uterus carcinoma cells) üzerinde test edildi. *O. calcultensis*'in antiproliferatif etkileri, 100, 250 ve 500 µg/mL'lik konsantrasyonlarda denendi.

Antikanser aktivite sonuçlarının istatistiksel değerlendirmeleri için SPSS® programı kullanılmıştır. Varyans analiz sonuçları, tüm konsantrasyonlarda anlamlı bulunmuştur (p<0,01). Çoklu karşılaştırma (Duncan) testinde *O. calcultensis*, 250 ve 500 µg / mL konsantrasyonlarında test sonuçlarına göre DMSO ve kontrol grubundan daha iyi antiproliferatif etki gösterdi (p <0.01).

Anahtar Kelimeler: Cyanobacteria, *Oscillatoria calcultensis*, Antikanser Aktivite, BrdU Hücre Proliferasyon Metodu

The Anticancer Activity of *Oscillatoria calcultensis*

Abstract

Algae are organisms that live in water generally. These organisms supply a great majority of the atmospheric oxygen by photosynthesis, and they form the first ring of the food chain in water. Furthermore, algae are used economically in the industries of medicine, pharmacy, cosmetics, painting, construction, textile and several other areas. All of the algae species comprise carbohydrates, proteins and lipids in different ratios. Their structures absolutely contain chlorophylls that are necessary for photosynthesis. Secondary metabolites that are produced in cells vary by species of algae. In this study, it was aimed to investigate the anticancer activity of *Oscillatoria calcultensis*, one of the algae with many uses in medical and industrial fields.

In this study, anticancer effects of *Oscillatoria calcultensis* extracts grown in culture conditions were investigated. Extracts were tested on Vero cells and human uterus carcinoma cells by using the BrdU cell proliferation ELISA method. The antiproliferative effects of *O. calcultensis* were assayed at concentrations of 100, 250 and 500 µg / mL.

SPSS® program was used for statistical evaluation of anticancer activity results. The variance analysis results were significant at all concentrations (p <0.01). In the multiple comparison (Duncan) test, *O. calcultensis* showed better antiproliferative effect than DMSO and control group (p <0.01) according to the test results at concentrations of 250 and 500 µg / mL.

Keywords: Cyanobacteria, *Oscillatoria calcultensis*, Anticancer Activity, The BrdU Cell Proliferation Assay

Symploca hydnoides'in Antimikrobiyal Aktivitesi

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Özet

Algler, yeryüzündeki tüm akuatik habitatlarda yaşayan fotosentetik organizmalardır. Organizasyon derecesi olarak prokaryotik veya ökaryotik olabilirler. Mavi-Yeşil Algler olarak bilinen Cyanobacteria grubundaki algler, prokaryotiktir ve oldukça ekstrem şartlara dayanabilirler. Bu alglerden elde edilen sekonder metabolitler, oldukça önemli özelliklere sahiptir. Son yıllarda, siyanobakterilerden elde edilen bu moleküllerin biyolojik aktivitelerine olan ilgi gittikçe artmaktadır. Bunun yanı sıra, siyanobakteriyel sekonder metabolitlerin hipokolestrolemik, enzim inhibisyonu ve diğer bazı farmakolojik etkileri de ortaya konulmuştur. Bu doğal ürünler, yalnızca ilaç hammaddesi olarak değil, sentetik moleküllerin yapımında yapısal birer model olarak da görev almaktadırlar. Bu çalışma ile, tıbbi ve endüstriyel açıdan pek çok kullanım alanı bulunan alglerden biri olan *Symploca hydnoides*'in antimikrobiyal aktivitesinin incelenmesi amaçlanmıştır. Bu çalışmada, kültür koşullarında üretilen *Symploca hydnoides* ile hazırlanan ekstraktların antimikrobiyal etkileri araştırılmıştır. Ekstraktlar 0,5 M Tris-HCL pH:8,00, N-butanol ve Etanol ile hazırlanmıştır. Antimikrobiyal aktivite testleri, disk difüzyon yöntemi ile yapılmış ve ekstraktlar *Staphylococcus aureus* ATCC 25923, *Bacillus subtilis* ATCC 6633, *Listeria monocytogenes* ATCC 7644, *Escherichia coli* O 157:H7, *Pseudomonas aeruginosa* ATCC 27853, *Salmonella typhimurium* CCM 5445 ve *Candida albicans* ATCC 10239 mikroorganizmaları üzerinde denenmiştir. En yüksek antimikrobiyal etki, *Escherichia coli*'ye karşı kaydedilmiştir. Diğer test mikroorganizmaları da farklı derecelerde etkilenmişlerdir.

Anahtar Kelimeler: *Cyanobacteria*, *Symploca hydnoides*, Antimikrobiyal Aktivite, Disk Difüzyon Metodu

The Antimicrobial Activity of *Symploca Hydnoides*

Abstract

Algae are photosynthetic organisms living in all aquatic habitats on earth. They may be prokaryotic or eukaryotic in terms of organization level. Algae in the Cyanobacteria group, also known as blue-green algae, are prokaryotic and able to endure pretty extreme conditions. Secondary metabolites obtained from these algae have quite important properties. In recent years, the interest in biological activities of these molecules obtained from cyanobacteria has been increasing. In addition, cyanobacterial secondary metabolites have been shown to have hypocholesterolemic, enzyme inhibiting and some other pharmacological effects. These natural products are not only used as drug raw material, but also as structural models in production of synthetic molecules. This study aims to investigate the antimicrobial activity of *Symploca hydnoides*, one of the algae with many uses in medical and industrial fields. In this study, the antimicrobial effects of extracts prepared with *Symploca hydnoides* produced in culture conditions were investigated. Extracts were prepared with 0.5 M Tris-HCL pH: 8.00, N-butanol and Ethanol. Antimicrobial activity tests were performed by disc diffusion method and the extracts were tested on microorganisms of *Staphylococcus aureus* ATCC 25923, *Bacillus subtilis* ATCC 6633, *Listeria monocytogenes* ATCC 7644, *Escherichia coli* O 157: H7, *Pseudomonas aeruginosa* ATCC 27853, *Salmonella typhimurium* CCM 5445 and *Candida albicans* ATCC 10239. The highest antimicrobial effect was recorded against *Escherichia coli*. Other test microorganisms were also affected at different levels.

Keywords: *Cyanobacteria*, *Symploca hydnoides*, Antimicrobial activity, The Disc Diffusion Method

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A New Method in SAP Noise 2

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Abstract

In this study, we first define a new median method referred to as frequency median (fm) and which is calculated the repeat number of the regular entries. Then we define a new median filter called k-Approximate Frequency Median Filter (FMFk) by using fm. Afterwards, we give the results of FMF1 by using 12 test images and an image quality metric referred to as Peak Signal-to-Noise Ratio (PSNR). We finally show that FMF1 can be successfully removed SAP noise at all noise densities.

Keywords: *Image denoising, impulse noise, salt and pepper noise, noise removal, low-pass filter*

A New Method in SAP Noise 3

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Abstract

In this study, we define a new median method referred to as right median (rm). Then we define a new filter called Adaptive Right Median Filter (ARMF) by using rm. Afterwards, we give the results of ARMF by using 12 test images and an image quality metric called Peak Signal-to-Noise Ratio (PSNR). The results show that ARMF can be successfully removed SAP noise at all noise densities.

Keywords: *Image denoising, impulse noise, salt and pepper noise, noise removal, low-pass filter*

Convergence of Difference Schemes for Linear Delay Parabolic Equations with Neumann Condition

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Abstract

Mathematical models described by various real dynamic processes can reduce boundary value problems for partial differential equations. A well-known widely applied method of approximate solutions of various problems of partial differential equations is the method of difference schemes. The main characteristics of difference schemes are their accuracy and stability. Modern computers allow the implementation of highly accurate difference schemes. Hence, a task of current interest is the construction and investigation of highly accurate difference schemes for various boundary value problems for partial differential equations. Applying the theory of positive operators and interpolation spaces, important stability and coercive stability inequalities results for a high order accuracy difference schemes approximately solutions of Cauchy problem for multi-dimensional parabolic equations $2m$ -th order. The study is based on a new notion of positivity of difference operators in Banach spaces. This approach is important to develop the theory of difference schemes of high order accuracy for various boundary value problems for partial differential equations which resulted in the important scientific discovery in this field. At present many mathematicians apply this approach to investigate various problems of mathematical physics with unbounded operators acting on delay terms. So, we will study the convergence of difference schemes for linear delay parabolic equations with Neumann conditions. The published articles and theses related with the subject. We consider the first and second orders of accuracy in t for the approximate solution of the Neumann problem for linear delay parabolic equations. The convergence estimates for the solution of these difference schemes are established. A procedure of modified Gauss elimination method is used to solve these difference schemes. The theoretical results are supported by numerical experiments. MATLAB programming is used for numerical results.

Keywords: *delay parabolic equations, convergence, MATLAB*

Çelik Yapılarda Kullanılan Kolon Taban Levhalarının Analitik Olarak İncelenmesi

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Özet

Özellikle son yıllarda meydana gelen depremler, önde gelen mühendislerin ve bilim adamlarının yapılarıdaki özel birleşim noktalarına dikkatlerini çekmiştir. Yapıdaki birleşimlerin kapasiteleri bütün yapıya ait kapasiteyi önemli ölçüde belirlediğinden, mühendisler yük altında yeni bağlantılar tasarlamaya ve limit durumlarını belirlemeye çalışmaktadırlar. Çelik yapılarda kolon taban levhalarının birleşimleri büyük önem taşımaktadır. Bu çalışmada, farklı kalınlıklarda taban levhaları, farklı sayıda ankraj çubukları ve farklı kolon profillerinden üretilen birleşimler statik yükler altında analiz edilerek, elemanlar üzerinde oluşan gerilme ve deformasyonlar bakımından karşılaştırmalı sonuçlar sunulmuştur.

Tipik bir kolon-temel birleşimi kolon, taban levhası, ankraj çubukları ve temel olmak üzere 4 unsurdan oluşmaktadır. Bu çalışmada birleşimi oluşturan elemanlardan 3 farklı tip kolon, 2 farklı kalınlıkta taban levhası ve farklı sayıda ankraj çubukları kullanılarak 16 farklı birleşim tasarlanmıştır. Bazı birleşimlerde rijitlik levhaları kullanılmıştır. Birleşimlerin her biri 4 ayrı yüklemeye maruz bırakılmıştır. İlk üç yüklemeye, taban levhasına kaynakla bağlanmış kolonun üst ucuna 50, 100 ve 150 kN olarak değişen yatay yükler uygulanmıştır. Dördüncü yükleme, SAP2000 yapısal analiz yazılımı ile ön analizleri Türkiye Deprem Yönetmeliği'nde yer alan yüklemeye protokollerine göre yapılmış olan 15 katlı konut binasının temel mesnet reaksiyonlarına göre yapılmıştır. Birleşimin sonlu elemanlar modeli ANSYS Workbench yazılımı kullanılarak 3 boyutlu katı model olarak oluşturulmuştur. Sonlu elemanlar modelinde geometri ve malzeme bakımından doğrusal olmayan davranış dikkate alınmıştır. Birleşimde kullanılan çeliğin gerçek davranışına yaklaşılabilmek için çoklu doğrusal pekleşmeli izotropik malzeme modeli kullanılmıştır. Birleşim çeliği için akma gerilmesinin 300 MPa, kopma gerilmesinin 400 MPa, elastisite modülünün 215 GPa ve poisson oranının 0,35 olduğu varsayılmıştır.

Bu çalışmada 64 farklı statik analiz gerçekleştirildi. Analiz sonuçlarına göre; maksimum gerilmenin genellikle taban levhası üzerinde olduğu görülmüştür. Taban levhası üzerindeki maksimum gerilmeler çoğunlukla ankraj deliklerinin kenarında veya taban levhası kolon profili birleşim yerlerinde hesaplanmıştır. Taban levhasında gerilmeler yatay yüklemeler için 144-466 MPa aralığında hesaplanmışken, 15 katlı binanın taban reaksiyon kuvvetleri için yapılan hesapta 138-329 MPa aralığında hesaplanmıştır. Bu yüklemeler için taban levhasında oluşan deformasyonlar yatay yükler için 1.4-46.4 mm aralığında, 15 katlı binanın taban reaksiyon kuvvetleri için yapılan hesapta 0.79-1.214 mm aralığında hesaplanmıştır. Levha kalınlığının ve ankraj çubuğu sayısının artırılmasının ve rijitlik levhası kullanımının birleşiminin rijitliğini arttırdığı ve böylece deformasyonları azalttığı görülmüştür.

Anahtar Kelimeler: Taban levhası, gerilme, çelik birleşimler

Analytical Investigation of Column Base Plates Used in Steel Structures

Abstract

Especially the earthquakes which have been occurred in recent years, lead engineers and scientists to give their attention to the special joints in structures. Because the capacities of the connections in the structure almost defines the whole structure's capacity, engineers try to design new connections and determine their limit states and capacities under loading. Column base plates connections have great importance in steel structures. In this study different types of column

base plate connections having different thickness of base plate, different number of anchor rods and different type of column profile, are studied and comparative results are introduced in terms of stress and deformations.

A typical column base plate connection consists of column, base plate, anchor rods and foundation. In this study 16 different connection was designed by using three different column profile, base plates with different thicknesses and anchor rods with different quantities. Stiffness plates were used for some kind of connections. The connections were subjected to four loading procedure and comparative analyzes were carried out for these loading conditions to investigate the effects on the components in base plate connections used in steel structures. In the first three loading, horizontal loads of 50, 100 and 150 kN were applied to the upper end of the column which was welded to the base plate with a corner weld. Fourth loading condition is that; the column base plate connections were loaded according to the basic support reactions of a 15-storey residential building on which pre-analyzes were carried out with the structural analyses software SAP2000[®] according to the Turkish Earthquake Code. The finite element model of the base plate connection was prepared as a 3D solid model using the finite element software, Ansys[®] Workbench. Material and geometric non-linearity was taken into account in the FEM model. A multi-linear isotropic hardening material model was used in order to approximate the actual behaviour of the steel used in connection. For the connection steel, the material properties were assumed as 300 MPa for the yield stress, 400 MPa for the ultimate stress, 215 GPa for the Young's modulus and 0.35 for the Poisson's ratio.

In this study 64 different static analyzes were conducted. According to these results; the maximum stresses generally take place at base plate of the connection. The maximum stresses were calculated at around the anchor rod hole or at the connection line of base the plate and the column. While the stresses at the base plate were calculated as the values varying between 144-466 MPa for horizontal loads, they were calculated as the values ranging from 138 MPa to 329 MPa for the base reaction forces of 15-story building. For these loads, deformations on the base plate were calculated as the values varying between 1.4-46.4 mm for horizontal loads and at 0.79-1.214 mm for the base reaction forces of 15-bed building. It has been observed that increasing thickness of the plate and the number of anchor rods and using stiffness plate contributes the rigidity of the connection and thus reduces deformations occurred at base plate.

Keywords: *Base plate, stress, steel connections*

Initial Evaluation of O-Propyl, S-Propyl and N-Propyl Substituted Naphthoquinones and Anthraquinones as Fingerprint Reagents

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Abstract

In this work, 5,8-dibromo-2-propoxynaphthalene-1,4-dione (**3**), 5,8-dibromo-2(propylamino)naphthalene-1,4-dione (**4**), 5,8-dibromo-2-(propylthio)naphthalene-1,4-dione (**5**), 9,10-dibromo-2propoxyanthracene-1,4-dione (**6**), 9,10-dibromo-2-propylaminoanthracene-1,4-dione (**7**) and 9,10-dibromo-2,3-bis (propylthio)anthracene-1,4-dione (**8**) were synthesized and their reactivity as fingerprints on porous surfaces was investigated in comparison with lawsone.

2,5,8-Tribromo-1,4-naphthoquinone (**1**) and 2,9,10-tribromo-1,4-anthraquinone (**2**) were treated with 1-propanol, 1-propylamine and 1-propanethiol in the presence of a base and in a suitable solvent. The reactions yielded 5,8-dibromo-2-propoxynaphthalene-1,4-dione (**3**), 5,8-dibromo-2-(propylamino)naphthalene-1,4dione (**4**), 5,8-dibromo-2-(propylthio)naphthalene-1,4-dione (**5**), 9,10-dibromo-2-propoxyanthracene-1,4-dione (**6**), 9,10-dibromo-2-propylaminoanthracene-1,4-dione (**7**) and 9,10-dibromo-2,3-bis (propylthio) anthracene-1,4-dione (**8**). The solutions of obtained compounds were treated with fingerprints collected on selected porous surfaces (white photocopy paper, blue coloured photocopy paper, newspaper and thermal invoice paper). The obtained results were compared with the results obtained with lawsone.

It has been found that all compounds can make fingerprints visible on at least one porous surface. In the tests, generally better results were obtained from the lawsone. All of the compounds can be suggested as fingerprint reagents.

Keywords: *Naphthoquinone, anthraquinone, fingerprint, lawsone*

Bazı Tahıl Cinslerinin Gluten Enteropatisi Üzerine Etkisi

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Özet

Gluten enteropatisi veya diğer adıyla Çölyak Hastalığı (GE), gluten ve benzeri protein tabiatındaki gıdalara karşı **kalıcı intolerans** olarak bilinen **otoimmün** bir ince bağırsak hastalığıdır. Ülkemizde yaklaşık % 0.5-1 GE vardır, ancak ne yazık ki her tanı alan hastaya karşın, tanı almayan 10 GE olduğu kabul edilmektedir. Ömür boyu devam edecek olan diyet nedeniyle, GE için günümüzde tahıllardaki toksit etkili bantların belirlenmesi, belkide gelecekte bu insanlar için, bu tahılları tüketebilme olanağı sağlayacaktır.

Klinik gluten ya da gluten benzeri proteinlerin alınmasıyla, gluteni oluşturan gliadine karşı IgA'nın öne çıktığı güçlü humoral ve sitotoksik hücrel bir tepkiyle gerçekleşir ve gliadin molekülü toksiktir. GE tanısında antigliadin, anti-doku transglutaminaz ve/veya anti-endomisyum antikorlarının saptanması önemlidir. Sıkı glutensiz diyet ile bu antikor düzeylerinin düşmesi veya tamamen kaybolması beklenir. GE sadece gastrointestinal sistem bulguları ile değil, aynı zamanda renal, endokrin, metabolik, nörolojik ve psikolojik sorunlar ile de karşımıza çıkar. Çoğu hasta geç tanı alabildiğinden, bu problemler ciddi mortalite ve morbidite sebebi olmaktadır. Erken tanı ve ömür boyu devam edecek olan diyet hastalığın seyri açısından çok önemlidir. Beslenme alışkanlığının temelini buğdayın oluşturduğu Anadolu insanında GE yaklaşık % 1 oranında görülürken, beslenme alışkanlığının temelini pirincin oluşturduğu Japonya ve Çin gibi Asya ülkelerinde bu oran % 0.01' dir. Tahıl cinsleri arasında; buğday, yulaf, mısır, çavdar da sırasıyla; gliadin, avenin, zein, secalin proteinleri bulunmaktadır. Gliadin (özellikle alfa), secalin ve avenin (kısmi) proteinleri GE için toksit etkiye sahip olmasına rağmen, zein proteinlerini barındıran mısır toksit etkiye sahip değildir.

GE tanı konulana kadar bir hastalık iken tanı sonrası yaşam biçimi olarak karşımıza çıkar. Tahıl cinslerinde toksit etkiye sahip olduğu bilinen bantların belirlenmesi, ıslahçıların GE için zararlı proteinlerden arındırılmış buğday geliştirmeleri açısından önemlidir.

Anahtar Kelimeler: Çölyak Hastalığı, Tahıl, Bant, Zein.

The Effect of Some Cereal Species on Gluten Enteropathy

Abstract

Gluten enteropathy(GE), is an autoimmune small intestinal disease known as permanent intolerance to food-borne gluten and the like. There are approximately 0.5-1% GE in our country, but unfortunately, it is accepted that there are 10 GE's that are not diagnosed in every diagnosis. Because of the lifelong diet, the identification of toxic-effective bands in the grains nowadays for GE will probably allow future consumption of these grains for these people.

Taking clinical gluten or gluten-like proteins results in a strong humoral and cytotoxic cellular response to IgA-induced glutathione-forming gliadin, and the gliadin molecule is toxic. It is important to detect antigliadin, anti-tissue transglutaminase and / or anti-endomycin antibodies in the GE. With a tight gluten-free diet, these antibody levels are expected to fall or disappear completely. GE is confronted not only with gastrointestinal system findings but also with renal, endocrine, metabolic, neurological and psychological problems. Since most patients can be diagnosed late, these problems cause serious mortality and morbidity. Early diagnosis and life-long diet is very important in terms of disease progression. The rate of GE is about 1% in Anatolian people whose wheat is the basis of eating habits and 0.01% in like Japan and China where rice habits are the basis of feeding habits. Among the grain types; wheat, oats, corn, rye, respectively; gliadin, avenin, zein, and secalin proteins. Although gliadin (especially alpha), secalin and avenin (partial) proteins have toxic effects for GE, the maize that contains the zein proteins does not have toxic effect.

While GE is a disease until diagnosis, it comes out as a life style after diagnosis. Identification of bands known to have toxic effects in cereal species is important for breeders' wheat development free of harmful proteins for GE.

Keywords: *Celiac Disease, cereal, band, zein.*

Sinop İli Rüzgâr Verileri ile Çalışan Rüzgâr Türbini Modeli ve Simülasyonu

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Özet

Bu çalışmada Sinop İli yıllık rüzgâr veri bilgileri elde edilerek bu bilgiler aylık olarak Matlab/Simulink programı yardımıyla modellenen rüzgâr türbinine uygulanmıştır. Çalışmadan elde edilebilen bilgilerin güvenilirliği için üretimi gerçekleştirilmiş olan gerçek bir rüzgâr türbinin fiziki parametreleri Simulink programında elde edilen modele aktarılmıştır. Bu yolla Sinop İlinde kurulması muhtemel bir rüzgâr enerji santralinde 12 ay boyunca bu rüzgâr verilerine dayanarak kurulu güce bağlı verim üzerinde durulmuştur.

Rüzgâr türbini matematiksel modeli ile Matlab/Simulink programında gerçekleştirilen simülasyon çalışmasında noktasal gerçek rüzgâr verilerinin gerçek yatay eksenli bir rüzgâr türbini parametreleri üzerinde uygulanması sonucu elde edilen çıkış gücü değerleri paylaşılmıştır.

Bu çalışma ile elde edilen rüzgâr verileri ve rüzgâr türbini verim analizi sonuçlarıyla ilerleyen sürede kurulması muhtemel bir rüzgâr enerjisi santraline ışık tutulmaktadır.

Ahtar Kelimeler: *Sinop, rüzgâr türbini, simülasyon.*

Modeling and Simulation of Wind Turbine Working with Sinop Wind Data

Abstract

In this study, Sinop Annual wind data was obtained and this information was applied monthly to the wind turbine modeled by Matlab / Simulink program. The real wind turbine parameters that have been produced for reliability of the information obtained without working are transferred to the model obtained in the Simulink program. In this way, a possible wind power plant established in Sinop province has been based on this wind power for 12 months, focusing on the installed efficiency.

In the simulation study performed in Matlab / Simulink program with the mathematical model of the wind turbine, the output power values obtained by applying the actual real wind data on the parameters of a real horizontal axis wind turbine are presented.

Wind power and wind turbine obtained from this study are lighted by a wind energy power plant which is likely to be established in the course of the yield analysis.

Keywords: *Sinop, wind turbine, simulation.*

Programlama Başarısını Etkileyen Bazı Faktörlerin İncelenmesi

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Özet

Programlama dersi başarısının genel itibariyle düşük olması problemine yönelik olarak, öğrencilerin programlama yeteneği, mantıksal düşünme yeteneği, öğrenme stilleri ve programlamaya ilişkin öz yeterlilik algılarının programlama başarısına etkileri incelenmiştir. Araştırma 2016 – 2017 eğitim – öğretim yılında Ondokuz Mayıs Üniversitesi Eğitim Fakültesi Bilgisayar ve Öğretim teknolojileri Eğitimi Programlama Dilleri I dersini alan öğrenciler ile yürütülmüştür. Elde edilen veriler ile programlama dersinde başarıyı arttırmak için öneriler getirmek ve literatüre katkı sağlamak amaçlanmıştır.

Çalışma ilişkisel tarama modeline göre modellenmiştir. Öğrencilerin programlama yeteneklerini belirlemek için Programlama Yetenek testi, mantıksal düşünme yeteneklerini belirlemek için Mantıksal Düşünme Yeteneği Testi, programlamaya özgü öz yeterlilik algılarını ölçmek için Programlamaya İlişkin Öz Yeterlilik Ölçeği ve öğrenme stillerini belirlemek için Kolb Öğrenme Stilleri Envanteri III kullanılmıştır. Bu testlere ek olarak öğrencilerin bilgisayar kullanım yılları ve programlama ile ilgilendikleri süre yıl olarak belirlenmiştir. Dersi veren öğretim üyesinin hazırladığı programlama başarı testinden alınan puan ile toplanan veriler arasındaki ilişki incelenmiştir. Korelasyon analizi kullanılarak programlama yeteneği, programlama öz yeterliliği, mantıksal düşünme yeteneği, programlama deneyimi ve bilgisayar deneyimi ile programlama başarısı arasındaki ilişki belirlenmiştir. Öğrencilerin sahip oldukları öğrenme stiline göre programlama başarıları arasında bir fark olup olmadığını anlamak için ilişkisiz örneklem için tek yönlü varyans analizi yapılmıştır. Son olarak çoklu regresyon analizi ile mantıksal düşünme yeteneği, programlama öz yeterliliği, programlama yeteneği ve öğrenme stillerinin programlama başarısını hangi önem sırasında ve ne düzeyde açıklayabildiğini belirlenmiştir.

Araştırma sonucunda mantıksal düşünme yeteneği, programlama yeteneği ve bilgisayar deneyimi ile programlama başarısı arasında istatistiksel olarak anlamlı bir ilişki bulunamamıştır. Öğrencilerin programlama deneyimi ile programlama başarısı arasında düşük seviyede pozitif yönde bir ilişki bulunmuştur. Programlama başarısı ile programlama öz yeterliliği incelendiğinde orta seviyede pozitif yönde bir ilişki bulunmuştur. Özümseme öğrenme stili, çalışmaya katılan öğrenciler arasında en çok tercih edilen öğrenme stili olmasına karşın programlamada en başarısız olan öğrenme stilidir. En çok tercih edilen ikinci öğrenme stili Ayırıştırma stilidir. Programlamada en yüksek başarıyı sağlayan öğrenme stili de Ayırıştırma stilidir. Farklı öğrenme stillerinin programlama başarısı arasında fark olup olmadığını anlamak için yapılan ANOVA sonucunda öğrenme stillerinin en az ikisi arasında anlamlı bir fark olduğu sonucuna ulaşılmıştır. Yapılan regresyon analizine göre programlama başarısının %41'i ele alınan bağımsız değişkenler tarafından açıklanabilmektedir.

Anahtar kelimeler: *programlama yeteneği, mantıksal düşünme yeteneği, öğrenme stilleri, programlama öz yeterliliği, programlama başarısı*

Investigation of Some Factors Affecting Programming Success

Abstract

In order to address the problem that the performance of the programming lesson is generally low, relationship between programming ability, logical thinking ability, learning style, computer programming self-efficacy, computer experience, programming experience and programming success were studied. The research was conducted with 67 second-year students in the Department of Computer and Instructional Technology Education at Ondokuz Mayıs University in the academic year of 2016-2017. It is aimed to bring proposals to increase success in the programming lesson with the obtained data and to contribute to the literature.

The Programming Aptitude Test for students' programming aptitude, Test of Logical Thinking for students' logical thinking abilities, Computer Programming Self-Efficacy Scale for students' programming self-efficacy and Kolb Learning Styles Inventory III for students' learning styles were used. In addition to these tests, the years of computer use and the time of interest in programming were determined as years. The relationship between the score obtained from the programming achievement test prepared by the lecturer and the collected data was examined. Using correlation analysis, the relationship between programming ability, programming self-efficacy, logical thinking ability, programming experience, computer experience and programming success was determined. An ANOVA was conducted to determine if there is a difference between the learning successes of the students according to the learning style they have. Finally, with multiple regression analysis, it has been determined how logical thinking ability, programming self-efficacy, programming ability and learning styles can explain the importance of programming success and at what level.

As a result of the research, there was no statistically significant relation between logical thinking ability, programming ability, computer experience and programming success. There is a positive relationship between the programming experience of students and programming success at low level. When programming success and programming self-sufficiency were examined, a relation was found in the middle level in the positive direction. The assimilation learning style is the most preferred learning style among the students participating in the study, but the most unsuccessful learning style in programming. The second most preferred style of learning is Converging style. Converging style is the most successful learning style in programming. The result of ANOVA to understand whether there is a difference between programming performance of different learning styles is reached as a significant difference between at least two of the learning styles. According to the regression analysis, 41% of programming success can be explained by the independent variables discussed.

Keywords: *programming ability, logical thinking ability, learning styles, programming self-efficacy, programming success*

Effects of Dopant Addition on Optical Properties of SPS-ed α -SiAlON Ceramics

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Abstract

SiAlON ceramics are a solid solution of $\text{Si}_3\text{N}_4\text{-Al}_2\text{O}_3$ and have been generally used for structural applications because of their high level of fracture toughness and strength, excellent chemical stability and wear resistance. In recent years, the functional properties such as optical and IR transmission of SiAlON ceramics have been investigated also. The aim of this study to investigate the effects of rare earth dopant addition, dopant type and amount on densification, final microstructure and optical properties of SPS-ed α -SiAlON ceramics.

Translucent α -sialon ceramics were successfully fabricated by spark plasma sintering (SPS) method. The IR and optical transmittance of the sintered α -SiAlON ceramics were inspected by using FTIR. The microstructure and phase characterization of the samples were also carried out by using SEM and XRD techniques, respectively.

The results showed that the densification behaviour of low oxide contented composition is so weak to fabricate fully densified α -SiAlON ceramics. Also, the ionic radius of rare earth cation which is used as dopant as effective as oxide content of starting composition on the densification behaviour, phase stability and the optical properties of α -SiAlON ceramics.

Keywords: α -SiAlON, SPS, Starting Composition; Microstructure; Optical Properties.

Preparation and Determination of Mechanical Properties of Polylactic Acid/Polyethylene vinyl acetate BlendsHüseyin Çağdaş Aslan^{1*}, Hüseyin Bakırcı¹, Mithat Çelebi¹ and Mehmet Arif Kaya¹¹*Department of Polymer Engineering, Yalova University, Turkey*^{*}*hcagdas.aslan@yalova.edu.tr*

Abstract

Polylactic acid (PLA) is a thermoplastic aliphatic polyester produced from biosources and it can be said it is most popular biodegradable and compatible polymer. Due to excellent mechanical properties such as strength and stiffness PLA is favorable and successful alternative for commodity thermoplastics obtained from petrochemical sources. But some disadvantages of PLA such as brittleness and low fracture toughness need to be overcome. Polyethylene vinyl acetate (EVA or PEVA) is the copolymer of ethylene and vinyl acetate and combines toughness and low-temperature sealability with excellent clarity, cling, flexibility, and impact and puncture resistance. Blending EVA and PLA polymers provides a new, more flexible and non-brittle material compared with natural PLA.

The polymer blends consist of different polymer ratios such as 30:70, 40:60 and 50:50 EVA and PLA respectively prepared by 16mm twin screw, co-rotating extruder with a constant screw speed (200 rpm) and mechanical, thermal and physical properties of blends have various EVA ratios were investigated.

Polylactic acid / Polyethylene vinyl acetate blends at different compositions ratios were prepared successfully via extrusion process. Structures of PLA/EVA blends were examined with spectroscopic and thermal methods, and confirmed with specific region peaks and thermal transition values. Evaluation of mechanical properties revealed a decrease in tensile strength values and an increase in elongation values depending on the amount of EVA increased in the blends as expected.

Keywords: *PLA, EVA, Blend, mechanical properties*

Application of Enzyme-Linked Immunosorbent Assay (ELISA) for Determination of the Insecticide Imidacloprid in Lettuce, Parsley and Spinach Samples from Tokat

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Abstract

Imidacloprid is a neonicotinoid type pesticide used against soil insects to enhance agricultural crop yields. It is highly soluble and non-volatile compound and is determined to be moderately toxic to mammals. Due to its carcinogenic effects on human health, fast, low-cost screening methods are needed to determine pesticide levels in food or environmental samples. In this study, we propose the use of a competitive enzyme-linked immunosorbent assay (ELISA) method to evaluate quantification of imidacloprid in agricultural crops, such as lettuce, parsley and spinach grown in Tokat. This method is alternative to detection of pesticides using liquid chromatography-mass spectrometry (LC-MS) and gas chromatography (GC) methods which require well-trained personnel, equipment, longer time and a budget. Simple, quick and cost-effective ELISA method provides advantages over LC-MS and GC to monitor pesticides within an assay including many different samples.

We used analytical grade imidacloprid from Sigma-Aldrich. Lettuce, parsley and spinach samples were homogenized with a blender. Homogenate was extracted in acetonitrile. The mixtures were filtered and used directly or diluted 10-fold with water for ELISA analysis. A commercially available ELISA kit was used for imidacloprid determination. 0.2, 1 and 6 ppb imidacloprid calibrators from the kit was used. Imidacloprid was dissolved in methanol to get a 50 ppm stock solution. It was then used to prepare serial dilutions of the standarts to get final concentrations of 6, 4, 2, 1, 0.5, 0.2, 0.1 ppb. Negative control from the kit and blank samples were also included in the test. All the controls and the samples were used in duplicate. The ELISA method was performed according to manufacturer's instructions.

The standart curve for imidacloprid based on duplicates were plotted. The IC₅₀ value was determined as 3.3 ppb. The limit of detection (LOD) for the kit was 0.07 ppb and the assay range included 0.2 to 6 ppb. Our results indicate that the imidacloprid residues in lettuce and parsley were about 5.2 ppb and 4.38 ppb in spinach. The precision of the method was determined as 5.7% recovery (% CV) for 3 ppb, in which our samples were detected in this range. The use of ELISA provides a convenient tool for detecting imidacloprid residues in agricultural samples.

Keywords: *Imidacloprid, ELISA, pesticide, agricultural samples*

Effect of chewing characteristics on mandibular callus stability

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Abstract

The aim of this paper is to numerically assess the biomechanical behavior of callus tissues formed after Mandibular Distraction Osteogenesis under different loading conditions and to discuss the possible outcomes of chewing characteristics on healing period.

In this study, a pre-operative three-dimensional model was created by processing of computational tomography images of an individual patient using a biomedical modelling software, MIMICS. Virtual surgery operation were simulated in the same software following the segmentation of mandibular regions such as trabecular, cortical bones and teeth. After the virtual surgeries and segmentation process, callus tissues were modelled bilaterally. In addition, mandibular distractors were modelled and assembled to the model. The post-operative model then transferred to a Finite Element (FE) modelling software, ANSYS. Mesh structure of all parts were optimized in the number and the quality in order to get both efficient and accurate FE model.

Different analyses were run for different chewing characteristics to compare the biomechanical response of callus tissues whose stability is a key factor for healing process. The FE results showed that not only tooth position but also occlusal force angle affects the stability of callus.

Keywords: *Finite Element Analysis, Mandibular Distraction Osteogenesis, Virtual Surgery, Callus Stability*

Is It Possible to Prevent The Adjacent Segment Disease Using Flexible Rods for Spinal Implants? : A Finite Element Analysis

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Abstract

The aim of this paper is to numerically assess the mechanical behavior of spinal implants and to discuss the possible effects of using flexible rods for Adjacent Segment Disease (ASD) risk.

In this study, a pre-operative three-dimensional spine model was created using a biomedical modelling software. The spinal implant modeled in SOLIDWORKS transferred to the MIMICS in order to simulate the virtual spinal surgery operation. All parts of the assembly model were exported to 3Matic Software to get volume mesh structures of the parts. Then assembly mesh was obtained using FE modeler in ANSYS Workbench. Static-Structural module was used to perform the analysis and the material properties for all parts were assigned. Different material properties for spinal rods were also defined providing stiffness alterations.

The optimum stiffness value for spinal rods allowing the most proper physiologic function was investigated. The results of this paper indicate that ASD risk, a mandatory outcome of spinal surgery, can be minimized by using enough flexible rods for spinal implants. On the other hand, the rigidity of the rods should be optimized in order to provide a sufficient stability.

Keywords: Adjacent Segment Disease, Spinal Implants, Finite Element Analysis

Red (orange) fluorescent protein TurboRFP from sea anemon: Expression recombinantly in *E. coli* using by bioreactor, purification and characterizationHülya Kuduğ^{1*}, Rizvan İmamoğlu¹, Duygu Düzgün¹ and İsa Gökçe¹ and Savaş Sönmezoğlu²¹Department of Genetic and Bioengineering, Gaziosmanpaşa University, Turkey²Department of Metallurgy and Materials Engineering, Karamanoğlu Mehmetbey University, Turkey[*hlykudug@gmail.com](mailto:hlykudug@gmail.com)

Abstract

TurboRFP is a red (orange) fluorescent protein (excitation/emission maxima are 553 and 574 nm, respectively) derived from sea anemone *Entacmaea quadricolor* [Merzlyak et al. 2007]. Possessing high photostability and pH stability, TurboRFP is more than twice brighter than DsRed2. TurboRFP can be expressed and detected in a wide range of organisms. Mammalian cells transiently transfected with TurboRFP expression vectors produce bright fluorescence in 8-10 hrs after transfection. No cytotoxic effects or visible protein aggregation are observed. In this study, it is aimed that high expression of TurboRFP in *E.coli* pBAD expression system that allows to modulate levels to optimize yields.

E.coli BL21-AI strains transformed with TurboRFP-pBAD plasmid construct by heat shock and incubated on selective 50 mls LB medium in flasks with 100 ug/ml ampicillin at 37 °C. Arabinose was used as an inducer for araBAD promoter. Effect of different arabinose concentrations (0.002-0.04%) on expression level was investigated. SDS-PAGE results showed that 0.04% arabinose concentration resulted highest expression level. Recombinant protein production carried out in bioreactor to reach maximum cell-density and efficiency. The cultivation of *E.coli* cells was executed using 3 liters LB medium. Gas mix (oxygen and air), air flow and stirring parameters were adjusted in a manner that ensured that dissolved oxygen levels were kept over 30%. Temperature and pH were automatically maintained at 37°C and pH 7.0, respectively by water cooling and addition of sodium hydroxide. The induction for protein expression with 0.04% arabinose concentration was done for 5 hours. The culture broth was centrifugated and cell pellets disrupted by sonication. Soluble proteins were collected using ultra-centrifugation. The supernatant applied to affinity chromatography column for purification of His-tagged TurboRFP. The expression levels of TurboRFP was assessed using 10% (w/v) SDS-PAGE and UV spectroscopy.

In this work we successfully expressed the gene of TurboRFP from sea anemone *Entacmaea quadricolor* in *E.coli* BL21-AI cells using bioreactor. Recombinant vector TurboRFP-pBAD which contains the target protein transformed into *E.coli* cells by heat shock. SDS-PAGE results show that inducit6on and concentration experiments significantly affected protein yielding. The inducer arabinose concentration firstly optimized in 50 mls LB flasks. Optimization of the expression procedure showed that, induction by %0,04 arabinose at OD₆₀₀=2 and 5 hours incubation at 37°C resulted in the highest protein yield. For large scale production carried out in bioreactor under controlled parameters. The expression of TurboRFP resulted in production of a soluble and pure in a yield of 20 mg/L bioreactor cultivation.

Keywords: red fluorescent protein, TurboRFP, recombinant protein, *E.coli*

This study was supported by the Scientific and Technological Research Council of Turkey (TUBITAK Grant Number 114Z956) who provided financial support for this research.

Mosquito Odorant-Binding Protein 1 (OBP1): Ideal Target to Prevent Mosquito-borne Disease Transmission

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Abstract

Mosquitoes are the most important vectors for human diseases which causes millions of deaths worldwide. Odorant binding proteins (OBPs) are the key molecular players in mosquito olfactory system to detect odorant molecules in the environment. The release of genome sequences of several mosquito species helped identification of OBPs in these genomes. Characterization of OBPs expressed mainly in the antennae of the female mosquitoes provide ideal targets to interfere with their host-seeking behavior. In this study, OBP1 gene orthologs from at least six different mosquito species were used for comparison to better understand its function. Molecular and structural knowledge on OBPs are of great importance to develop OBP-based repellent design to combat mosquito-borne diseases.

OBP1 gene ortholog sequences from *Anopheles gambiae*, *Anopheles stephensi*, *Aedes aegypti*, *Aedes albopictus*, *Aedes cretinus*, and *Culex pipiens quinquefasciatus* were obtained from GenBank. Their peptide sequences were aligned using ClustalW and analyzed for conservation in the peptide sequence. ExPASy Bioinformatics resource portal was used for protein secondary structure prediction and structure based homology modeling using the known structure of AgamOBP1 and AaegOBP1. A preliminary work was initiated to predict potential ligands of OBP1 in *Aedes cretinus* using SwissDock and understand features for a design of a repellent molecule.

The peptide sequence alignment of OBP1 ortologs from *Anopheles gambiae*, *Anopheles stephensi*, *Aedes agypti*, *Aedes albopictus*, *Aedes cretinus*, and *Culex pipiens quinquefasciatus* showed high sequence identity among these mosquito species (more than 90% among Aedes and Anopheles species). The crystal structure of OBP1 from mosquito species *Anopheles gambiae*, *Aedes aegypti* and *Culex pipiens quinquefasciatus* has been previously determined. In this work, *in silico* based structure similarity search and homology modeling was used to better understand mosquito OBP1 function. Structure based-ligand search was initiated and expected to result in molecules that can be used as potential repellents. Molecular and structural similarities of OBP1 in mosquitoes may indicate its important role in mosquito olfactory behavior, such as host-seeking behavior for a blood meal. The use of repellents that can bind to its target OBP will help reduce human exposure to infectious mosquito bites and thus enhance the combat for devastating diseases.

Keywords: *mosquito, Odorant-binding protein, host-seeking behavior, repellent discovery, mosquito-borne diseases*

Bilgi Paylaşımının Örgütlerde Yenilikçilik Üzerindeki Etkisi: Bankacılık Sektöründe Bir Uygulama

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Özet

Bilgiye dayalı ekonomik sistemlerde örgütlerin gelişmesi ve sürdürülebilirliği açısından belirsizliğin azaltılması ve yeniliklerin uygulamaya konulabilmesi önem kazanmaktadır. Örgütsel yenilikçiliğin gerçekleştirilmesi açısından en önemli faktör ise insan kaynağıdır. Çalışanların yenilikleri anlama, geliştirme ve yayma konusunda istekli olmaları, sorunların belirlenmesi ve çözümüne katkı sağlamaları, üretilen ürün ve hizmetlere yansiyacak, böylece faaliyetlerde etkinlik ve verimliliğin artırılması sağlanabilecektir. Bilgi paylaşımı çalışanların yeniliklere adaptasyon sürecinin kısaltılması açısından önem kazanmaktadır. Örgütlerde stratejik kaynakların elde edilmesiyle rekabet üstünlüğüne ulaşılması da yeniliklerin uygulanmasını kolaylaştıracaktır. Bu çalışmada hizmet üreten örgütler arasında bankacılık sektörü ele alınarak bilgi paylaşımının yenilikçi uygulamalar üzerindeki etkisi irdelenmeye çalışılmıştır.

Çalışmada “bilgi paylaşımının yenilikçilik kapasitesi üzerinde belirgin ve olumlu etkisinin olduğu” temel hipotez olarak belirlenmiştir. Bu hipotezin doğrulanması için yapılan saha çalışması İstanbul’da faaliyet gösteren 7 özel bankada, bireysel ve kurumsal müşteri temsilcisi olarak görev yapan ve tesadüfi örneklem olarak seçilen 138 banka çalışanı ile gerçekleştirilmiştir.

Çalışmada öne sürülen temel hipotez doğrulanmış ve bilgi paylaşımı bankacılık sektöründe faaliyet gösteren işletmelerde yenilikçilik uygulamalarını olumlu yönde etkileyen bir etken olarak belirlenmiştir. Çalışmada yalnızca bankacılık sektöründen bir kısım çalışanla uygulama yapılması konunun genelleştirilmesi açısından bir kısıtlama teşkil etse de, konu ile ilgili fikir vermesi açısından önemlidir.

Anahtar kelimeler: yenilikçilik, bilgi paylaşımı, sürdürülebilirlik

The Effects of Knowledge Sharing on Innovation at the Organizations: An Application in Banking Sector

Abstract

In economic systems based on information, it becomes important to reduce ambiguity in terms of development and sustainability of organizations and to be able to put innovations into practice. The most important factor in the realization of organizational innovation is human resource. Employees should be willing to understand, develop and disseminate innovations, identify problems and contribute to the solution, reflect on the products and services produced, and thus increase efficiency and efficiency in the activities. Information sharing gains importance in terms of shortening the adaptation period of employees to innovations. Achieving competitive advantage through the acquisition of strategic resources in organizations will facilitate the implementation of innovations. In this study, the effect of the sharing of information on innovative applications was tried to be examined by considering the banking sector among the service producing organizations.

The basic hypothesis in the study is that "knowledge sharing has a distinct and positive impact on innovation capacity". The fieldwork for validation of this hypothesis was conducted in 7 private banks operating in Istanbul, with 138 bank employees who acted as individual and corporate client representatives and were selected as random samples.

The basic hypothesis put forward in the study has been confirmed and information sharing has been identified as a factor that positively influences innovations in businesses operating in the banking sector. Implementation with only few employees from the banking sector is a limitation in terms of generalization of the matter, but it is important to give an idea about the subject.

Keywords: innovation, knowledge sharing, sustainability

İnsan Kaynakları Yönetiminde Örgütsel Değişim Açısından Sosyal Medyanın Etkileri: Hizmet Sektöründeki Örgütlerde Bir Uygulama

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Özet

Bu çalışmada sağlık, eğitim, finans ve diğer hizmet sektörlerindeki örneklem grupları esas alınmak suretiyle sosyal medyanın insan kaynakları yöneticilerini, çalışanları ve örgütü ne ölçüde etkilediğinin araştırılması hedef alınmıştır. Yapılan literatür araştırmasında insan kaynakları yönetimi ve örgütsel değişim ile ilgili çok sayıda çalışma bulunmuştur. Ancak sosyal medyanın yönetici, çalışan ve örgüt üzerindeki etkilerini araştıran kısıtlı sayıda çalışma mevcuttur.

Bu çalışmada veriler anket yöntemi ile toplanmıştır. Ölçeğin birinci kısmında sosyo-demografik sorular ile katılanların yaş, cinsiyet v.s. özellikleri belirlenmiş; ikinci bölümde ise sosyal ağ kullanma sıklığı, hangi amaçla ve hangi sosyal ağlara üye olduklarını ölçen sorular ile bireye ve örgüte sosyal medyanın etkisini ölçen 5'li likert tipinde 51 soruluk araştırma ölçeği 266 yönetici ve çalışana uygulanmıştır. Mail yoluyla ve yüz yüze görüşme sonunda toplanan veriler SPSS 20 programında değerlendirilmiştir.

Yapılan bu çalışmayla sosyal medyanın insan kaynakları yöneticilerine ve çalışanlarına olumlu etkileri olduğu sonucuna varılmıştır. Sosyal medya, etkileşim ve paylaşımı canlı tutan bir mekanizmadır. Bu sistemi etkin olarak kullanan, performansı yüksek ve verimli insan kaynağının örgüte sağlayacağı değişim de olumlu olacaktır.

Anahtar kelimeler : değişim, insan kaynakları, sosyal medya

The Effects of Social Media in Terms of Organizational Change in Human Resources Management an Application at the Service Industry Organizations

Abstract

In this study, it was aimed to investigate the effect of social media on human resources managers, employees and organization based on sample groups in health, education, finance and other service sectors. A large number of studies on human resource management and organizational change were found in the literature survey. However, there is a limited number of studies investigating the effects of social media on managers, employees and the organization.

In this study, data were collected by questionnaire method. In the first part of the scale, by socio-demographic questions age, sex, etc properties were determined; in the second part, 51 questions which is a 5-point Likert type were applied to 266 managers and employees measuring the frequency of use of social network, purpose and the social network they are members of, the influence of social media on the individual. Data collected by mail and interview were evaluated in the SPSS 20 program.

This work resulted in the positive impact of social media on human resources managers and employees. Social media is a mechanism that keeps interaction and sharing alive. The change that will be provided by efficient human resource which shows high performance and effectively using this system, will also be positive.

Keywords : change, human resources, social media

Effects of Non-Specific Binding Agents on the Performance of Magnetic PSA Immunosensor

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Abstract

Immunosensors based on antigen-antibody binding are one of the most widely used to detect disease related substances which are known as biomarkers in clinical diagnostics. Prostate-specific antigen (PSA) is one of the first tumor biomarkers to be identified and put into routine clinical use for screening and diagnosis of prostate cancer. In this study, we fabricated a sandwich-type immunosensor for PSA detection using the amino-functionalized iron oxide nanoparticles. The aim of this study is to investigate the effects of the non-specific binding (NSB) agents on performance of PSA immunosensor.

Magnetic iron oxide nanoparticles (MIONPs) were produced by the co-precipitation method using FeCl₃ and FeSO₄.7H₂O salts. Produced MIONPs were modified with silanization reaction in the presence of 3-aminopropyl-triethoxysilane. The modified MIONPs were used as a platform for the synthesis of magnetic PSA immunosensor. MIONPs were conjugated with the monoclonal antibody-1 (mAb1) and then PSA was captured onto the MIONPs followed by adding horseradish peroxidase (HRP) labeled monoclonal antibody-2 (mAb2-HRP). N-(3-dimethylaminopropyl)-N'-ethylcarbodiimide hydrochloride and N-hydroxysuccinimide were used as crosslinking agents in the synthesis of PSA immunosensor. To improve the performance of PSA immunosensor, bovine serum albumin (BSA), triton X-100, polyethylene glycol (PEG) and lysine were added separately as NSB agents to the reaction medium. The reaction was carried out at 25 °C and 200 rpm for 4 hours. The performance of the synthesized magnetic PSA immunosensor was examined by measuring the HRP activity using an UV spectrometer (UV1800, Shimadzu) and its surface characterization was analyzed with FTIR spectrometer (Spectrum 100, Perkin Elmer). The zeta potential (ZP) and average hydrodynamic diameter (Z_{ave}) values of the magnetic PSA immunosensor were examined by Zetasizer (Nano ZS, Malvern) instrument.

Z_{ave} and ZP values of PSA immunosensor without NSB agents were determined to be 322.4 nm and -17.8 mV, respectively. It is observed that an increase in Z_{ave} values of PSA immunosensor with NSB agents and a decrease in the absolute ZP values of PSA immunosensor with NSB agents. These changes in Z_{ave} and ZP values when compared to the original PSA immunosensor indicates that a new group bonded to the surface. HRP activity of the original magnetic PSA immunosensor was 62.906 U/mg_{solid}. The HRP activities of magnetic PSA immunosensors were 34.892, 48.070, 68.127 and 72.520 U/mg_{solid} for BSA, triton X-100, PEG and lysine, respectively. According to these results, it can be said that BSA and triton X-100 have a negative effect on HRP activity of the magnetic PSA immunosensor, whereas PEG and lysine have positive effect on the activity. The similar basic peaks were observed in the FTIR results for all types of the NSB agents.

Keywords: PSA, MIONP, NSB agent, immunosensor.

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Çiftçinin Gıda Amaçlı Bitkisel Yağ, Hayvan Yemi, En14214-En14212 Standardında Biyodizel, Isı ve Elektrik Enerjisi Üretmesini Sağlayacak Proses Tasarımı ÖnerisiMustafa Döngeloğlu^{1*}¹*Turhal Vocational School, Gaziosmanpaşa University, Turkey*
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Özet

Bu çalışmada, endüstriyel yağ bitkisi (ayçiçek, aspir, kanola, soya) üreten yerel çiftçinin kendi ihtiyacı olan miktarlarda soğuk pres gıda amaçlı bitkisel yağı, protein ağırlıklı yem, traktörü için biyodizel, ısı ve elektrik ihtiyacı için yakıt biyodizeli üretimini sağlayacak proses tasarımı önerilmiştir. Endüstriyel yağ bitkilerinin çekirdeklerinde ortalama %35-50 oranında bitkisel yağ vardır ve kalan kısım yağ harici protein ağırlıklı bir yapıdadır. Vidalı veya expeller soğuk pres makineleri ile hücre duvarı çatlatılarak yapıdaki yağın pres özelliklerine göre ortalama %80'i alınır. Bu çok kıymetli yapısı bozulmamış ısı görmemiş sızma bitkisel yağdır. Çekirdekten yağı alınan ve kalan %70'lik kısım mükemmel protein ağırlıklı hayvan yemidir. Bu yağın bir bölümü gıda amaçlı kullanılır, bir bölümü transestrifikasyon yöntemiyle tasarlanan plot prosesle biyodizele dönüştürülür. Elde edilen biyodizel jeneratörle elektrik enerjisi veya ısı enerjisi üretimi için kullanılır. Endüstriyel yağ bitkilerinden soğuk pres yöntemiyle istenilen kapasitede yağ edilmektedir. Mevcut yağ fabrikalarında üretimde birinci aşama sıcak mekanik preslemedir. Bu çalışmada, hiç ısı kullanmadan soğuk presleme gerçekleştirilmiştir. Bu amaçlı soğuk pres makineleri çok yaygın bulunmaktadır. Elde edilen ham yağ dinlendirme filitasyon aşamasından sonra gıda amaçlı olarak kullanılabilir. Bir bölüm ham yağ biyodizel amaçlı plot biyodizel ünitesinde transestrifikasyon yöntemiyle biyodizele dönüştürülür. Biyodizel (EN14214) olarak traktör, jeneratör ve tarım aletlerinde kullanılır. Yakıt biyodizeli (EN 14212) tarım amaçlı istenilen alanda kullanılabilir. Yağ harici elde edilen posa hiçbir ekipman kullanılmadan direkt olarak hayvan yemi olarak kullanılır.

Anahtar kelimeler: *Soğuk pres yağ, biyodizel üretimi, transestrifikasyon yöntemi, biyodizel, yakıt biyodizel*

Process Design Suggestion for Farmers to Produce Vegetable Oil for Food Purposes, Animal Feed, Biodiesel in En14214-En14212 Standard, Heat and Electric Energy

Abstract

In this study, the local farmer who produces industrial oil plants (sunflower, aspir, canola, soybean) has proposed a process design which will provide the production of vegetable oil, protein weight feed, biodiesel for the tractor, biodiesel for heat and electricity. The seeds of industrial oil plants have an average of 35-50% vegetable oil and the rest is a non-fat protein weighted structure. The cell wall is cracked with screw or expeller cold press machines, and 80% of the oil in the structure is averaged according to the press characteristics. This very valuable structure is untouched and unseen vegetable oil. The remaining 70% of the fat from the kernel is the excellent protein weight animal feed. Some of this oil is used for food, and some of it is transformed into biodiesel by a plot process, which is designed by transestrification. The resulting biodiesel is used for generating electricity or heat energy with the generator. Industrial oil plants are oiled at the desired capacity by cold pressing method. In the present oil plants, the first stage in production is hot mechanical pressing. In this work, cold pressing was carried out without using any heat. Cold press machines for this purpose are very common. The crude oil obtained can be used for food after the rehydration filtration step. One section is transformed into biodiesel by transesterification in the plot biodiesel unit for crude oil biodiesel. Biodiesel (EN14214) is used in tractors, generators and agricultural equipments. Fuel biodiesel (EN 14212) can be used for agricultural purposes. The pulp obtained from the oil is used directly as animal food without using any equipment.

Keywords: *Cold press oil, biodiesel production, transesterification method, biodiesel, fuel biodiesel*

Magnetic Levitation Force Measurements on TSMG YBCO and GdBCO

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Abstract

The levitation force measurements are very important for electric machine parts constructed from high temperature superconducting bulks such as the both rotor and the stator for rotary bearing.

Therefore vertical force measurements have been made on YBCO and GdBCO bulks fabricated by top seeded melt growth (TSMG) by the handmade levitation measurement system at liquid nitrogen temperature.

Maximum levitation force and hysteresis loss for the YBCO is higher than the GdBCO. This is because the current density of the GdBCO is higher than the YBCO.

Keywords: *Magnetic levitation force, YBCO, GdBCO, TSMG*

Ab-initio Calculations for the Structural, Mechanical and Electronic Properties of Martensite Phase in Cu₂AlBe Shape Memory AlloysCengiz Soykan^{1*}, Şükrü Yıldız²¹ Vocational School of Health Services, Ahi Evran University, Turkey² Department of Metallurgical and Materials, Ahi Evran University, Turkey*cengiz.soykan@ahievran.edu.tr

Abstract

The aim of this work investigate to the structural, mechanical and electronic properties of Cu₂AlBe in the martensite phase by using *ab-initio* method within the generalized gradient approximation (GGA) based on Density Functional Theory (DFT).

Different alloys have been suggested to be developed as a candidate for SMA's which show practically attractive characteristic improving the ductility. Cu-Al-Be alloy is a shape memory alloy that may be a candidate. Although, many experimental studies aiming to understand the physical properties governing the martensitic phase transition have been performed the *ab-initio* calculations have taken little interest in Cu-Al-Be alloys. A series of energy calculations based on density functional theory (DFT) have been carried out to investigate the structural, electronic and mechanical properties of Cu₂AlBe SMA's in the austenitic and martensitic structures. It was determined that cubic L2₁ austenitic phase is metastable at $a=5.712 \text{ \AA}$, the tetragonal NM, orthorhombic 3M, 5M, 7M and 9R martensitic structures are stable at $c/a=1.40$, $c/a=1.50$, $c/a=1.19$, $c/a=1.16$ and $c/a=1.24$, respectively.

The electronic properties of the structures considered in this study were calculated using DFT, with projector augmented wave (PAW) pseudopotential, as implemented in the Vienna *ab-initio* Simulation Package (VASP). The electronic exchange correlation function is described utilizing the generalized gradient approximation (GGA) parameterized by Perdew, Burke and Ernzerhof. The valence states considered in this work were $3d^{10}4s^1$, $3s^23p^1$ and $2s^2$ for Cu, Al and Be, respectively.

The lowest energy calculated for all the crystal structures was calculated around 40-45 meV. The energy difference between the new phases constitutes a kinetic energy barrier of about 400-450 K. The computed kinetic energy is higher than the selected energy value (1-10 meV) for convergence calculations where the systems is brought to equilibrium. Thus, it is clear that the calculated phases can be mentioned about the existence and dependence of each other on the heat. Furthermore, it was observed that phase to phase transition did not occur the depending on the pressure. The newly determined crystal phases of Cu₂AlBe alloy are calculated the structural parameters such as lattice constants $a(A^0)$, $b(A^0)$ and $c(A^0)$, bulk modulus $B(GPa)$ and it's pressure derivative B' , the elastic constants C_{ij} and electronic properties. The calculated newly phases means that both the material may have different physical properties and a significant contribution to the literature of Cu-Al-Be alloys.

Keywords: Density Functional Theory, Ab-initio calculation, Lattice parameters, Bulk Modulus, Elastic Stiffness coefficients.

Investigation of the Structural, Mechanical and Electronic Properties of Cubic L2₁ Austenitic Phase in Ti-V-Al Magnetic Shape Memory Alloys from First-Principles Calculations

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Abstract

We have performed first-principles total energy calculations using the Density Functional Theory (DFT) within the generalized gradient approximation (GGA) parameterized by Perdew, Burke and Ernzerhof and the interaction between the ion and electron are described by the projector augmented wave method (PAW) to investigate the structural, mechanical and electronic properties of the cubic L2₁ austenitic phase in Ti-V-Al magnetic shape memory alloys.

Titanium-based alloys owing to the combination of light weight and high strength are of practical interest for automotive and aerospace industries. Because, these materials have application areas at different temperatures. Ti-V-Al alloys can be an superior candidate for light weight shape memory alloys (LWSMA). Firstly, Ti-V-Al alloy has a relatively low density which is about 4.5 g/cm³. Namely much lower than the density of the conventional such as NiTi based alloy. Secondly, Ti-V-Al alloys has a great cold workability compared to the conventional alloys. The first principle calculations were performed within the GGA method according to DFT using VASP code. Interactions of the ions and electrons with each other's was characterized by PAW method. The energy convergency criterion of the electronic self-consistency was chosen as 10⁻⁸ eV/A⁰. The minimum total energy and ground state geometric properties were determined using the conjugate-gradient algorithm via minimizing stresses on atoms and Hellman-Feynman forces. During all relaxations Brillouin zone integration was accomplished by Gaussian broadening method for 0.1 eV.

The lattice parameter, bulk modulus, it's pressure derivative are calculated by using energy as a function of cell volume for cubic L2₁ crystal phase in Ti-V-Al shape memory alloy. In addition to, elastic stiffness coefficients are also calculated by using the linear respond method. We have also investigated the electronic properties such as density of state (DOS) and partial density of state (pDOS) to understand electronic behaviour of cubic L2₁ phase in T-V-Al material. Our results for structural parameters and elastic constants at the equilibrium phase are in good agreement with the available experimental and previous theoretical studies.

Keywords: First-principle calculation, Lattice parameters, Bulk modulus, Elastic stiffness coefficients, Density of state (DOS), partial density of state (pDOS).

Determination of the Success of the Raised Cosine Filter According to Modulation Types

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Abstract

Pulse shaping techniques are frequently used in modern data transmission systems to eliminate interference between symbols and to reduce bit error rates (BER). The raised cosine filter, which is one of the pulse shaping filters and belongs to the class of filters that satisfy the Nyquist criterion, is the most popular filter type used to eliminate inter-symbol interference. The rolloff factor value used in this filter is a parameter that varies between 0 and 1, directly affecting the filter's switching function and bandwidth. In this study, it is aimed to investigate the system performance in different modulation types by using the most appropriate rolloff factor value of the raised cosine filter.

In this work, a communication system simulator consisting of transmitter, transmission channel and receiver blocks was created using MATLAB programming language. In developed system, by using Pulse Amplitude Modulation (PAM) and Quadrature Amplitude Modulation (QAM), which are among the amplitude modulation types, Phase Shift Keying (PSK), Differential Phase Shift Keying (DPSK) and Quadrature Phase Shift Keying (QPSK), which are among to phase modulation types and Frequency Modulation Frequency Shift Keying (FSK) which is among to frequency modulation, the system performance in the Additive White Gaussian Noise (AWGN) channel is compared with the BER value according to the modulation types.

System performance calculated from the BER value in the communication system simulator created from the MATLAB environment was found to be 0.03615 for PAM, 0.00243 for QAM, 0.00071 for PSK, 0.02661 for DPSK, 0.00233 for QPSK and 0.16727 for FSK. As a result, it was found that the lowest BER value was obtained in the PSK modulation type using the 0.25 rolloff factor, which is the best value for the signal to noise ratio (SNR) 4dB.

Keywords: *raised cosine filter, modulation, awgn channel, Matlab*

SAR Estimation Due To Exposure from a Realistic Computational Smartphone

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Abstract

Technological improvements and dense use of wireless systems has led to an increase in exposed electromagnetic radiation (EMR) levels in recent years thus such as smartphones and tablets, have come into wide use. The number of opportunities for exposure to electromagnetic (EM) waves from such terminals is increasing in the general population. Therefore, to monitor the safety of radio-frequency EM fields, it is extremely important to estimate the specific absorption rate (SAR), which is the amount of EM energy absorbed by a human body exposed to EM waves from such terminals.

We estimated the specific absorption rate (SAR) of electromagnetic radiation by numerical simulation using a realistic computational smartphone model with three antenna for (main,diversity and bluetooth). Antennas used in smartphones frequency range: [0.7, 2.5] GHz (Steady-state Frequencies is 1.87 GHz) and computational head models with the anatomical structures of male adult. For simulating human head model and, smartphone also for calculation of SAR value we used Xfdtd programme .

Modeled in simulation the total weight of the head is 5.263 gr. In the vicinity of the operating frequency mentioned above, the conductivity of the head internal fluid is 1.4 S/m. The head's thermal conductivity is 0.026 W/(m.K). The average SAR sensor result was measured as 0.001223 W / kg for an average of 10g of tissue and the average SAR sensor result was measured as 0.001879 W / kg for an average of 1g of tissue. The net input power for the smartphone used in simulation is 0.002373 W while the total dissipated power is 0.002004 W.

Keywords: SAR, Xfdtd, computational head model, smartphone.

Piezo Elektrik İle Temiz Enerji Elde Edilmesi ve Metrolarda Aydınlatılmanın Sağlanması

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Özet

Piezoelektrik malzemeye basınç uygulandığı durumlarda elektrik enerjisi üretir. Basınç uygulanmaya devam ettiği takdirde enerji üretimi devam etmektedir. Bu çalışmada da Piezoelektrik malzeme konulduğu düşünülerek temiz ve yenilenebilir elektrik enerjisi üreterek, metrolarda sürekli aydınlatmanın gerekli olduğu yerlerde aydınlatmanın sağlanması için hesaplama yapılmıştır.

Çalışmada yurtdışında üretilen üçgen tipi ve her bir kenarı 50 cm. olan piezoelektrik malzeme kullanılmıştır. Malzemenin 5 watt ürettiği ve yaklaşık 12-48 volt ürettiği bilinmektedir. Üretilen enerjiden yola çıkılarak metronun içinde bir alan düşünülmüştür. Bu alanın sürekli aydınlatmaya ihtiyacı olduğu bilinmektedir. Metronun içindeki bu alanların aydınlatılması için yere bu üçgen malzeme ile döşendiği düşünülmektedir. Bu durumda toplam güç bulunmuş olup ve kaç armatürün çalışacağı hesaplanmıştır. Hesaplamaların sonunda maliyet ve amorti süresi çıkmıştır.

Çalışmada piezoelektrik malzeme kullanılarak metro istasyonlarında sürekli aydınlatma sağlamak için varsayımlar yapılarak hesaplamalar yapılmıştır. Hesaplamaların sonucunda yaklaşık 132 adet malzeme kullanılırsa, ortalama 528 watt üretileceği düşünülmektedir. Bu üretilen güçle yaklaşık 26 adet led lamba metrolarda aydınlatma sağlayacaktır. Gelecekte enerji kaynaklarının tükenmesi ve yenilenebilir enerji kaynağına ihtiyaç duyulması artacağı düşünüldüğün de amorti süresi uzun olsa da malzemenin kullanılması yararlı olacağı düşünülmektedir. Bu sayede temiz enerji kullanarak sürekli bir enerji ve tükenmeyen bir enerji elde edilmiş olacaktır.

Anahtar kelimeler: Piezoelektrik, Yenilenebilir enerji.

To Obtain Green Energy with Pizoelectricity and Providing Lighting to Subway

Abstract

When pressure is applied to the piezoelectric material, it generates electricity. When pressure continues to be applied, energy production is ongoing. In this study, it is assumed that the piezo material is placed on the floor and it is calculated to produce energies of clean and renewable electricity and to enlighten the places where constant illumination is required in the metro.

Piezoelectric material that the working triangle type's each side is 50 cm. is used. It is known that the material produced 5 watts and produced about 12-48 volts. A subway floor is considered as the produced energetic path. It is known that this area needs constant illumination. It is thought that this area is furnished with this triangular material in order to illuminate it. In this case, total power was found and how many lamps are to be worked. At the end of the calculations, the cost and amortization period has been founded.

Calculation was made by making assumptions to provide constant illumination at subway stations using piezoelectric material in the study. If approximately 132 pieces of material are used as a result of the calculations, an average of 528 watts is expected to be produced. With this generated power, approximately

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26 LED lamps will provide illumination on the metro. In the future it is thought that the consumption of energy sources and the need for renewable energy sources will increase, but the use of materials will be beneficial even if the amortization period is long. By using clean energy on meanwhile, a continuous energy and a non-consuming energy will be obtained.

Keywords: *Piezoelectricity, Renewable Energy.*

Real-Time Noise Monitoring System with WoT Framework

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Abstract

Noise, generally described as unwanted sound, is known to have several adverse effects on human life. The real-time monitoring of noise level in urban areas is important for a smart city. Noise mapping is state of the art in EU Environmental Noise Directive 2002/49/EC (END); it plays a significant role in noise control and city planning. [7] The paper aims to build a WoT-based real-time noise mapping system, used as a decision support system for urban planning and noise management.

A technology that can be developed for an integrated noise monitoring system is wireless sensor network (WSN) utilizing WoT sensor device, connected with microphone (dBA). As a communication protocol, we used WLAN 802.11b/g/n connectivity to store the data to a cloud system. A prototype of this system had been tested in the controlled laboratory environment and the performance of the developed system was as expected. The result of this system can be used by government and policy makers as basic information to take further actions reducing noise level.

In this designed system, the noise levels for every minute were calculated with WoT software around the laboratory. And the performance of the developed system was as expected. Result of this system can be used by government and policymakers as basic information to take further actions reducing noise level.

Keywords: Noise Monitor, Web of Things, WoT Nodes.

Design and implementation of Internet of Things for Fire Alarm System

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Abstract

In today's technological constructions, the need for integration between fire detection systems and other security and control systems is increasing day by day in the buildings, factories, business centers, hospitals and buildings where people are concentrated. For the extensive areas, especially industrial plants, the existing fire alarm systems do not provide an optimum solution. This paper provides a central solution.

The developed system connects all the fire nodes to central by using Wi-Fi communication. Each fire nodes consists of the Wi-Fi communication module, gas sensor, smoke sensor, motion, temperature and humidity sensor. The cloud server receives the data from the fire nodes and stores them in the table and plotting the variables simultaneously.

The designed system allows the temperature, humidity and luminosity variations to be viewed and controlled whenever users want from anywhere in the world. It is expected that the designed low-cost system will be more useful in existing industrial plants because of not necessary wire connection, reliability and easy set-up.

Keywords: *Smart Fire Alarm System, Internet of Things, Fire Nodes.*

A modified central composite design-based robust design optimization for both controllable and noise input variables

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Abstract

The aim of this study is to select an appropriate experimental design using both controllable and noise input variables in a regular experimental design space. Then, a robust design optimization model is proposed in order to obtain optimal operating conditions and reduce the variability for an estimated response.

Robust design is an effective quality improvement method in order to reduce the process variability as soon as possible. In the literature, the traditional central composite design is widely used for robust design optimization models. This method is highly effective method in order to run an experiment in a regular experimental design space for controllable input variables. For some quality engineering situations, both controllable and noise input variables may be needed to run an experimental design. Therefore, the traditional central composite design may not be an appropriate choice. This study lays out the theoretical foundation of the modified central composite design for both controllable and noise input variables. A modified central composite design-based robust design optimization model is then proposed to in order to obtain optimal operating conditions and reduce the variability for an estimated response. Comparison study is also conducted with the traditional counterparts.

A numerical example shows that the proposed model may be effective to reduce the process variability while considering the slight process bias.

Keywords: *quality engineering, modified central composite design, robust design, controllable and noise input variables, optimization.*

P-value-based nonlinear programming models for continuous quality improvement

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Abstract

The aim of this study is to improve processes and products using p-value-based nonlinear programming models while minimizing the variability.

Continuous quality improvement is an effective approach in order to reduce the process and product variability while considering nonlinear programming models. In addition, a p-value determines the significance of an effect for the response. In this study, the least square method is used with the p-value concept to obtain the fitted mean, standard deviation and variance response functions. P-value-based nonlinear programming models are then proposed using these fitted response functions in order to reduce the process and product variability as possible as.

A numerical example is provided to illustrate the effectiveness of the proposed p-value-based nonlinear programming models.

Keywords: *continuous quality improvement, nonlinear programming models, p-value concept, least square method, optimization.*

Stator ve Rotor Kalınlığının Şebeke Kalkışlı EA-SMSM'nin Performansına Etkisi

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Özet

Dünyada, enerji tüketiminde elektrik motorları büyük paya sahiptir. Bu yüzden elektrik motorları kullanıcıları/üreticileri daha verimli motorlar kullanmaya önem vermektedirler. Elektrik motorlarında verimliliği etkileyen unsurlardan biri de nüve kayıplarıdır. Bu çalışma ile bir elektrik motorunun tasarım aşamasında stator ve rotor kalınlıklarının motor çıkış parametrelerine etkisi incelenmiştir.

Bu çalışmada prototip motor olarak 5.5 kW mil gücünde 4 kutuplu Şebeke Kalkışlı Eksenel Akılı Sürekli Mıknatıslı Senkron Motor (EA-SMSM) tasarlanmıştır. Şebeke Kalkışlı EA-SMSM Sonlu Elemanlar Yöntemi (SEY) ile modellenmiştir. Prototip motorun. SEY ile analizi ANSYS Electromagnetic 16.0 programında gerçekleştirilmiştir. Optimum stator ve rotor kalınlıklarını belirlemek için prototip motorun diğer parametreleri sabit tutulmuştur. Stator kalınlığı belirlenirken, stator kalınlığı 55mm -60mm aralığının da 0.5 mm değerlerinde artırılmıştır. Aynı işlem rotor kalınlığı için 35 mm -42 mm değerleri arasında tekrarlanmıştır. Bu işlemler, dinamik çalışma koşullarında tam yükte 0.001 sn zaman aralıkları ile 1.8 sn süresince Şebeke Kalkışlı EA-SMSM'nin çalıştırılması ile gerçekleştirilmiştir.

Stator ve rotor ölçülerinin belirlenmesinde motorun stator akımlarının ortalama rms değeri, güç faktörü, malzemelerde meydana gelen akı yoğunlukları, tork dalgalanması ve en önemlisi verim değeri belirleyici olmuştur. Şebeke Kalkışlı EA-SMSM'nin dinamik çalışma koşullarında elde edilen sonuçlara göre stator kalınlığı 60 mm, rotor kalınlığı ise 42 mm değerinde iken hedeflenen sonuç elde edilmiştir.

Keywords: *Eksenel Akı, Motor Verimi, Şebeke Kalkışlı Eksenel Akılı SMSM.*

Influence of the Stator and Rotor Thickness to the Performance of a Line Start AF-PMSM

Abstract

In the World, electric motors have a large share in energy consumption. Because of this, users/manufactures of electric motors take attention to use more efficient motors. One of the factors affecting efficiency in electric motors is core loss. This study examines the effect of stator and rotor thickness on the motor output parameters of an electric motor during the design phase. This section must describe the main objective of the current study.

In this study, 4 poles 5,5 kW shaft power Line Start Axial Flux Permanent Magnet Synchronous Motor (AF-PMSM) was designed. Analysis of the prototype motor with FEM was performed in ANSYS Electromagnetic 16.0 program. The other parameters of the prototype motor are kept constant to determine the optimum stator and rotor thicknesses. When the stator thickness is determined, the stator thickness is increased by 0.5 mm in the range of 55mm-60mm. The same procedure was repeated between 35 mm and 42 mm for rotor thickness. These operations were performed by running the AF-PMSM was operated for 1.8 sec with a time interval of 0.001 sec at full load in dynamic operating conditions.

Determination of stator and rotor dimensions; the average rms value of the stator currents, the power factor, the flux densities occurring in the materials, the torque ripple and, most importantly, the efficiency value have been decisive. According to the results obtained in dynamic working conditions of Line Start AF-PMSM, the targeted result was obtained when the stator thickness was 60 mm and the rotor thickness was 42 mm.

Keywords: *Axial Flux, Motor Efficiency, Line Start Axial Flux PMSM.*

BLDC Motor Design for Electrical Vehicle

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Abstract

Brushless Direct Current Motors (BLDC) are preferred as drive elements especially in electric vehicles due to their high torque, high moment capability, long life and flexible controlling ability. In this study, the design of an external rotor BLDC for electrical vehicles was carried out.

The power calculation for 300 kg weight electric vehicle was realized. Then, analytical calculations of an external rotor BLDC motor at this power value were made. The motor which is analytically calculated 2.5 kW output power is modeled with RMxprt in the ANSYS Electromagnetics 16.0 program. After the analytical and electromagnetic design has been completed, the thermal design of the motor under full load has been done.

As a result of the analytical design, a 26-poles outer rotor BLDC motor was obtained that can operate at 48 V operating voltage, 2.5 kW shaft power, 880 rpm nominal speed and over the 90% efficiency. It is seen that analytical and electromagnetic analysis results are similar. In the analysis result at RMxprt, the BLDC air gap flux density was 0.9 T. According to the result of thermal analysis, the maximum value of the temperature in the motor was 58 °C which is occurred at the stator windings.

Keywords: *Motor Design, BLDC Motor, Electromagnetic Analysis.*

Experimental and Computational Study of 2,4,6-Trimethylpyridine-3-amine

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Abstract

Experimental studies on 2,4,6-Trimethylpyridine-3-amine have been crosschecked by using the B3LYP and B3PW91 levels of density functional theory (DFT). As the literature survey reveals neither quantum chemical calculations nor an experimental study of 2,4,6-Trimethylpyridine-3-amine has been reported so far.

2,4,6-Trimethylpyridine-3-amine was purchased from Sigma-Aldrich Company with a stated purity 97%. The IR spectrum of the title molecule was recorded in the range of 4000 – 400 cm⁻¹ using a Perkin-Elmer FTIR spectrometer using KBr disc. The title compound was subjected to the B3LYP [1] and B3PW91 [2] levels of Density Functional Theory (DFT) calculations to obtain the optimized geometrical parameters and vibrational frequencies. All calculations were performed using GAUSSIAN 09W [3] software package and GAUSSIAN VIEW 5.0 molecular visualization program [4].

In this study, structural, electronic, and spectroscopic studies of 2,4,6-Trimethylpyridine-3-amine have been achieved both experimentally and theoretically. The vibrational frequencies in ground state were calculated by using the DFT method B3LYP and B3PW91 levels with the 6-311 ++ G(d,p) basis set. The vibrational spectral data were compared with experimental ones. The vibrational wavenumbers obtained by the two different methods are in well agreement with that from FT-IR. The electronic transitions were investigated by time dependent DFT (TD-DFT) method with integral equation formalism-polarized continuum model (IEF-PCM). The HOMO (Highest Occupied Molecular Orbital) and the LUMO (Lowest Unoccupied Molecular Orbital) are called frontier molecular orbitals (FMOs). The energy gap between FMOs is a critical parameter in determining chemical reactivity of the molecule such as hardness, softness chemical potential, and electronegativity. The frontier molecular orbital energies, hardness, softness and electronegativity were evaluated using the DFT (B3LYP and B3PW91) method with the 6-311++G(d,p) basis set.

Keywords: *Energy, Quantum Chemical Calculation, FT-IR*

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A Combined Theoretical and Experimental Study of Cu (II) Complex with 2,6-Pyridinedicarbonyl DichlorideHatice VURAL^{1*}, Metin ORBAY², Telhat OZDOGAN³¹*Department of Electrical and Electronics Engineering, Faculty of Technology, Amasya University, Amasya*²*Department of Science Education, Faculty of Education, Amasya University, Amasya*³*Department of Computer Education and Instructional Technology, Faculty of Education, Amasya University, Amasya**hatice.vural@amasya.edu.tr

Abstract

The molecular, electronic structures and the spectroscopic characterization of the copper (II) complex with 2,6-pyridinedicarbonyl dichloride have not been performed so far. In this study, we have determined both the structural and energetic properties of the copper (II) complex with the 2,6-pyridinedicarbonyl dichloride ligand.

2,6-pyridinedicarbonyl dichloride was purchased from Sigma-Aldrich Company with a stated purity 97%. An aqueous solution of Cu(Cl)₂ (1 mmol, 0.13g) in water (20 ml) was added to a solution of 2,6-pyridinedicarbonyl dichloride (1 mmol, 0.20g) in methanol (20 ml) under stirring at room temperature in a 1:1 M ratio for 1 h. Blue crystals of the title complex that are stable in air were obtained by filtration of the result solution. The IR spectrum of the title molecule was recorded in the range of 4000 – 400 cm⁻¹ using a Perkin-Elmer FTIR spectrometer using KBr disc. The Cu(II) complex was subjected to the Hartree Fock (HF) [1] and Density Functional Theory (DFT) /B3LYP [2] methods with 6-311++G(d,p) basis set. All calculations were performed using GAUSSIAN 09W [3] software package and GAUSSIAN VIEW 5.0 molecular visualization program [4].

A new copper (II) complex with 2,6-pyridinedicarbonyl dichloride was synthesized and characterized by X-ray diffraction (XRD) and Fourier Transform-Infrared (FT-IR) spectroscopy. Molecular modeling of the Cu(II) complex was done by using the Hartree Fock (HF) and Density Functional Theory (DFT) methods. The geometric parameters obtained by the two different methods are in well agreement with that from XRD data. The vibrational spectrum of the title complex was experimentally recorded using FT-IR. The calculated vibrational frequencies were compared with the corresponding experimental data. The theoretical results show good agreement with experimental ones. The HOMO (Highest Occupied Molecular Orbital) and the LUMO (Lowest Unoccupied Molecular Orbital) are called frontier molecular orbitals (FMOs). The energy gap between FMOs is a critical parameter in determining chemical reactivity of the molecule such as hardness, softness chemical potential, and electronegativity. The frontier molecular orbital energies, hardness, softness, and electronegativity were investigated using DFT/B3LYP method with the 6-311++G(d,p) basis set.

Keywords: XRD, FT-IR, Energy, Quantum Chemical Calculation

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Printing a Tensile Sample from the FDM Type 3D Printer

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Abstract

Today, additive manufacturing techniques are rapidly developing and popular. Especially, the Fused Deposition Modeling (FDM), from the additive manufacturing methods, is at the forefront due to its simplicity and low cost. In this study, prints were taken from an FDM type printer to determine the mechanical properties of ABS (Acrylonitrile Butadiene Styrene) and PLA (Polylactic Acid) materials.

In order to determine the tensile strengths of ABS and PLA materials, samples were obtained by taking the parameters such as percentage of fullness, printing temperature and printing speed into consideration. The samples were printed with 3 different percentages, %60, %80 and %100. The pressure temperature is 200, 210 and 220 ° C in PLA and 240, 250 and 260 ° C in ABS. According to the print speed parameter, the samples were printed at 50, 70 and 90 mm/s. Subsequently, tensile strengths were determined by subjecting the samples to a tensile test.

According to the results, PLA is better positioned than ABS. It 's shown that as increases in infill ratio the tensile strength values increase both in PLA and ABS.

Keywords: Additive Manufacturing, 3D Printing, Fused Deposition Modeling (FDM)

3D Printer Selection for Industrial Design Offices by Using DEMATEL- VIKOR Based Approach

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Abstract

3D printing technology has developed rapidly in recent years. Because of its rapid prototyping feature, three-dimensional printers are often used for prototyping in the product development phase. 3D printer selection is important in industrial design offices. It is a multi-criteria decision making problem for decision makers. In 3D printer selection, there are a lot of criteria such as surface quality, dimensional tolerance, printing speed, printer price, colour, maintenance and noise. Aim of study is the determining criteria and selecting the most suitable 3D printer among alternative printers for industrial designers in office environments.

There are many 3D printer alternatives that can be used to make prototypes in the product design phase. Eight of the 3D printer models that are frequently used in the market have been selected by taking benefit of expert opinions. A hierarchical structure consisting of 14 sub-criteria based on main criteria which are economical, performance, technical and other parameters was established to evaluate alternatives by using the literature. Since the problem of 3D printer selection includes ambiguity and conflicting criteria, it is suitable to use a multi criteria decision making method to solve this problem. In this study, The Decision Making Trial and Evaluation Laboratory (DEMATEL) method is used for weighting the evaluation criteria and the Vise Kriterijumska Optimizacija I Kompromisno Resenje (VIKOR) method is applied for selecting suitable 3D printer for industrial designers in office environments.

Among the criteria evaluated in this study, post-printing processes and harmful gas release criteria have a lower effect than other criteria on the choice of 3D printer. The weight of the other criteria is close to each other. However, the cost of parts, printer price and print speed criteria have a higher effect on the selection than others. According to the obtained weights, Ultimaker 2+ is chosen as the most suitable printer among the eight alternatives. Although the Makerbot Replicator is cheaper than the Ultimaker 2+, it is in second place. because it has lower performance considering the criteria such as size tolerance and surface roughness, print speed and machine size. The MakerBot Replicator has become the second option, although it is cheaper than the Ultimaker 2+. According to decision makers, it is not the most suitable 3D printer because of its dimensional tolerance and lower performance when the criteria such as surface roughness, print speed and machine size are taken into consideration.

Keywords: 3D printer, additive manufacturing, DEMATEL, VIKOR.

Creating a Turkish Second-Hand Car Dataset for Machine Learning

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Abstract

With the growing tax rates in Turkey, demand for second-hand cars is increasing. In this work, we analyzed second-hand car advertisements on a publicly available website. We tried to find the diversity of advertisements and factors affecting car prices and other features.

Second-hand car data was first scraped using a web crawler tool named Scrapy from a second-hand car advertisement web site. In order to detect outliers, we used Elliptic Envelope and One-class Support Vector Machines and did some manual checks. Then some computed features are calculated like painted part count, changed part count etc. Some statistical properties of the data are analyzed. Finally, correlation analysis is applied to detect how much features are related with others.

After purification of the data we obtained a dataset of seventy-two thousand second-hand car dataset to be used for machine learning purposes. The dataset consists of 477 different models of 59 brands from every city in the country.

Keywords: *second-hand car dataset, outlier detection, data analysis*

Additive Manufacturing Technique Selection for Investment Casting Applications with integrated fuzzy AHP and TOPSIS Approach

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Abstract

Additive manufacturing techniques are one of the newest manufacturing methods and technological direction nowadays. The additive manufacturing techniques used in many areas are also frequently used in investment casting applications. There are a lot of additive manufacturing techniques such as vat photopolymerization, powder bed fusion, extrusion based systems, material jetting, binder jetting. Each of these manufacturing techniques has advantages and disadvantages in investment casting applications. These techniques can be compared to many criteria such as print speed, dimensional tolerance, surface roughness, print size, pattern cost and maintenance. Aim of study is the ranking additive manufacturing methods for investment casting applications.

The additive manufacturing method selection is a multi-criteria decision making problem. There are a lot of conflicting criteria such as print speed, dimensional tolerance, surface roughness, print size, pattern cost and maintenance. Having many conflicting criteria makes it difficult to choose the appropriate additive manufacturing method. For this reason, an appropriate additive manufacturing method for investment casting applications can be select by using a multi-criteria decision making technique. Common criteria and alternative additive manufacturing techniques have been determined by taking into account the literature and expert opinions. The appropriate manufacturing technique has been determined by evaluating nine sub-criteria under the main criteria of economical, performance and technical. Fuzzy Analytic Hierarchy Process (FAHP) method is used for weighting of criteria and Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) method is used for evaluation of manufacturing methods according to obtained weights.

As a result of comparison of the criteria used in the selection of the investment casting alternatives, model cost, dimensional tolerance and surface roughness criteria have the highest weight and maintenance and post-press process criteria are ineffective. By using these weights, the extrusion based systems are the most suitable manufacturing techniques for the investment casting. Other manufacturing techniques are material jetting, powder bed fusion, vat photopolymerization and binder jetting respectively.

Keywords: 3D printer, additive manufacturing, investment casting, fuzzy AHP, TOPSIS.

Katı Atık Depolama Sahası Seçiminde Coğrafi Konum Kriterlerinin Analizi: Literatür İncelemesi

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Özet

Katı atık depolama, katı atıkların bertaraf edilmesi için en yaygın yöntem olarak uzun yıllar kullanılmaktadır. Bununla birlikte, yeni bir atık depolama alanının kurulmasında en önemli aşama, kullanılacak alanın seçimidir. Çünkü katı atık depolaması için uygunsuz bir alanın seçilmesi toprak, hava ve yeraltı sularının kirlenmesine, hastalıkların yayılmasına veya kontrolsüz metan salınmasına neden olabilir. Bu nedenle, depolama sahası seçimi, farklı boyuttaki kriterlerin ele alındığı ve bilimsel olarak uygulandığı bir süreç olmalıdır.

Geçtiğimiz on yıllarda, atık sahası seçimi ile ilgili gerçek vaka incelemelerinde, yöntemlerin ve/veya araçların (örn. coğrafi bilgi sistemleri (CBS), çok kriterli karar verme) uygulanması ile ilgili çeşitli araştırma makaleleri yayınlanmıştır. Bu çalışmada, belediyenin katı atık depolama alanları seçimi yapılırken CBS tabanlı yerleşim analizinde uygulanan jeo-mekansal ölçütler araştırılmıştır. Bunu yapmak için, bu çalışmada, aday depolama alanlarının değerlendirilmesinin yapıldığı literatürdeki 30 makale incelenmiştir. Çalışma, düzenli depolama alanlarının analiz için jeo-mekansal kriterler için kapsamlı bir rehber sunmaktadır.

Çalışmada, yerleşim alanlarına uzaklık, ana yollara uzaklık, eğim ve yüzey suyu veya akiferler gibi kriterlerin katı atık depolama sahasının seçiminde sıklıkla kullanıldığı ortaya konulmuştur. Bu nedenle, belediyelerin, katı atık depolama alanlarının seçimi ve yatırımından önce şehirleşme planlarını ve toprak yapısını araştırmaları gereklidir.

Ahatar Kelimeler: *Geo-mekansal kriterler, CBS, katı atık depolama alanı seçimi, literatür araştırması.*

Analysis of Geo-spatial Criteria for Landfill Site Selection: A Literature Review

Abstract

Landfilling has been used for many years as the most common method for the disposal of solid waste. However, the most important stage in the development of a new landfill is the selection of the site to be used. Because the inappropriate selection of a site can contribute to the contamination of soil and ground water, air pollution, spreading of diseases, or uncontrolled release of methane. Therefore, landfill site selection should be a step-by-step process, in which different dimensional criteria are applied successively and scientifically.

During recent decades a variety of research articles have been published regarding the implementation of methods and/or tools (e.g. geographic information systems (GIS), multi-criteria decision making) in a variety of real-world case studies of landfill site selection. In this study, the geo-spatial criteria implemented in GIS-based siting analysis when selecting the sites for municipal solid waste landfills are discussed. To do so, this paper reviews 30 papers in which the evaluation of candidate landfill sites is conducted. The review provides a comprehensive guide to the geo-spatial criteria for landfill siting analysis.

Finally, the review revealed that the distance to settlement areas, distance to main-roads, slope and surface water or aquifers are common geo-spatial criteria in the selection of landfill site. Therefore, it is necessary for municipals to investigate the urbanization plans and soil structure prior to landfill site selection and investment.

Keywords: *geo-spatial criteria, GIS, landfill site selection, literature review.*

Establishment of Adventitious Root Cultures and Analysis of Bioactive Compounds in *Occimum basilicum* L.İlhami Karataş^{1*}, Rahime Karataş², Nusret Genç³ and Mahfuz Elmastaş⁴¹Department of Forestry / Almus Vocational School, Gaziosmanpaşa University, Turkey²Middle Black Sea Transitional Zone Agricultural Research Institute/ Ministry of Food, Agriculture and Livestock, Turkey³Department of Chemistry / Faculty of Arts and Sciences, Gaziosmanpaşa University, Turkey⁴Faculty of Pharmacy, University of Health Sciences, Turkey*(ilhami.karatas@gop.edu.tr) Email of the corresponding author

Abstract

Adventitious root cultures, one of the plant cell, tissue and organ culture methods, are one of the alternative methods in which valuable plant secondary metabolites can be produced commercially. In this study, adventitious root development was investigated in calli obtained from different nutrient media conditions in basil (*Occimum basilicum* L.) plants. In addition, the total phenolic contents, flavonoid contents, antioxidant activity and individual phenolic composition (contents of 12 phenolic compound) of the adventitious roots were examined.

Adventitious root cultures were induced from callus cultures obtained from hypocotyl explants on solid Murashige and Skoog (MS) medium supplemented with different amounts and combination of auxin (2,4-Dichlorophenoxyacetic acid (2,4-D), Indole-3-acetic acid (IAA), Indole-3-butyric acid (IBA), and Naphthalene acetic acid (NAA)) and cytokinin (Benzyl aminopurine (BAP)). After 30 days, the adventitious root were extracted in methanol-dichloromethane to determine the antioxidant activity, total phenolic, flavonoid and individual phenolic content. The distribution of phenolic compounds containing 4-hydrobenzoic acid, salicylic acid, vanilic acid, ferulic acid, rosmarinic acid, chicoric acid, caffeic acid, gallic acid, epicatechin, rutin, quercetin, and kaempferol were determined by high performance liquid chromatography equipped with diode-array detection (HPLC-DAD). The antioxidant capacities of the adventitious root were measured by 2,2-azino-bis(3-ethylbenzthiazoline-6-sulfonic acid) (ABTS) radical scavenging, 1,1-diphenyl-2-picryl-hydrazyl (DPPH) free radical scavenging and ferric reducing antioxidant power (FRAP). Total phenolic and flavonoid contents were determined by Folin-Ciocalteu and aluminum chloride methods, respectively.

The rate of adventitious root development in callus varies between 0 and 95%. The highest adventitious root development in callus was obtained from nutrient media containing NAA and IBA. The root development was not observed in calli obtained from nutrient media containing 2,4-D. The average number of roots per callus varies between 0 and 4,33. According to HPLC results, individual phenolic compound contents were showed that the main phenolic compounds are rosmarinic acid, caffeic acid and ferulic acid. The other compounds either detected in low amounts or not determined at all. Rosmarinic acid accounts for about 77 % of the total phenolic compound content. Flavonoid content is about 6 % of the total phenolic content. Adventitious root extract exhibited high DPPH free radical scavenging activity and ABTS radical scavenging activity in addition to high ferric reducing antioxidant power.

Keywords: *Adventitious root cultures, Antioxidant activity, Flavonoid, Occimum basilicum, Phenolic compound*

Et Ürünlerinde Nitrozaminler ve Sağlık Üzerine EtkileriEngin Eldivenci^{1*}, Cemal Kaya², Mustafa Bayram³¹*Meat and Milk Corp. General Directorate, Turkey*^{2,3}*Gaziosmanpaşa University, Department of Food Engineering, Turkey*^{*}*engin.eldivenci@esk.gov.tr*

Özet

Nitrozaminler, $R_1R_2N-N=O$ genel yapısına sahip bileşikler olup doğada; toprakta, suda ve havada bulunabilirler ve gıdaları, yemleri, ilaçları ve kozmetikleri kontamine edebilirler. Gıdalarda nitrozamin oluşumu, sekonder veya tersiyer aminlerin; nitroksit, nitrat veya nitrit tuzları gibi bir nitrolama ajanı ile reaksiyonu sonucu oluşurlar. Et ürünlerinde, patojen bakterilerden özellikle *Clostridium botulinum* türlerini inhibe etmek, stabil renk ve aroma oluşumu sağlamak amacıyla nitrat ve nitrit tuzlarının kullanımı zorunludur. Nitrat ve nitrit tuzları, ette bulunan amin bileşikleriyle reaksiyonu sonucunda nitrozamin oluşturma riskine rağmen daha uygun bir alternatif bulunmadığı için günümüzde et ürünlerinde halen kullanılmaktadır.

N-nitrozo bileşiklerinin oluşumunda; et ürünlerine uygulanan ısıl işlem parametreleri, ilave edilen nitrit ve nitrat tuzları ile askorbik asit miktarlarının yanında, pişirilme şekli, pişirme süresi ve uygulanan sıcaklık etkili olmaktadır. Özellikle kızartılarak pişirilen nitritle kürlenmiş etlerde, N-nitrozo bileşiklerinin daha fazla oluştuğu bilinmektedir.

Pek çok epidemiyolojik çalışma, et ürünleri tüketimi ile barsak, pankreas ve mide kanseri arasında olduğu gibi kardiyovasküler hastalıklar arasında da anlamlı bir ilişki olduğunu göstermiştir. N-Nitrozo bileşiklerinin, deney hayvanları üzerinde yapılan araştırmalar sonucunda toksik, teratojenik, mutajenik ve kanserojenik etkilerinin olduğu belirtilmiştir.

Et ürünlerinde, askorbik asit (C vitamini), alfa-tokoferol (E vitamini) ve polifenolik maddeler gibi antioksidanların katkı maddesi olarak uygun miktarlarda kullanımı ile N-nitrozo bileşiklerinin oluşumu azaltılabilmekte ya da tamamen önlenmektedir. Yapılan bir çalışmada yeşil çay polifenollerini ve üzüm çekirdeği ekstraktı ilave edilmiş soslerde, nitrosodimetilamin (NDMA) oluşumunun belirgin derecede azalmış olduğu görülmüştür.

Anahtar kelimeler: Nitrozamin, et ürünleri, sağlık, kanser

Nitrosamines in Meat Products and Effects on Human Health**Abstract**

Nitrosamines are chemical compounds of the general chemical structure $R_1R_2N-N=O$ which can occur in water, air and soil. Nitrosamines can contaminate food, drug and cosmetics. These compounds can be formed by reaction between secondary or tertiary amines and a nitrosating agent like nitroxide, nitrate-nitrite salts. Addition of nitrate-nitrite salts to meat products are essential due to inhibiting some pathogenic bacteria particular to *Clostridium botulinum* and improving colour and aroma stability. Although these additives cause formation of nitrosamines, they are still in use today due to lack of any other better option. In the formation of N-nitroso compounds; the heat treatment parameters applied to meat products, the amount of added nitrite and nitrate salts and the content of ascorbic acid, as well as the cooking method, the cooking time and the applied temperature are effective. It is known that more N-nitroso compounds are formed in nitrite-cured meats, especially fried and cooked. Many epidemiological studies showed a significant association between cardiovascular diseases as well as between meat consumption and intestine, pancreas and stomach cancer. N-nitroso compounds have been reported to be toxic, teratogenic, mutagenic and carcinogenic effects as a result of investigations on experimental animals. The use of antioxidants such as ascorbic acid (vitamin C), alpha-tocopherol (vitamin E) and polyphenolic substances as additives can reduce or completely prevent the formation of N-nitroso compounds in meat products. In a study conducted, it was observed that the formation of nitrosodimethylamine (NDMA) decreased significantly in green tea polyphenols and grape seed extract added sausages.

Keywords: Nitrosamines, Meat Products, health, cancer

The Effect of Ti Content on Mechanical and Microstructural Properties of Melt Spinned Al-Si Alloys powdered by Cryomilling

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Abstract

In this study, the effect of Ti addition (0, 1, 3, 5, 7, 10 wt%) on the microstructure and mechanical properties of Al-25Si alloys fabricated by melt spinning was investigated. Also powdered samples by cryomilling were investigated by the mean of morphologically.

The microstructure and structural characterization were performed by X-ray diffractometry (XRD), optical microscopy (OM) and scanning electron microscopy (SEM) with an energy dispersive X-ray spectroscopy (EDS). Mechanical properties of spinned types were investigated by micro hardness test.

With increasing the Ti contents in Al-Si alloys, mechanical properties of the type alloys increased first, then decreased, and again increased with a maximum Ti contents. The improvement on mechanical properties can be explained by the refinement of primary Si by the well-surrounded and uniformly distributed Ti but diminish can be explained by the growth of primary Si.

Keywords: Al-Si Alloys, Titanium adding, Rapid solidification, Cryogenic milling

Numerical Analysis of Temperature Distribution of Superconducting Coil Stack

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Abstract

In this study, magneto-thermal studies were carried out by solving Ampere and heat conduction equations together in superconducting coil stacks wounded by coated conductors.

The coil stack used in the calculations consists of 4 bobbins in the solenoidal structure and each bobbin has 100 windings. Coated conductors are 12mm in width, 100 µm in thickness and has 100 A critical current density.

The two-dimensional temperature distributions of the coil stack for different current amplitudes were obtained. The effect of the distance between the coils and the frequency of the applied current on the coils temperature was investigated. As the current amplitudes increases, the temperature in the coils increases and as the distance between the coils increases, the temperature decreases.

Keywords: *Coil stacks, High temperature superconductor, Magneto-thermal analysis.*

Acknowledgments: This study is supported by the Scientific and Technological Research Council of Turkey (TUBITAK) under the grant number 114F424.

Finite Element Analysis of Electro-Mechanical Properties of Superconducting Coil Stack

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Abstract

In this study, the stresses formed by the Lorentz force were investigated in the superconducting coil stacks consisting of four bobbins carrying the transport current using the finite element method.

Coupling of Ampere for electromagnetic analysis and "mechanical equilibrium equation" partial differential equations in terms of displacement field for the mechanical part were solved in Comsol Multihysics finite element software. A-V formulation for the solution of the ampere equation and plain strain approach for the mechanical part.

The results obtained from the numerical calculations were compared with the analytical expressions extracted for the superconducting slab exposed to the magnetic field and the stripe passing through the transport current. A very good agreement between the numerical calculations and the analytical calculations were obtained. The two dimensional radial and axial stress distributions in the coils during the current flow are shown. During the current activation, the maximum stress changes occurring in the coil stack were obtained. Numerical calculations showed that the maximum stresses induced by the Lorentz force were well below the permissible values for tapes

Keywords: *Coil stacks, High temperature superconductor, Magneto-thermal analysis.*

Acknowledgments: This study is supported by the Scientific and Technological Research Council of Turkey (TUBITAK) under the grant number 114F424.

Greenery systems as an energy-efficient retrofit solution toward 2030 and 2050 zero-carbon building targets

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Abstract

By increasing the welfare of the people living in urban areas, the energy consumption has considerably grown over the last four decades all over the world. Based on a report presented by International Energy Agency, the global energy uses increase by 93% from 1971 to 2014. The buildings are greatly responsible for this growing rate and according to United Nations Environment Program (UNEP), 40% of total world energy consumption is attributed to building sector. In European countries, buildings account for 36% of total greenhouse gas emissions. Through technological advancement, comfort conditions of dwellers improve but the improvements also affect total energy consumption in building sector. In this respect, building sector attracts attention of many policy makers and governments to reduce the building-related energy consumption and to mitigate the role of buildings in greenhouse gas emissions. As claimed by UN, green buildings have an advantage to obviate hazardous effects of existing buildings on environment. Based on the survey carried out in the USA, traditional buildings consume approximately 30% more energy in proportion to green buildings. Not only the mitigation of energy consumption levels but also the prevention of greenhouse gas emissions is achieved owing to green buildings. Greenery systems are considered as a decisive solution for existing buildings for efficient-use of energy throughout the building envelope. On the basis of the research findings, the heat loss from the roofs in cooling and heating seasons decreases by approximately 70-90% and 10-30%, respectively due to green roofs. Vertical greenery systems provide a reduction in peak cooling load transferred through the walls about 28% on a clear sunny day. Moreover, the range of temperature difference between living wall and bare wall is reported to be 1-31.9°C. The heat flux reduction is found to be in the range of 30-70 W/m² during daytime and 1.5 W/m² during night. In addition to these, when compared the green roofs to the vertical greenery systems with respect to annual carbon accumulation, the amounts of CO₂ accumulated by green roofs and vertical greenery systems are in the range of 0.375-30.12 kg carbon/m² and 0.99-0.14 kg carbon/m², respectively. The aim of this study is to provide an overview about the benefits of greenery systems and to illustrate energyefficient retrofit solutions of greenery systems to reach the 2030 and 2050 target designated by European Commission in terms of CO₂ emissions and energy consumption.

Keywords: *Greenery systems, energy consumption, greenhouse gases, energy saving, energy-efficient retrofit*

Dissection of Four QTLs on a Synthetic Hexaploid Bread Wheat (*Triticum aestivum* L.) Mapping Population

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Abstract

Bread wheat (*Triticum aestivum* L.) is the third crop by production and first crop by food consumption with maize and rice. Efforts to increase grain yield in these crops have been a major objective for plant breeders since modern breeding. Same trait was always one of the top priorities of farmers since domestication. Within the last century, crop yields increased dramatically especially after Green-Revolution. However, over the last two decades, devastating losses caused by climate change were noticed. Major factor for the losses was low performance of current cultivars under stressed conditions. It caused a gear change in breeding with more emphasis on stress tolerance. Root system, as the main organ for water and nutrient uptake, gained interest in stress studies, however, it is still hard to incorporate root phenotyping in classical breeding. Marker Assisted Selection (MAS) provides significant advantages to breeders to eliminate costly phenotyping. We aimed at dissecting genetics of root system, to incorporate these traits in to breeding goals with minimal cost.

147 lines from previously mapped Synthetic* Opata Bi-Parental mapping population used for phenotypic analysis. Plants grown in PVC tubes 1 m long and 10 cm in diameter, filled with #30 grade silica sand. Plants grown until maturity and watered daily with half strength Hoagland's nutrient solution. Phenotypic and phenologic parameters are collected over the season and after experiment completed. Above and below ground parts separated and roots washed carefully with low pressured water. Dry weights of roots and shoots were taken for statistical analysis. Linkage and QTL mapping were conducted with appropriate softwares.

Analysis of 147 synthetic lines and parents revealed significant genetic diversity within the population. Three Quantitative trait loci (QTL) for total root biomass, shallow root weight, and deep root weight were detected on chromosomes 5D, 5D and 6A, with LOD scores of 3.35, 3.84 and 3.59, respectively. These QTLs on chromosomes 5D and 6A caused 6.55%, 6.99% and 8.17% total phenotypic variation, respectively. We are currently working on validating these QTLs with further genetic analysis.

Keywords: *Root, Chromosome 5D, 6A, Bread wheat, drought tolerance*

Chemical Genomics; A New Approach to Unlock Plant Immunity

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Abstract

Plants are an important part of our universe and it has been studied from many perspectives for decades. Classical genetics techniques such as knockout mutations or over-expression are applied to study gene functions on most of the plant genetic studies. However, some issues like functional redundancy or lethal mutations limit study of some essential gene functions. Chemical genomics uses small molecules to induce phenotype of interest instead of mutations. Such bioactive compounds can enhance or reduce the activity of target proteins and can mimic gain-of-function or loss-of-function mutations. This approach has been successfully applied to dissect many plant-specific processes, such as auxin signaling, defense signaling, and endomembrane-trafficking. We will highlight the applications of chemical genomics and give some examples from our studies in plant immune system in this study.

Homozygous T4 CaBP222333-promoter::GUS Arabidopsis seedlings were grown in 200 mL of liquid half-strength MS medium on 96-well plates for chemical screening. Plants were grown on an orbital shaker under long-day conditions (16 h light, 8 h dark, 220C) for 7 days. After 7 days, each compound was administered by a robotic pin tool to each well for a final concentration of 4 to 20 mM in 0.001% solvent DMSO. Then plates were shaken for 24 hours and monitored for histochemical GUS staining. Chemicals that induced GUS expression were scored visually for the intensity of the blue color (high, medium, or low).

According to results, some of the promising molecules were selected and characterization of biological processes triggered by these candidate compounds were applied. We identified 114 synthetic elicitors that induced plant immune system, from the chemical screening of 60.000 small compounds. One of the chemicals; 2,4-dichloro-6-[(E)-(3-methoxyphenyl)imino]methyl}phenol (DPMP) showed strong induction on CaBP222333-promoter::GUS Arabidopsis seedlings. Here, we report the characterization of DPMP, that strongly triggers disease resistance of Arabidopsis against bacterial and oomycete pathogens and has a unique mode of action. The mRNA-seq analysis reveals transcriptional profiles triggered by DPMP to resemble typical defense-related responses.

Keywords: *Chemical Genomics, Synthetic Elicitors, Plant Immunity*

High Yield Bacterial Expression of sGFP Green Fluorescent Protein Using Inducible *E.coli* Expression System in Bioreactor

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Abstract

Fluorescent proteins are genetically encoded, highly versatile reporters useful for monitoring various aspects of recombinant protein production. Green fluorescent protein (GFP) is a fluorescent protein that was originally isolated from the luminous organ of the jellyfish *Aequorea victoria* by Dr. Osamu Shimomura. In addition to the widely popular green fluorescent from *A. victoria*, a variety of other fluorescent proteins have been discovered that display a wide range of spectral properties. Superfolder GFP (sGFP) is a variant of the GFP that folds efficiently when fused to poorly folded proteins. sGFP, a superfolder variant of the green fluorescent protein from *A. victoria*, folds efficiently when fused to poorly folded polypeptides [1]. Aim of this study is production of recombinant green fluorescent protein (sGFP) in a large scale in *E.coli* expression system using bioreactor.

In this work sGFP gene that cloned into bacterial expression vector pBAD transformed into BL21-AI *E.coli* strain by heat shock. sGFP expression was optimized by fine adjustments such as induction time and inducer concentration. *E.coli* cells were grown 3 L Luria-Bertani (LB)-Amp medium in bioreactor. Temperature at 37 °C and pH at 7.00 were controlled. The dissolved oxygen concentration (DO) was maintained at 30% saturation by increasing agitation and O₂-enrichment if required. Production of recombinant sGFP was induced at OD₆₀₀=2 with 0.04% (w/v) arabinose. 6xHis-tag on the N-terminus of the protein used for its purification. sGFP was characterized by SDS-PAGE and UV spectroscopy.

Our results demonstrated that sGFP was successfully expressed in bioreactor in *E.coli* pBAD expression system under the control of araBAD promoter. Optimization of the expression procedure showed that, induction by 0.04% arabinose at OD₆₀₀=2 and 5 hours incubation at 37 °C resulted in the highest expression levels of soluble sGFP. Expression under optimal conditions as determined by 12% SDS-PAGE and characterized by UV spectroscopy. The expression of sGFP resulted in production of a soluble and pure in a yield of 30 mg/L bioreactor cultivation.

Keywords: sGFP, Recombinant Protein, *E.coli*

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Reference:

Pedelacq, J.D., Cabantous, S., Tran, T., Terwilliger, T.C., and Waldo, G.S. (2006) Engineering and characterization of a superfolder green fluorescent protein. *Nat Biotechnol* **24**: 79–88.

Production of Recombinant Blue Fluorescent Protein (mTagBFP) for Further Researchs in Bioimaging

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Abstract

mTagBFP is a monomeric blue fluorescent protein generated by sitespecific and random mutagenesis of TagRFP [Subach et al. 2008]. TagBFP possesses bright blue fluorescence with excitation/emission maxima at 402 and 457 nm, characterized by high photostability and extremely high pH-stability. This work aimed to expression of mTagBFP in bioreactor in high yield using *E.coli* expression system and purification of it.

Transformed *E.coli* cells with pBAD- mTagBFP recombinant plasmid were cultured in 3 liters LB triple medium supplemented with 100 ug/ml ampicillin at 37 °C in bioreactor. When the optical density at 600 nm was 1.5, L- arabinose was added to a final concentration of %0.04 in order to express mTagBFP. After 5 hours, the cells were harvested by centrifugation. Cell pellets were suspended in lysis buffer and disrupted by sonication. Soluble protein was collected using ultra-centrifugation. 6xHis-tag on the N-terminus protein used for purification of recombinant mTagBFP. The expression levels of mTagBFP was assessed using 10% (w/v) SDS-PAGE and UV spectroscopy.

One of the most efficient expression systems for producing recombinant proteins in *E.coli* is a pBAD- system. It is observed that at optimized arabinose concentration (0.04 %) for 5 hours induction resulted high levels of fluorescent protein expression. The method relies on induced expression in the BL21-AI strain of *E.coli* and yields large amounts (20 mg/L) of fluorescent protein from a 3 liters culture. This method provides a quick, high-yield production and can be used to produce any fluorescent protein that is needed in biomedical research especially bioimaging.

Keywords: mTagBFP, Recombinant Protein, Blue Protein

This study was supported by the Scientific and Technological Research Council of Turkey (TUBITAK Grant Number 114Z956) who provided financial support for this research.

Reference: Subach OM et al. (2008) Conversion of Red Fluorescent Protein into a Bright Blue Probe. *Chemistry & Biology* 15(10): 1116–1124.

An Example of Using of Mobile Device in Municipal Services: Location and Multimedia Based Mobile Maintenance and Fault Notification System

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Abstract

The aim of this study is to develop a mobile application which notify maintenance and faults of municipal services to municipal administration by citizens in the scope of municipality engineering. The municipality engineering includes that executing and management urban society services by municipal employees to aim of best maintaining of life of society. For last two centuries, with increasing population of cities or establishing new cities by governments, the municipal services have increased and diversified. The large number of municipal tasks are associated with numerous similar responsibilities like local traffic and transportation, car parking control, management and disposal of waste, maintenance of public parks, water supply systems, lighting of streets, environmental cleaning and planning.

Sometimes, the municipal maintenance and troubleshooting services which emerged in somewhere in the city are hard to follow by the municipal employees. The location, contents and emerging time of the faults cannot be defined completely with the notifications of the citizens by using phone or e-mail over computer.

Therefore, the municipal services with faults are going to be failed and the citizens are going to have more negative feelings against municipal management regrettably. In this study, the location based mobile application has been developed to aim that notify the municipal maintenance and fault clearance services to municipal employees by taken photo or recorded audio or video by mobile devices user. The citizens are able to rapidly send notification about municipal services that required maintenance and troubleshooting services to municipal management with this mobile application. For example, the citizens are able to send notification to municipal information system by taking picture or video of bus station broken glass or seat or the street light that need to be changed. Besides, they are able to send notification about broken flagstones or damaged sport equipment that result of misusing. After these notifications have been controlled by a municipal employee using criteria as priority order and municipal responsibility etc., they will be transferred to maintenance personnel. The maintenance personnel define which unit will deal with this malfunction and starts necessary actions of this notification. By this way, it is ensured that dissolve malfunction away expeditiously. Thereby, municipal services carry out with minimum delayed or without delayed. It is decided that this mobile application is going to develop to be executed on Android OS due to it has more users among other mobile operating systems. The municipal services which is mostly used or have high priority order are selected to be used in mobile application. In this application, municipal service category is selected firstly. Then video or photo, location information where making notification and description about faulty services are sent by necessity. The personal information like name, surname, e-mail, phone number, device name IP address are sent by optional.

Every user can send a new notification each municipal services category in three days at maximum to aim of blocking for abusing of mobile application. If it is necessary, the municipal personnel might send a feedback about fixing faulty services to users who send notification by entering communication information like email or phone number. The personal information of users that are shared by optional are just stored in notification which used on cloud based storage services and are not stored somewhere else like database or file system by order of confidentiality of personal information. The municipal maintenance and fault services are going to be executed more efficiently and rapidly by using this mobile application with citizens' contributions.

Keywords: mobile application, android, software, cloud computing, municipal engineering, fault notification system

Local Stability in a Discrete-time Population Model with Delay and Allee Effect

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Abstract

In this work, we give the local stability conditions of the fixed point of a general difference-time population model with delay. The local stability of the fixed point of presented model with Allee effect is analyzed. We show that Allee effect increases the local stability of the fixed point of the model.

Keywords: *Population model, Fixed Point, Allee effect.*

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Modification of Fly Ash Based Eco-Friendly Geopolymer Concretes with Blast Furnace Slag and Waste Glass Powder

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Abstract

Concrete is the most common construction material. It consists of aggregate, water, chemical and mineral additives and cement as binder. It is known that cement industry causes environmental challenges due to CO₂ emission during production process. In recent years geopolymer started to become an alternative to cement as binder. Geopolymer concrete is cement free and environment friendly material. Many researchers have been studying on geopolymer concrete lately due to its advantages.

In this study fly ash based geopolymer concretes produced and these mixtures were modified with blast furnace slag and waste glass powder which has high content of silicon dioxide (SiO₂). Blast furnace slag and glass powder were used separately and together by 100, 200 and 300 kg/m³ instead of fly ash. All mixtures activated with sodium hydroxide (NaOH). The effects of blast furnace slag and glass powder on compressive strength and splitting tensile strength were investigated. Besides, ultrasonic pulse velocity, capillary water absorption and unit weight tests were performed.

According to the results, blast furnace slag and glass powder increased the engineering properties of fly ash based geopolymer concrete but high amount of glass powder usage affected the results negatively.

Keywords: Blast furnace slag, Engineering properties, Fly ash, Geopolymer, Waste glass powder

A Preliminary Study on Fire Resistance of Concretes Produced With Waste Materials under Different Cooling Conditions

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Abstract

Fire is one of the most important threats for concrete structures. During the fire, temperatures extremely increase and concrete elements expose to these high temperatures for a while. It is known that high temperatures affect the properties of concrete elements such as the structure of hydration products, creep and expansion, porosity, pore pressure and spalling. Thus, the service life of the structure is directly affected. Besides, concrete properties also affected by the cooling regime after fire exposure. The purpose of the study is to investigate the high temperature resistance of concretes produced by different waste materials after different cooling conditions.

In this study, blast furnace slag, waste glass powder and colemanite ore wastes were used as waste supplementary cementitious materials. Blast furnace slag and waste glass powder were used for 5%, 10% and 20% and colemanite ore waste was used for 1%, 3% and 5% of cement by weight. All the concrete samples produced cured for 28 days and exposed to 400 °C, 600 °C and 800 °C respectively. After fire exposure concrete samples cooled by two different cooling regimes which are natural cooling and water cooling. Before and after fire exposure, compressive strength and ultrasonic pulse velocity tests were performed on the samples. Besides, weight losses of the samples after fire exposure were investigated.

As expected water cooling caused more damage on the concrete samples. Samples produced with the colemanite ore waste were the highest fire resistant concretes. Besides, colemanite ore waste admixture reduced the damage occurred by water cooling. Fire resistance was increased by the increase of colemanite ore waste amount. Colemanite ore waste was very effective even in small amounts. Waste glass powder and blast furnace slag could not contribute to the fire resistance of the concretes at 28th day.

Keywords: Fire resistance, Water cooling, Air cooling, Waste glass powder, Colemanite ore waste, Blast furnace slag

Predicting Second-Hand Car Prices in Turkey using Deep Learning

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Abstract

Interest in second-hand cars are growing due to increase in prices of new cars. Price estimation of a second-hand car for an unexperienced buyer might be difficult. In this work, we developed a second-hand car prediction system using artificial neural networks.

We used a second-hand car dataset which we prepared for machine learning purposes. The dataset contains seventy-two thousands of second-hand car data including car mileage, price, color, brand, model etc. First, we encoded string variables to numbers and then one-hot encoded categorical data like brand, color, model. Neural network had 682 input and 1 regression output. We've build a neural network topology of two hidden layers consisting of 1024 neurons each. Rectified linear unit activation function and RMSprop for gradient optimization is used. After every hidden layer, a dropout layer is applied to overcome overfitting. For validation 5-fold cross validation is applied. Keras deep learning library with tensorflow backend is used for artificial neural network training.

We developed a price prediction system for second-hand cars. Our system was able to predict the car price with 4255 TL mean absolute error. 4255 TL is the average of the cross validation mean absolute errors. Average R2 value cross validation is 0.92.

Keywords: *second-hand car, price prediction, deep learning, artificial neural networks*

Değişken Kemik Çimento Miktarı İle Vertebroplasti Sonrası Komşu Segment Kırıkları Önlenebilir Mi? : Sonlu Elemanlar Analiz ÇalışmasıLevent Uğur¹, Engin Ufuk Ergül², Canan Oral³ and Erhan Bergil^{4*}¹Department of Mechanical Engineering/Faculty of Technology,, Amasya University, Turkey^{2,3}Department of Electrical-Electronics Engineering/Faculty of Technology, Amasya University, Turkey⁴Department of Electronics and Automation /Technical Sciences Vocational School, Amasya University, Turkey
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Özet

Osteoporoz, düşük kemik yoğunluğu ve kemik mikromimarisinde bozulma sonucunda kemik mukavemetinde azalma ve basit travmalar ile kırıkların oluştuğu özellikle yaşlı nüfusta görülen kronik ve ilerleyici bir hastalıktır. Bu grup hastalarda sıklıkla vertebrada osteoporotik vertebra kırıkları meydana gelmektedir. Osteoporotik vertebra kırıklarında vertebranın stabilizasyonu ve ağrı tedavisi için vertebroplasti yöntemi kullanılmaktadır. Bu teknikte kırılan vertebranın süngerimsi kemik doku içine kemik çimentosu enjekte edilerek vertebranın güçlendirilmesi ve ağrının azaltılması amaçlanır. Fakat vertebroplasti ile sertleşen omurga zamanla kendisinden daha yumuşak olan alt veya üst omurgaya baskı yaparak komşu segment kırıklarına sebep olmaktadır. Bu çalışmanın amacı farklı oranlarda kemik çimentosu enjekte edilerek bitişik vertebralarda ve disklerde meydana gelen gerilmeler ve reaksiyon kuvvetlerini araştırmaktır.

Bilgisayarlı tomografi görüntülerinden sağlıklı bir insanın bel bölgesi omurgası 3 boyutlu olarak modellenmiştir. Oluşturulan omurganın spongiöz kemik bölgesinin malzeme özellikleri osteoporoz olarak girildikten sonra içerisine spongiöz kemiğin %20 %40 ve %60 si kadar çıkartılarak yerine kemik çimentosu ile doldurulmuştur. Elde edilen modellere aksiyel planda 500 N' luk yük ve fleksiyonda 5000 Nmm' lik döndürme momenti uygulanmıştır. Analizler sonlu elemanlar yazılımı olan ANSYS versiyon 17 kullanılarak non-linear ve statik olarak yapılmış ve tüm modellerde aynı sınır şartları uygulanmıştır.

Analizler sonucunda sağlıklı bir bireyle farklı oranlarda vertebroplasti uygulanmış modellerde komşu vertebralarda meydana gelen maksimum gerilmeler karşılaştırılmıştır. Vertebra arasında bulunan disklerde meydana gelen reaksiyon kuvvetinin yönünün ve şiddetinin değiştiği tespit edilmiştir. Osteoporik hastaların tedavisinde kullanılan vertebroplasti yönteminde kullanılan kemik çimentosunun miktarı arttıkça komşu vertebralarda meydana gelen gerilmenin önemli ölçüde artmasına neden olduğu gözlemlenmiştir. Bu durum, disklerde meydana gelen reaksiyon kuvvetinin artmasına sebep olabilir. Kullanılan çimento miktarı azaltılarak komşu segmentte oluşacak kırık riski azaltılabilir.

Anahtar Kelimeler: Vertebra, Vertebroplasti, Biyomekanik, Kemik Çimentosu, Sonlu Elemanlar Analizi.

Is It Possible To Prevent Adjacent Segment Fractures After Vertebroplasty With Variable Amount Of Bone Cement? : A Finite Elements Analysis Study

Abstract

Osteoporosis is a chronic and progressive disease, especially seen in the elderly population, in which fracture occurs due to reduced bone strength and simple trauma as a result of low bone density and deterioration in bone microarchitecture. In this group of patients often osteoporotic vertebral fractures in vertebrae occur. Vertebroplasty is used to stabilize the vertebrae and to treat the pain in osteoporotic vertebral fractures. In this technique, it is aimed to strengthen the vertebrae and reduce the pain by injecting bone cement into the spongy bone tissue of the broken vertebra. However, the hardened vertebrae after the vertebroplasty cause adjacent segment fractures by applying pressure on the lower or upper vertebra, which is softer than itself. The aim of this study is to investigate the stresses and reaction forces that occur in adjacent vertebrae and discs by injecting bone cement at different rates.

A healthy human backbone spine is modeled as three-dimensional using computerized tomography images. After the material properties of the spongy bone area of the formed spine are entered as osteoporosis, different rate of the

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spongiosa bone are removed and then it is filled with bone cement instead. A load of 500 N in the axial plane are applied to the obtained models. Analyzes are done nonlinearly and statically using ANSYS Version 17 and the same boundary conditions are applied in all models.

As a result of the analyzes, the maximum stress in the adjacent vertebrae are compared for a healthy individual and models with vertebroplasty applied at different rates. It has been observed that when the amount of bone cement used in the treatment of osteoporotic patients for vertebroplasty, a significant increase occurs in the tension of the adjacent vertebrae.

Keywords: *Vertebra, Vertebroplasty, Biomechanics, Bone Cements, Finite Element Analysis.*

Comparative Analysis of Heart Sound Segmentation Features to Extract Fundamental Heart Sounds

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Abstract

The heart sound segmentation is the first step of heart sound examination and plays in highly essential role in definition of pathological situation of heart diseases using heart sound. Besides, heart sound segmentation is very important to research similarities between ECG signals and heart sounds. In this study, different heart sound segmentation features have been comparatively analyzed on different heart sounds to extract fundamental heart sounds as S1 and S2. By doing this process, parts of heart sound have been prepared to reduce dimensions. It is planned that dimensions reduced parts is going to be used in artificial or convolution neural network for classification with parts of ECG with the aim of figure out similarities heart sounds and ECG.

The five segmentation features that mostly used are selected by researching on literature. These features are as follows; Shannon Energy, Wavelet Coefficients, Spectral Features, Regression Coefficients and Dynamic Thresholding and each of which have been applied on the different heart sounds type like normal, abnormal, extra systole from different open heart sound database. Firstly, the fundamental heart sounds in different heart sound databases have been separated to S1 and S2 part physically and these parts have been marked by experts. Secondly, the heart sounds have been pre-processed for re-sampling and normalization. The Shannon Energy of heart sounds has been obtained for finding the exact boundary samples of each heart sounds. After obtained Shannon Energy features, Dynamic Thresholding has been applied in order to find the location of the S1. The Mel-Spaced filter banks has utilized for extracting spectral characteristics from the heart sound signal. The Regression Coefficients have been operated to obtain the changes in each features.

The segmentation results show that if these segmentation features are applied stand-alone basis on heart sounds, the meaningful segmentation won't be actualized. But some of these features is used together, it has been shown that more meaningful segmentation will be obtained.

Keywords: *heart sound segmentation, shannon energy, wavelet coefficients, spectral features, dynamic thresholding*

Application of Rare Earth Element (REEs) Investigation of Oil Shale: A Case Study from the Çeltek Formation, Sorgun, Yozgat (Turkey)

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Abstract

Oil shale was formed millions of years ago by deposition of silt and organic debris on lake beds and sea bottoms. While oil shale has been used as fuel and as a source of oil in small quantities for many years, few countries currently produce oil from oil shale on a significant commercial level. Oil shales are important as syngenetic hosts for metal deposits. Organic sedimentary rock, which is one of the most important of these geological environments and REE is one of the most important source of enrichment. In this study, the characteristics of some trace elements and rare earth elements (REEs) in Çeltek Formation oil shales were examined by inductively coupled plasma mass spectrometry (ICP-MS). In particular REEs are showing a positive correlation with organic carbon, it is known to even reach the size to create the ore deposit. Therefore, the REE needs of technologies, will be important to be determination of the oil shale formation environment; Investigation of relationship between REE and organic carbon, also determining the geochemical properties of the storage basin in the area. Samples will be evaluated within the scope of the study, especially organic geochemical content and rare earth elements (REE) was studied for the first time in terms of comparing the geochemical properties.

Keywords: *Oil shale, rare earth elements (REE), organic carbon, ICP-MS, Çeltek Formation*

Candidate tumor suppressor protein CTCF: Novel insights into implication in cancer from integrative bioinformatics analysis of multi-omics data

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Abstract

The advent of high-throughput profiling biotechnologies, such as genomics, transcriptomics and proteomics, has resulted into a vast amount of multi-omics data. Integrative bioinformatics analysis facilitates the investigation of complex diseases by enabling the combined statistical evaluation of multiple omics data. This study focuses on the elucidation of the CCCTC-binding factor (CTCF) protein's role in cancer by use of the aforementioned approach. Due to the lack of experimental and computational results, current evidence only loosely links CTCF to cancer as a candidate tumor suppressor gene. The emergence of experimental multi-omics data offers the unprecedented possibility to fill the gap. Multiple experimental datasets were retrieved from the selected omics databases and leveraged in this explorative study with the purpose of meta-analysis in the context of the CTCF's putative involvement in cancer. The data analysis pipeline, based on multiple data mining software, implemented diverse machine learning, knowledge discovery and vizualization algorithms. The employed integrative bioinformatics approach links CTCF-associated experimental patterns by reconstructing the putative CTCF protein-protein interaction network and associates CTCF with distinct molecular processes. This work complements experimental CTCF findings by providing new insights into implication of this candidate tumor suppressor protein in cancer and demonstrates usability of the integrative bioinformatics methods.

Keywords: *Biotechnology, Data mining and knowledge discovery, Machine learning technologies, Bioinformatics, OMICS, Cancer research*

Using organic materials to Recycle Rare Earth Elements from Wastewater

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Abstract

Rare earth elements are essential for high-tech applications like cell phones and green technologies. With this new technology, supplies of metals like terbium, used in magnets and superconductors, and dysprosium, could last another 30 years. Attempts to recycle them so far have not been cost effective, with a major challenge being that the elements are usually very diluted in wastewater. Natural geological formation of Rare Earth Elements (REEs) enriched environments where the world is quite different. Organic matter rich rocks is one of the most important of these geological environment. These elements tend to adsorb to clays and organic matter in rocks. This makes metals a contaminant concern at rare earth element production sites in environmental mediums as well as a toxicological concern for organisms depending on those mediums for survival. On the other hand, GTSO CEO Paul Watson said. "This technology from China is particularly intriguing because extracting rare earths from wastewater is a game changer that can bring considerable economic benefits." the recycling process is discussed after it is taken and used from the natural environment in the world. How it works rare earth element technology, environmental effects and recycling processes in Turkey? Why organic materials as oil shales are not used ?

Keywords: *Oil shale, rare earth elements (REE), organic materials, toxicological concern, recycling process*

Devlet ve Özel Şeker Fabrikalarının Örgütsel Sinizm ve Örgütsel Bağlılık Düzeylerinin Karşılaştırılması

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Özet

Devlete ait olan şeker fabrikalarının ve özelleştirilmiş olan şeker fabrikalarının incelendiği bu çalışmada çalışanların örgütsel sinizm ve örgütsel bağlılık düzeylerinin belirlenmesi amaçlanmaktadır. Ayrıca sahipliğine göre devlet-özel karşılaştırması yapılarak aynı işi yapan çalışanların işverenlerine göre örgütsel sinizm tutumlarında ve örgütsel bağlılık davranışlarında farklılık olup olmadığını ortaya koyma isteği bu çalışmanın yapılmasına sebep olmuştur.

Araştırma kapsamında İç Anadolu Bölgesinde halen devlete ait olan bir şeker fabrikası ve yaklaşık 7 yıldır özel kesime ait olan özelleştirilmiş bir şeker fabrikasında anketler yapılmıştır. Fabrika yönetimlerinin izni doğrultusunda daha önceden hazırlanmış anket formları işçilere dağıtılmıştır. Ayrıca yine fabrika yönetimleri ile görüşmeler esnasında yönetimin isteği ile fabrika isim ve şehirlerinin paylaşılması kararı alınmıştır. 3 bölümden oluşan anket formunun ilk bölümünde demografik bilgiler ikinci bölümünde Brandes, Dharwadkar ve Dean (1999) tarafından geliştirilmiş olan “Örgütsel Sinizm Ölçeği” ve üçüncü bölümde ise Meyer ve Allen (1984, 1997) tarafından geliştirilen “Örgütsel Bağlılık Ölçeği” kullanılmıştır. Toplam 95 tam zamanlı işçi istihdam edilen devlet fabrikasında 63, toplam 71 tam zamanlı işçi istihdam edilen özelleştirilmiş fabrikada ise 53 geçerli anket olmak üzere 116 işçi çalışmanın örneklemini oluşturmuştur. Uygulama 2016 yılı Kasım-Aralık aylarında gerçekleştirilmiştir.

Geçerli anketlerin incelenmesi sonucunda elde edilen bulgular incelenmiştir. Öncelikle demografik faktörler ve ölçek ortalamaları incelenmiştir. Tamamı erkek katılımcılardan oluşan örnekleme kurumda çalışma sürelerinin arasında gözle görünür bir fark olduğu ve özelleştirilmiş olan fabrikada 5 yıl ve üzerinde çalışan hiç kimsenin olmadığı tespit edilmiştir. Ölçek ortalamaları incelendiğinde ise devlet fabrikasında örgütsel sinizm düzeyinin 2,35 özelleştirilmiş fabrikada ise 3,20 civarında ortalamaya sahip olması devlet-özel fabrika arasında örgütsel sinizm tutumları arasında bir fark olduğunu göstermiştir. Örgütsel bağlılık davranışları incelendiğinde ise devlet fabrikasında çalışanların bağlılık düzeyinin 3,50 üzerinde bir ortalamaya sahip olduğu özel fabrikada ise bu ortalamanın 2,60 civarında olduğu görülmüştür. Devlet fabrikasında çalışanlar ile özel fabrikada çalışanlar karşılaştırıldığında devlet fabrikasında çalışanlarda örgütsel sinizm düzeyi oldukça düşük örgütsel bağlılık ise oldukça yüksek çıkmıştır. Özel fabrikada ise tam tersi bir şekilde örgütsel sinizm düzeyi ortalamanın gayet üzerinde örgütsel bağlılık seviyesi devlet fabrikasına nazaran oldukça düşük sonuçlar vermiştir. Elde edilen bu bulgular ışığında istatistiki analizlerin artırılmasına, çalışma kapsamının genişletilmesine karar verilmiştir.

Anahtar Kelimeler: Örgütsel Sinizm, Örgütsel Bağlılık, Karşılaştırma, Özelleştirme

Comparison of Organizational Cynicism and Organizational Commitment Levels of Public and Private Sugar Factories

Abstract

Determination of organizational cynicism and organizational commitment levels of employees is aimed in this study in which both the state sugar factories and the private sugar factories are examined. Moreover; the desire of understanding if there are any differences in organizational cynicism manners and organizational commitment behaviors according to the employers by comparing public-private sectors caused this study to be done.

Within the context of this study; surveys were done in a sugar factory owned by the state and on the other hand in a privatized sugar factory which is under private rule for about 7 years in the Central Anatolia Region. Questionnaire forms were distributed to factory workers by kind permission of the management. Besides, during the negotiations with

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the factory management, it was decided not to share the factory and city names. In the first part of the questionnaire, which is composed up to three parts, demographic information was asked. In the second part “Organizational Cynicism Scale” that was improved by Brandes, Dharwadkar and Dean (1999); and in the third part “Organizational Commitment Scale” were used. 63 workers over 95 full time workers of employment in the public factory and 53 workers over 71 full time workers of employment in privatized factory; to sum up 116 workers formed the paradigm of present study. The application was executed in November-December in 2016.

The findings were examined after valid questionnaires. First of all, demographic factors and scale means were examined. The sample group is all made up with male participants and there is a noticeable difference in institution working hours between public and private factories. What is more, there is no single employee in privatized factory over 5 years. When we examine the scale means, the level of organizational cynicism in public sugar factory is 2,35 and in privatized factory is 3,20. These rates prove that there is an obvious difference between public-private factories for organizational cynicism manners. On the other hand when we examine the organizational commitment, it can be seen that the commitment level in state factory is over 3,50 and in private factory it is about 2,60. When we compare the state factory and private factory employees, the level of organizational cynicism is rather low; however, the level of organizational commitment is considerable high for those who work in public sugar factory. And vice versa in private factory, the level of organizational cynicism is quite above the average, but the level of organizational commitment gave comparatively low results in regard to public factory. In the light of these findings, it was decided to increase the statistic analyses and widen the scope of study.

Keywords: Organizational Cynicism, Organizational Commitment, Comparison, Privatization.

Rare-earth Elements (REEs) geochemistry of organic matter rich oil shales in Beydili, Beydili Kayası and Taşpınar (Nallıhan-Ankara-Turkey)

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Abstract

Located between the towns of Eskisehir Beydili Nallıhan of Ankara Sarıcakaya (BD), Beydili Kayası (BK) and Taşpınar (TSP) has significant oil shale resources in the region. Distribution patterns and contents of Rare-earth Elements (REEs) within oil shales of these regions were studied by inductively-coupled plasma mass spectrometer (ICP-MS). REE values and TOC values for a total of 126 samples (BK = 18, BD = 56, TSP = 52) were normalized and compared with REE characteristics in various media. The TOC values of the oil shales analyzed are between 0.1% and 11.32% with an average of 3.25%. The mean TOC values according to sample points are BD> TSP> BK (mean values 2.94, 2.96 and 4.66, respectively). The values of Σ REE, Σ LREE, Σ HREE and Σ MREE for all sample points are again BD> TSP> BK. Therefore, the REE needs of technologies, will be important to be determination of the oil shale formation environment. The samples were found to have parallel trends and show MREE enrichment when the average shale, PAAS, UPPER CRUST and NASC were normalized. Most of the specimens are common features of uncertain Ce and positive Eu anomaly. MREE enrichments are not a marker for high-pH systems or alkaline lakes, but represent mostly low-pH waters. Positive Eu anomalies in sediments are due to both the high CO₂ content and the ineffectiveness of diagenesis. REE mobility may occur in the course of organic matter formation under strongly reducing conditions and at low temperatures. The REE concentration and enrichment in organic matter can contribute to the economy by determining the environment and the origin relationship. The concentration and enrichment of REE in organic matter can be used for high technology by determining the environment and origin relationship, and the economy can contribute.

Keywords: Rare-earth Elements (REEs), inductively-coupled plasma mass spectrometer (ICP-MS), TOC, high technology,

Üç Katmanlı Güvenlik Analizi Yaklaşımına Dayanan İris Tanıma İle Kimlik Doğrulama

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Özet

Erişim izni isteyen alanlara kişilerin giriş yapabilmesi için yapılan denetim kontrolleri kimlik, manyetik kart, şifre, pin kodu gibi araçlar kullanılarak yapılmaktadır. Bu durum güvenlik önlemlerinin de artmasıyla kişileri birden fazla şifreyi hatırlamaya zorlamaktadır. Ayrıca kişinin kendini tanıtabilmesi için birden fazla çeşit kartı yanında bulundurmasını zorunlu kılan bir hale gelmektedir. Bu tarz tedbirlerin giderek güvenilirlikten ve pratikten uzaklaşması araştırmacıların, kişilerin kendini tanıtmada kendi yapısal özelliklerini kullanarak tanıma yöntemi olan biyometrik sistemlere olan ilgisini artırmaktadır. Bu çalışmadaki amacımız bu biyometrik sistemlerden biri olan iris tanıma ile kimlik doğrulama yapmaktır

Çalışmada birinci katmanda göz rengi, ikinci katmanda iris çapının göz küresinin çapına oranı ve üçüncü katmanda ise doku analizi yapılmaktadır. Herhangi bir katmanda daha önceden veritabanına kaydedilmiş olan görüntülerden biriyle eşleşme yapılamazsa diğer katmana geçilememektedir. Proje gerçek zamanlı olarak çalışmaktadır. Temin edilen bir kamera ile farklı kişilerden iris görüntüleri alınmış ve bir veritabanı oluşturulmuştur. Görüntü işleme teknikleri kullanılarak bu veri tabanındaki görüntüler işlenmekte ve anahtar görevi gören bir iris kodu oluşturulmaktadır. Canlı gözden alınan anlık görüntüler, oluşturulan iris kodu aracılığıyla veri tabanındaki verilerle karşılaştırılıp eşleşme olup olmadığı araştırılmaktadır. Bu çalışmanın bu alanda daha önceden çalışılmış diğer çalışmalardan farkı güvenlik katmanı sayısı artırılarak farklı bir algoritma yaklaşımıyla kimlik doğrulama işleminin gerçekleştirilmesidir. Böylece gerçekliğe daha güvenli ve kısa sürede ulaşılması hedeflenmektedir. Literatürde iris tanımada sadece irisin dokusunu inceleme üzerine çalışmalar yapılmıştır. Diğer etkenler çalışmalarda değerlendirilmemiştir. Bu çalışmada göz rengi ve iris çapının göz küresine oranı da hesaba katılarak inceleme yapılmaktadır. Bu etkenler doğru eşleme yaptıktan sonra iris dokusu incelenmektedir

Yapılan çalışma yüksek başarı oranıyla kısa zamanda ve doğru eşleşmeleri yapmaktadır. Bu çalışmayla kişilerin kendini tanıtabilmesi için yanlarında birçok kart taşıma ve birçok şifreyi ezberleme zorunluluğunun önüne geçilmiş olmaktadır. Kurumlara ve bireylere zamandan tasarruf ve maddi kazanımlar sağlamaktadır. İris tanıma hakkında yurt içinde çok fazla bir çalışma yapılmamış olup, bu alandaki gerekli yazılımlar genelde yurt dışından temin edilmektedir. Bu çalışmayla araştırmacıların bu alana olan ilgisinin artması ve yurt içindeki bu eksikliğin giderilmesi hedeflenmektedir.

Anahtar Kelimeler: *Biyometrik güvenlik, doku eşleme, kimlik doğrulama, artırılmış güvenlik*

Authentication with Iris Recognition Based on a 3-Tier Security Analysis Approach

Abstract

Audit controls are made using the tools such as ID, magnetic card, password, pin code to enable people to access to areas requiring access permission. This situation with increasing the number of security measures forces people to remember more than one password. In addition, it is becoming compulsory for a person to have more than one type of card in order to be able to identify himself / herself. Increasingly reliable and practical detachment of such measures has increased the interest of researchers in biometrics systems, which is the recognition method of self-identification by using their own structural features. Our goal in this study is to authenticate with one of these biometric systems, iris recognition.

In the study, eye color in the first layer, ratio of the diameter of the iris to the diameter of the eye blade in the second layer, and tissue analysis in the third layer is examined. If you can not match any of the images previously saved in the database to any layer, you can not switch to the other layer. The project works in real time. With a camera supplied, iris images were taken from different people and a database was created. By using image processing techniques, images in

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this database are processed and an iris code is created which acts as a key. The snapshots taken from the live eye are compared with the data in the database through the generated iris code to determine whether they match. The difference between this work and other work that has been worked on in this area is that the authentication process is performed with a different algorithm approach by increasing the number of security layers. Thus, it is aimed to reach reality more securely and in a short time. In the literature, only studies of iris tissue have been studied in the definition of iris. Other factors have not been evaluated in studies. In this study, the ratio of the eye color and iris diameter to the eyelash is also examined by taking into account. These factors are examined correctly after matching the iris texture.

The study is conducted in a short time and with a high success rate. In order to be able to introduce themselves with this work, the necessity of carrying many cards with them and memorizing many passwords has been prevented. It provides savings and financial benefits to institutions and individuals. There is not much study about the recognition of iris in the country, and the necessary software in this area is generally supplied from abroad. With this study, it is aimed to increase the interest of researchers in this field and to eliminate this deficiency in the country

Keywords: *Biometric security, pattern recognition, authentication, augmented security.*

Error Detection on Glass Products with Morphological Image Processing Techniques

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Abstract

The aim of the study is to process and understand the images obtained from the cameras on the basis of Industrial Image Processing with computer software. The system can perform the visual quality control and inspection processes performed by people with less errors faster and cheaper. Image processing applications are applied in almost every sector and usage fields are increasing. For example, in the metal industry, when metal surfaces perceive burrs and cracks, in the logo detection of glass bottle caps, we can list the mistakes in the packaging boxes as an example. This work focuses on two types of faults (submerged and scratched) found on glass products. This study is done to find the errors and numbers on the glass surface with morphological image processing techniques.

In this study, defect scanning was done on a total of 50 glass products. When the product is error-scanned, the camera images of glass products are taken under 100 lumens of light and high contrast and the images of the glass products are made by digital camera with 14.1 Megapixels, CCD image processor, 4x digital zoom, 5x smart zoom. Morphological Image processing (opening, closing, erosion, dilation) is performed in the form of figures. By moving the structural element in the opening process, the defects on the picture are removed. By moving the structural element, the gaps in the picture are removed, and with enlargement and erosion process, small roughness such as the hill on the picture and the hollow capillary channels are removed. In this study, morphological image processing techniques were used. Glass products were focused on two types of faults, submerged and scratched, and since the submerged faults were spot faults, a center point was determined due to circular structure compatibility and the diameter of the faucet was calculated and found to be faulty. In the case of scratch products, it is determined that the rectangular shape is appropriate because the long edge and short edge are related, and short edge, long edge lengths are determined and scratched objects are found. By the way, after a number of attempts, a constant threshold value has been determined. With this fixed threshold value, the noise created in the picture is cleaned and the shape becomes more apparent, and wreckage and scratches are detected.

In this study made on glass products, in the error detection on 50 glassware, 97 wrecks and 107 scratches were detected in total 204 errors. When more careful screening was done, 263 wrecks, 213 scratches and 476 errors in total were detected. Using morphological image processing techniques in the scanning, 301 wrecks, 226 scratches and 527 general mistakes were detected. This shows that the desired goal has been achieved by being very close to the accuracy of the work done. Looking at the literature, in another study made for this purpose is a glass form error detection using the C.S. C based Segmentation method. Some faults have been identified and classified on large glass plates. These mistakes are spot errors, surface mistakes, edge mistakes, line mistakes, stain mistakes. Here we aim to develop a method for error detection by transforming various color spaces. (Lal Dua et al., 2013). In another study, glass defects or weaknesses are considered to be a major mistake, as they are a material used in glass industry and in many places such as domestic products. Here, faults (capillary fractures, haze, smoke, or dirt) are classified as point defects. What kind of results will be produced on low contrast surfaces and how to classify glass faults by artificial neural network based methodology is to develop a method for detecting thin glass surface imperfections. (KumudSachdeva IGCEF Abhipur, Mohali, Punjab, India AkshayGirdhar GNDEC, Ludhiana, Punjab, India, 2013)

Keywords: error detection, glass product, image processing

Ti6Al4V Alaşımının Korozyon Davranışı ve İslanabilirliği Üzerine İnce Film Kaplamaların Etkisi

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Özet

Günümüzde Ti6Al4V alaşımının kullanımı özellikle biyomedikal alanda hızla artmaktadır. Bu durum Ti6Al4V üzerine yapılan çalışmaların da artmasına neden olmuştur. Ti6Al4V alaşımı biyomedikal alanda vücut içerisinde yaygın olarak kullanılmaktadır. Korozyon direncinin yüksek oluşu ve yüksek dayanıma sahip olması Ti6Al4V alaşımının vücut içerisinde kullanılmasının en önemli sebeplerindendir. Vücut içerisinde kullanıldığında insan sağlığı açısından hayati öneme sahip olan Ti6Al4V alaşımının ömrünü uzatmaya yönelik olarak çalışmalar devam etmektedir. Bu alanda yüzey kaplamaları önemli bir yere sahiptir. Bu çalışmada TiAlN, TiN kaplamaların Ti6Al4V alaşımından hazırlanan numunelerin korozyon direncine etkisi araştırılmıştır. Bunun için ringer çözeltisi içerisinde potansiyodinamik korozyon testleri yapılmış, Tafel analizleri ile korozyon akımı, korozyon potansiyeli ve korozyon hızı hakkında bilgiler elde edilmiştir. Ayrıca yüzey kaplamalarının ıslanabilirlik üzerindeki etkisi araştırılmıştır.

PVD (Fiziksel buhar biriktirme) metodu ile elde edilen sert seramik kaplamalar biyomedikal alanlarda (protez, cerrahi aletler, dişçilik malzemeleri gibi) yüksek sertlikleri, aşınma dirençleri, korozyon dirençleri, biyo uyumlulukları sebebiyle kullanılmaktadır. Bu çalışmada reaktif magnetron sıçratma metodu ile TiAlN, TiN kaplanmış ve kaplanmamış Ti6Al4V alaşımının korozyon davranışı incelenmiştir. Kaplama sonrası numunelerin karakterizasyon çalışmaları kapsamında kaplama kalınlığı tespiti, pürüzlülük, nanosertlik ölçümleri, SEM, AFM, EDX, XRD analizleri yapılmıştır. Korozyon deneyleri İVIUYM potansiyostat cihazında gerçekleştirilmiştir. Numunelerin korozyon davranışları hakkında bilgi edinebilmek amacıyla her bir numune için testler ortam koşullarında tekrarlanarak elde edilen sonuçlar karşılaştırılmıştır. Karşılaştırmalar, Potansiyodinamik polarizasyon eğrileri kullanılarak yapılmıştır. Bunun için de, her bir deneyin sonuçları kullanılarak tafel eğrileri çizdirilmiş, eğriler üzerinde korozyon potansiyeli ve korozyon akımı belirlenmiştir. Biyomedikal malzemelerin üretiminde gün geçtikçe daha da önemli bir yer edinen Grade 5 (Ti6Al4V) alaşımının korozyon davranışı ve kaplamaların korozyon davranışı vücut ortam şartları oluşturularak incelenmiştir. Vücut içinde implanların çalışabilmesi aynı zamanda hidrofilik özelliklerine de bağlıdır. Bunu belirlemek amacıyla ganyometre yardımıyla test numunelerinin yüzeylerinde kontak açıları tayin edilmiştir. Yüzey kaplamalarının ıslanabilirlik üzerindeki etkisi araştırılmıştır.

Kaplamaların Ti6Al4V alaşımının korozyon direnci ve ıslanabilirliğine etkisini inceleyen araştırma sonucuna göre kaplamasız Ti6Al4V alaşımına göre TiAlN ve TiN kaplamalı alaşımın korozyon direnci bakımından daha yüksek değere sahip olduğu belirlenmiştir. Kaplamaların kontak açıları incelendiğinde değerlerin 90° den düşük çıktığı tespit edilmiştir. Vücut içi ortamında kaplamalı alaşımın hidrofilik özellik sayesinde iyi performans göstereceği tespit edilmiştir.

Anahtar Kelimeler: Ti6Al4V, korozyon, ıslanabilirlik, kaplama

The Effect of Thin Film Coatings on Corrosion Behavior and Wettability of Ti6Al4V Alloy

Abstract

Today, the use of Ti6Al4V alloy is increasing rapidly, especially in the biomedical field. This situation has resulted in the increase of studies on Ti6Al4V. Ti6Al4V alloy is widely used in the biomedical field in the body. The high corrosion resistance and high strength of Ti6Al4V alloy having one of the most importance in the use of the body. When used

in the body in order to extend the life of the Ti6Al4V alloy is vital work continues. Surface coatings have an important place in this area.

In this study, the effect of TiAlN, TiN coatings on the corrosion resistance of samples prepared from Ti6Al4V alloy was investigated. For this, potentiostatic corrosion tests were performed in the ringer solution, and Tafel analysis was used to obtain information on corrosion current, corrosion potential and corrosion rate. In addition, the effect of surface coatings on wettability has been investigated.

PVD (Physical vapor deposition) hard ceramic coatings have been widely used in the field of biomedical applications - such as surgical tools, implants, and materials used in dentistry because of excellent properties such as high hardness, good wear, corrosion and oxidation resistance, chemical stability and good bio-conformity .

In this study, the corrosion behavior of TiAlN, TiN coated and uncoated Ti6Al4V alloy was investigated by reactive magnetron sputtering method. Coating thickness determination, roughness, nanosertlik measurements, SEM, AFM, EDX, XRD analyzes were carried out in the characterization studies of the samples after coating. Corrosion tests were performed on the IVIUYM potentiostat device. In order to obtain information on corrosion behavior of the samples, the results obtained by repeating the tests in the ambient conditions for each sample were compared. The comparisons were made using potentiodynamic polarization curves. For this, tafel curves were drawn using the results of each experiment, the corrosion potential on the curves and the corrosion current were determined. The corrosion behavior of the Grade 5 (Ti6Al4V) alloy and the corrosion behavior of the coatings, which have become increasingly important in the production of biomedical materials, have been investigated by establishing the body environmental conditions. The ability of the implants to work within the body also depends on their hydrophilic properties. To determine this, contact angles were determined on the surfaces of the test specimens using a goniometer. The effect of surface coatings on wettability has been investigated.

According to the results of investigations on the effect of coatings on corrosion resistance and wettability of Ti6Al4V alloy, it was determined that TiAlN and TiN coated alloy have higher values of corrosion resistance than uncoated Ti6Al4V alloy.

When the contact angle of the coatings was examined, it was determined that the values were lowered by 90⁰ deg. It has been determined that in the body environment the coating will perform well due to the hydrophilic nature of the alloy.

Keywords: *Ti6Al4V, corrosion, wettability, coating*

Reusing of Waste Iron Powders Provided By Steel Industry in Production of Composites

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Abstract

In this study, it was tried to recycle of the waste materials provided after the production in Samsun steel industry. Sand molds used in steel casting production are reused with the help of reclamation process. Meanwhile, the iron dust separated from the sand is harmful to the environment as waste. The purpose of this study is to evaluate the reusability of iron powders as matrix materials in composite production.

Today, with technological developments and increasing human needs, the search for materials with superior properties along traditional materials is increasing day by day. Composites for this purpose are materials produced by combining the best properties of two or more different materials in a new and single material and combining them at the macro level. Particularly in automotive and aviation sectors, the preference of lighter materials is increasing with each passing day of the composite materials. In this study, the grinding process was performed because of the dimensional size of the samples containing waste iron powder. Then, the powders below 100 µm were sieved and moulded by cold press and sintered in the furnace at various temperatures in order to achieve optimum compression strength.

After sintering, it is desirable to measure the hardness values of the samples cooled in the furnace. However, due to the presence of ceramic powders such as Al₂O₃ and SiO₂, the Vickers hardness device does not provide a clear image. Therefore, it was decided to perform a compression test. The highest strength was seen after 3 hours. The appearance of the 3-hour sample was somewhat elevated.

Keywords: Waste iron powder, reclamation, composite

Optimization of Cutting Layout Plan by Using Genetic Algorithm in Garment Industry

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Abstract

In the apparel industry, the garment patterns must be made Cutting layout planning in the a given fabric area firstly. Cutting layout planning is of great importance in terms of reducing fabric cost. In the fabric which constitutes 50-60% of the cost of clothing, the decrease in the amount of fabric per garment will increase the profitability. The purpose of preparing graphics; loss of material and labor time. Generally, the shrinkage rates are accepted as 9-19% for men's clothes, 10-25% for women's clothes and 10-18% for laundry. There is never a single solution in graphical planning, just packed more tightly and thus more time is needed to get shorter graphics. In order to obtain a graphic with high efficiency, large pattern parts must first be placed, then small pieces should be placed in the spaces.

The cutting layout planning process is one of the problem types expressed as NP (Non-Polynomial) in the field of computer engineering. Extremely heuristic algorithms are used for solving these problems from the traditional algorithms. In this study, it has been tried to produce a solution to the layout plan preparation problem by using genetic algorithm which is one of the heuristic optimization methods.

Genetic algorithms, one of the intuitive problem solving methods, have been used in the study. Genetic algorithms are a method used to solve multidimensional problems that take the evolutionary best selection process as a model.

Çalışmada genetik algoritma kullanılarak giysi kalıpları için model olarak kullanılan şekillerin yerleşim planının genetik algoritma ile yapılabileceği gösterilmiştir.

Keywords: *genetic algorithm, layout planing , optimization .*

Küçük ve Orta Büyüklükteki İşletmelerin Fotovoltaik Sistemler İle Enerji İhtiyacının Karşılanması

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Özet

Günümüzde faaliyetlerine devam eden küçük ve orta büyüklükte sayısız işletme bulunmaktadır. Kar marjını arttırmak isteyen bu işletmeler hangi alanda faaliyet gösterirse göstereceği her geçen gün maliyetlerini de daha da azaltma yoluna gitmektedir. Maliyetleri azaltmanın bir yolu da işletmelerin temel giderleri arasında bulunan kullanılan oldukları makinelerin ve teçhizatların harcamış olduğu elektrik enerjisini minimuma indirmeye çalışmalarıdır. Harcanan enerji miktarını azaltmak için işletmeler genellikle ihtiyaca göre üretim, vardiya sayısını azaltma, küçülme gibi işletmelerin yükünü azaltacak yollara başvurmaktadır. Bu gibi problemlerin minimuma indirilmesi ve işletmelerin farklı yollara başvurmalarını önlemek için işletmelerin temel maliyetleri arasında bulunan elektrik enerjisi ihtiyacının yenilenebilir enerji kaynakları ile karşılanması gerekmektedir. Bu çalışmada, fotovoltaik sistemler ile küçük ve orta ölçekli işletmelerin ihtiyaç duyduğu ortalama enerji miktarı hesaplanmış ve önceden hazırlanmış uygulama programı ile hali hazırda üretime devam eden bir işletmeye yönelik fotovoltaik sistem tasarımı gerçekleştirilmiştir. Tasarım gerçekleştirilirken uygulama programı ile gerekli olan parametreler kullanılarak çeşitli hesaplamalar yapılmış ve bu hesaplamalar doğrultusunda işletmenin ortalama enerji ihtiyacını karşılayacak fotovoltaik modül sayısı hesaplanmış, uygun batarya ve invertör seçimi gerçekleştirilmiştir. Bir haftada ortalama 55000Wh enerji harcayan bir işletmenin bu enerjiyi karşılayabilmesi için; 86,24A-24V minimum kapasitede şarj regülatörüne, kapalı geçen gün sayısı 5gün olarak alındığında 150Ah/24V kapasitede seri bağlanmış 16 adet bataryaya, minimum 1kW güce sahip invertöre ve 80Wp çok kristalli silisyum modül ile tasarlanacak 2 paralel kol üzerinde toplam 44 adet(22*2) seri bağlı panele ihtiyaç olduğu tespit edilmiştir.

Anahtar kelimeler: Fotovoltaik, enerji sistemleri, KOBİ

Supplying the Energy Need with Photovoltaic Systems for Small and Medium-sized Enterprises

Abstract

Today, there are numerous small and medium-sized enterprises that continue their activities. These businesses, which want to increase profit margins, are going to reduce their costs every day by showing them wherever they operate. One way to reduce costs is to minimize the amount of electrical energy that machinery and equipment, which are among the basic costs of businesses, have spent. To reduce the amount of energy consumed, businesses often resort to ways of reducing the burden of businesses such as production, reducing the number of shifts, and shrinking. To reduce such problems to a minimum and to prevent businesses from resorting to different ways, the electricity needs that are among the basic costs of businesses need to be met with renewable energy sources. In this study, the average amount of energy required by photovoltaic systems and small and medium-sized enterprises was calculated and a photovoltaic system design for an ongoing operation was realized. In accordance with these calculations, the number of photovoltaic modules to meet the average energy requirement of the operator was calculated, and the appropriate battery, charging controller and inverter were selected. It has been determined that in order for an operator to spend an average of 55,000 watts a week to supply this energy, when the number of closed days is taken as 5 days, 10A-24V minimum capacity in the charge regulator, 27 batteries in 150Ah / 24V capacity, inverter with minimum 1kW power and a total of 38 (19 * 2) series connected panels are required on 2 parallel arms to be designed with an 80Wp polycrystalline silicon module.

Keywords: Photovoltaic, energy systems, SME

Tokat İl Merkezinde Rüzgâr Türbini İle Bir Evin Enerji İhtiyacının Karşlanması

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Özet

Atmosferde hava hareketlerine, denizlerde dalga hareketlerine sebep olan rüzgâr enerjisi kinetik ve mekanik enerjiye dönüştürülebilmektedir. Rüzgâr hızı, Tokat il merkezinde yılda ortalama 5,5 m/s ile 7 m/s arasında değişim göstermektedir. Bu durum mükemmel bir rüzgâr enerjisi üretim merkezi için yeterli olmasa da bir evin ortalama enerji ihtiyacı giderilebilecek sistemler geliştirilebilmektedir. Bu çalışmada, Tokat il merkezinde bir evin ihtiyacını giderebilecek rüzgâr türbini seçimi gerçekleştirilmiş ve kurulacak sistem maliyeti hesaplanmıştır. Türbin seçimi yapılırken evin günlük enerji ihtiyacı hesaplanmıştır. Bu doğrultuda evin ihtiyacını karşılanabilmesi için gerekli olan ortalama rüzgâr türbin gücü belirlenmiştir. Türbinlerin güç eğrileri de incelenerek maksimum ürettiği güç miktarlarına bakılmıştır. Verim oranı düşük olan rüzgâr türbinlerinin verimini düşüren etmenler incelenerek Tokat il merkezi koşullarında uygun türbin tasarımı gerçekleştirilmiştir. İl merkezinde bulunan ve günlük enerji ihtiyacı ortalama 6 kWh ile 7 kWh arasında değişen bir evin ihtiyacı olan enerji ortalama %40 verimlilikle çalışan optimum çıkış gücü 5kW, üç kanatlı, kanat çapı 5.6m, direk uzunluğu 12m, üretime başlama hızı 3 m/s olan türbin tasarımı gerçekleştirilmiştir. Ayrıca, Tokat il merkezinde kurulacak sistemin maliyetinin, kullanılacak malzemenin türüne göre ortalama 45000TL ile 55000TL arasında değişkenlik gösterdiği tespit edilmiştir.

Anahtar kelimeler: Rüzgâr Türbini, Yenilenebilir Enerji, Tokat Bölgesi.

Supplying the energy demand for a home with a wind turbine in the city center of Tokat

Abstract

The wind energy, which causes air movements in the atmosphere and wave movements in the seas, can be transformed into kinetic and mechanical energy. The wind speed varies between 5.5 m / s and 7 m / s on average per year in Tokat province. Although this is not sufficient for a perfect wind energy production center, systems can be developed that can eliminate the average energy requirement of a home. In this study, the selection of the wind turbine that can provide a home need in Tokat province center was made and the system cost to be installed was calculated. When the turbine is selected, the daily energy requirement of the house is calculated. In this direction, the average wind turbine power required to meet the needs of the house has been determined. The power curves of the turbines were also examined to determine the maximum power output. The factors that decrease the efficiency of wind turbines with low yield rate were examined and appropriate turbine design was realized in Tokat provincial center conditions. The energy requirement of a household with an average daily energy requirement of 6 kWh to 7 kWh in the city center with an average output power of 5kW with three blades, a blade diameter of 5.6m, a pole length of 12m, a production start speed of 3 m / s turbine design has been realized. In addition, it has been determined that the cost of the system to be installed in Tokat province varies between 45.000TL and 55.000TL on average depending on the type of material to be used.

Keywords: Wind Turbine, Renewable Energy, Tokat Region.

Tendon Onarımlarında Biyomekanik Özelliklere Etki Eden Parametreler Üzerine Bir Literatür Araştırılması

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Özet

Bu çalışmada tendon onarımlarında kullanılan materyallerin performanslarıyla ilgili yeni materyal üretimi veya karşılaştırması için bir bilgi havuzunun oluşturulması amaçlanmıştır. Bu nedenle literatür araştırması yapılarak çalışmalar incelenmiştir ve çalışmalarla ilgili gerekli bilgiler ayrıntılı bir şekilde verilmiştir.

Tendonların yırtılmasına ve kopmasına istinaden oluşan hasar durumlarında çeşitli materyaller kullanılarak farklı tedaviler uygulanmaktadır. Bu tedaviler sırasında kullanılan çeşitli teknik, materyaller vb. parametrelerin tedavi sonrası tendonun biyomekanik özelliklerinde meydana getirdiği değişiklikleri araştırın çalışmalar taranmıştır. Bu anlamda yapılan çalışmalar incelendiğinde; başta insanlar olmak üzere, koyun, tavşan ve tavuk gibi çeşitli hayvanların el, ayak, diz vb. tendonlarının kullanıldığı ve bu hasarlı tendonların çeşitli dikiş (sütür) teknikleriyle onarıldığı görülmüştür. Bununla birlikte onarılan tendonlarda çekme dayanımlarının incelendiği, uygulanan tekniklerin etkilerinin araştırıldığı da gözlemlenmiştir ve genel bir değerlendirme yapılmıştır.

Tıbbi tekstil olarak adlandırılan çeşitli hammadde ve yapıdaki ameliyat ipliklerinin, sütür teknikleriyle kombinlenerek tedavi edilmiş tendonun biyomekanik özelliklerinin araştırıldığı çalışmaya rastlanmamıştır. Bu anlamda çalışmanın en önemli sonucu, çeşitli insan veya hayvan tendonlarına ait onarımlarda iplik ve dikiş tekniklerinin çekme dayanımı gibi biyomekanik özelliklere olan etkisinin incelenmesi gerekliliğini ortaya çıkarmasıdır.

Anahtar Kelimeler: tendon, dikiş teknikleri, ameliyat iplikleri, biyomekanik özellikler

A Literature Research on Parameters Effecting Biomechanic Features of Tendon Repairment

Abstract

The aim of this study is to generate a data pool about performances of materials used for tendon repairment in order to create or produce new materials. For this reason, studies were analyzed by searching literature and necessary informations were given in a detailed way about these studies. It is applied different treatments by using various materials in case of tendon damage caused by tearing or breaking off. Literature was investigated about studies searching effects of parameter changings including various technics, materials etc. on biomechanic features. In this sense, it was seen that hand, foot and knee tendons of human, sheep, rabbit and chicken etc. were used in these stuedies and these kind of damaged tendons were treated various suture technique. However, it was observed that tensile strenghts of treated tendons were examined and effects of applied techniques were searched in these studies and it was evaluated. It was not encountered a study investigating biomechanic features of tendons treated by suture techniques combined with surgery yarns named as medical textiles. Most important result by this sense is revealing of a necessity of examining biomechanic features by changing parameters as medical yarns and suture techniques on human and animal tendon repairment.

Keywords: tendon, suture techniques, surgery yarns, biomechanic features.

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An Investigation on Perspectives of Students in Cloth Manufacturing Department on Online Shopping

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Abstract

The aim of this study is to specify perspectives of students in Amasya University Technical Vocational School Cloth Manufacturing Technology Programme in terms of online shopping behaviors.

Internet using is taking vital important part of our life as a result high technology improvements. One of these important parts is online shopping. Reaching to a garment being hundreds kilometers away from customers by using several buttons of computer makes shopping easily and swiftly. Customers do not encounter time restrictions, and are informed about discounts immediately. In addition, they reach different colours and forms of a garment with one click. For these reasons, online shopping is becoming more preferable than shopping in stores. In this sense, it was tried to observe and evaluate opinions and behaviors of Amasya University Technical Vocational School Cloth Manufacturing Technology Programme students on online shopping. A survey was applied to students in parallel with this purpose. Results gained from survey were analysed by SPSS programme and essential comments were made.

Behaviours of Cloth Manufacturing Technology students on online shopping were revealed. It was determined if there is an effect of being educated in apparel production programme on online shopping.

Keywords: *online shopping, customer behavior, survey.*

Production of Polyethylene Glycol (PEG) - Polycaprolactone (PCL) Membranes by the Co-electrospinning Technique

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Abstract

Electrospinning is an economic and efficient method that fibers from nanometers to micrometers in diameter can be produced with many different polymer types. Non-woven fibrous membranes with high surface area/volume ratio and highly porous structure can be produce by this method. Because of this structure it can be used in many application fields such as tissue engineering, biomedical engineering, environmental engineering, seperation-purification processes, filtration, textile, etc. Membranes produced from biocompatible and biodegradable polymers have been subject of research in itself especially in tissue engineering field and membranes with many different properties and designs were produced.

In this study, it is aimed to produce polymeric membranes by using PEG and PCL that both polymers are biocompatible. For this purpose PEG and PCL polymers were co-spun at the same time and counter position. After a series of trials, both PEG and PCL solution concentrations, distance between syringe tip and collector, applied voltage and flow rate of the solution were optimized for electrospinning process. Flow rate of PCL was adjusted to half of the flow rate of PEG while PEG and PCL were co-spun. Whilst PEG brought in hydrophilic properties due to different chemical, physical and mechanical properties of PEG, PCL increased mechanical stability especially flexibility.

Chemical structure, biodegradation rate, mechanical properties, hydrophilic properties, morphology and biocompatibility of the membranes with interlocking structure of PCL and PEG nanofibers were characterized and it is concluded that they can be used in various applications in tissue engineering field.

Keywords: *Co-electrospinning, Biopolymers, Membrane*

Alglerden Mikroalga ve Ultrasonik Ses Dalgalarıyla Yağ Eldesi ve Biyodizel Üretimi Prosesi Tasarımı

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Özet

Anadolunun çeşitli bölgelerinde volkanik kaynaklı akarsularda doğal olarak tatlı su algleri büyümektedir. Turhal - Zile bölgesinde doğal olarak çoğalan tatlı su mikro alg yatakları tespit edilmiştir. Mikroalga hücre duvarları çok sağlam olduğundan hücre duvarlarını kırmak oldukça zordur. Dolayısıyla hücre duvarını kırmak yapıdaki yağı ve diğer materyalleri ortaya çıkartmak için yeni nesil teknolojileri kullanmak gerekmektedir. Bu doğrultuda mikroalga ve ultrasonik ses dalgaları tekniğiyle hücre duvarları kırılarak yağ elde edilebilmektedir. Elde edilen yağdan biyodizel (Yağ ve Biyodizel kompakt) üretim prosesi tasarımı gerçekleştirilmiştir.

Endüstriyel yağ kaynaklarından bitkilerin çekirdeklerinden sonra en önemli kaynak algler gösterilmektedir. Biyolojik çeşitlerine göre; yapılarında ortalama %12 ile %50 oranında yağ vardır. Kalan yeşilimsi kısım yağ harici yapıdır. Alglerin en zayıf tarafı yetiştirilmesi zor ve masraflıdır. Anadolu'nun özellikle bol mineral selenyumlu volkanik kaynaklı akarsularında kendisinden büyümektedir. Güneş su mineral ortamını bulduğunda günde birkaç kat çoğalabilmektedir. Algler hücre duvar kalınlığı mikron boyutunda metrelerce uzun organik su canlılarındandır. Hücre duvarları çok kalın ve güçlüdür. Bu duvarı çatlatmadan hücre yapısına ulaşmak zordur. Hasat edilmiş algler belli oranda santrifüj ayırıcıdan geçirilerek özel reaktörde mikroalga ve ultrasonik ses dalgalarıyla hücre duvarı çatlatılabilmektedir. Hücre duvarı çatlatılmış yapıdaki yağ, vidalı veya expeller soğuk pres makineleri ile ayrılmaktadır. Özelliklerine göre yapıdaki yağın ortalama %80'i alınabilmektedir. Bu yağ gıda sektöründe kullanılmadığı için gıda arzı dengesine etkisi bulunmamaktadır. Elde edilen organik yağ transesterifikasyon yöntemiyle tasarlanan plot prosesle biyodizel dönüştürülmektedir.

Alglerden elde edilen yağların enerji olarak kullanılmasındaki en büyük avantaj gıda amaçlı kullanılmamasıdır. Dolayısıyla gıda güvenliği ve arzı tehlikeye girmemektedir. Tatlı su kaynaklarında doğal ortamda yetişen algler yaşam koşulları artırılarak daha fazla alg üretim ortamı sağlanabilmektedir. Mikroalgler, doğal koşullar sağlandığında günde birkaç kat çoğalabilecektir. Böylece alg arzı elde sağlanmış olacaktır. Sistem endüstrileştikçe biyodizel üretimi artacak ve gıda arzı tehlikeye düşmeden çevreci sürdürülebilir biyokütleyle ulaşılmış olacaktır.

Anahtar kelimeler: Mikroalg, biyodizel, ultrasonik, mikroalga, alg yağı.

Microwave and Ultrasonic Sound from Algae Floors with Oil Industry and Biodiesel Production Process Design

Abstract

Freshwater algae growing naturally in volcanic streams in various regions of Anatolia. Freshwater micro alga beds naturally growing have been identified in the Turhal - Zile region. Since the microwave cell walls are very strong, breaking cell walls is quite difficult. Therefore, it is necessary to use new generation technologies to break the cell wall and to bring out the oil and other materials in the structure. In this direction, oil can be obtained by breaking the cell walls by microwave and ultrasonic sound waves. Biodiesel (Oil and Biodiesel compact) production process design has been realized from the obtained oil.

The most important source algae are shown after the seeds of plants from industrial oil sources. According to biological varieties; There are about 12% to 50% fat on average. The remaining greenish part is the structure other than oil. Growing the weakest part of the algae is difficult and costly. Anatolia grows itself especially in volcanic sourced streams with abundant mineral selenites. The sun can multiply a few times a day when it finds a water mineral environment. The

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algae cell wall thicknesses are meters long in terms of micron-sized organisms. Cell walls are very thick and strong. It is difficult to reach the cell structure without cracking the wall. The harvested algae can be cracked by microwave and ultrasonic sound waves in the special reactor by passing through the centrifugal separator in a certain order. The cell wall is cracked with oil, screwed or expeller cold press machines. According to the characteristics, 80% of the oil in the structure can be taken on average. Since this fat is not used in the food sector, there is no effect of food supply imbalance. The obtained organic oil is converted into biodiesel by a plot process designed by the transesterification method. The biggest advantage in using oils obtained from algae as energy is that they are not used for food. Therefore, food safety and supply are not in danger. Algae grown in natural environment in fresh water resources can be provided with more algal production environment by increasing living conditions. Microalgae will increase a few times a day when natural conditions are met. Thus, the algae supply will be achieved. The system will increase industrial production of biodiesel and the environmental sustainable biomass will be achieved without jeopardizing the food supply.

Keywords: *Microalga, biodiesel, ultrasonic, microwave, alga oil.*

Evaluation of the Sufficiency and Accessibility of Open and Green Areas with GIS Technologies - A case Study of Tokat (Turkey) City

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Abstract

Depending on the general tendencies of social developments, people's expectations from the city and the city phenomenon are also constantly changing. It is expected from the cities that the basic needs such as housing and employment will be satisfied more easily. However, as the welfare level of the people living in the city increases, it is necessary to increase the quality of life by planning the cities not only physically but also aesthetically. In this study, it is aimed to research the sufficiency and accessibility of current open and green areas of Tokat city with Geographic Information Systems (GIS) technologies.

The method of research consists of analysis, observation, synthesis and evaluation. The open and green areas are classified as 7 topics in the Turkish legislation as children's garden, park, botanical Park, square, district sports area, recreation area and picnic area. Obtained information has been determined by observations made on-site of open and green areas of the city besides zoning plans, base maps and orthophotos. The amount of open and green areas and population in Tokat central district were taken into consideration in the research. In this respect, the sufficiency and qualifications of open and green areas have been examined. However, the service domain of pedestrian access to these areas was analyzed and accessibility was determined by walking buffer analysis.

As a result of analyzes made, about 459300 m² existing open and green area was determined in the central district of Tokat. According to the data of the year 2016, the population of Tokat central district is about 150000. In the current situation, it was calculated that the total open and green area per person is 3.06 m². According to the walking distance standards specified in the legislation, it was determined that %24 of the structures in the city are not accessible to open and green areas. As a result of the research, it was detected that the open green areas are not distributed homogeneously in the city and the per capita amounts are insufficient. In this direction, clear and green areas that are in the zoning plans but are not available should be actualized and new regulations need to be made in the areas that are needed.

Keywords: *Geographic Information System (GIS), Open and Green Areas, Accessibility Analysis, Walking Buffer*

Hardware Technologies Support for Aircraft Maintenance Technicians to Improve Their Safety and Maintenance Performance

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Abstract

Rapidly developing technological developments in the aviation industry are unfortunately not parallel to the field of aircraft maintenance. Particularly air traffic technologies and cockpit designs are used in today's technology while the technology used in the field of maintenance is behind the times. The technology used in maintenance organizations can only be used for training or documentation purposes, and the use of technology is inadequate for aircraft technicians. Nowadays, while the technicians carry out maintenance activities, they can only communicate with his workmates or chiefs via radio or mobile devices and also access some of the documents with the help of mobile devices. These inadequacies can lead to delays or cancels by prolonging maintenance periods, adversely affecting operation and maintenance safety issues, and thus creating heavy burdens on organizations in terms of cost. Human-machine interaction in aircraft maintenance area can be processed under two headings as software and hardware. Especially when working conditions are considered, it can be stated as hardware problems in human-machine interaction that work in high or narrow regions, sometimes difficult to reach. The technician who has to work in a hard-to-operate area of the aircraft can not efficiently use both the maintenance document and the tools he uses. This situation can lead to both the performance error and the time and cost that the organization will be negatively affected. The inclusion of emerging computer technology in the maintenance area will also benefit both aircraft safety and personal safety by positively impacting human error reduction. When the hardware issues are examined, the workplace, tools and equipment that will be maintained will come to mind. Ergonomically designed workspace will help to prevent work-related accidents and ensure that the work to be done is carried out more safely. Otherwise, the technician will be exposed to poor performance such as lack of communication, noise, lighting. Both the availability of tools and the availability of the technician's equipment will directly affect performance. In this study, the advantages and disadvantages of hardware technologies such as aircraft maintenance docks, new generation of toolbox, intelligent material boards have been discussed and deficiencies related to this issue have been identified and solutions have been proposed.

Keywords: *aircraft maintenance 1, aircraft maintenance technician 2, hardware technologies 3, aviation safety 4*

Discussion on Automation Effects for Human Operator's Performance in the Aviation

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Abstract

The rapid aircraft and ground based developments of the aviation technology create difference on the human operator working styles, used hardware and software for meeting highest expectations of the flight safety and efficiency. Automation levels for the aviation were defined by human factors experts and now they are observed in different levels for the different working positions such as cockpit crew, air traffic controllers, dispatchers and aircraft maintenance personnel ext. Since automation makes difference on the working styles and operational procedures with the help of high level information and communication technology, operator performance is affected. The validity and reliability of the automated tools and software are main identifiers for operator performance, workload and stress within high level time pressured operations. Trust to the automated tools and software by the operators is the main factor is shaping operator performance. Positive trust can improve the automation usage; negative trust can decrease the performance adversely. In this study, these factors will be discussed with operational examples from different working positions to take attention for human operator performance on the flight safety and efficiency in aviation environment.

Keywords: *aviation automation 1, human performance 2, human factors 3, aviation safety 4*

Aircraft Maintenance Technician Training Process and its Role in Flight Safety

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Abstract

This study emphasizes that the aircraft technician training is very important for air transportation safety considering passengers, aircraft and goods. In the scope of recent acceleration of air transportation, their training process and its efficiency is vital for all aviation operations. Their importance comes from international aircraft maintenance rules and regulation with high standards depending on the human performance. Aircraft operations depend on the all human performances directly or indirectly. Aircraft technician training seems to be indirect one but when the refreshment and development courses were considered it has a direct effect. The training process looks old fashioned when we compare with the aviation and aircraft high technology and advanced requirements in the operational environment. The Paper focuses on the technician training process including an explanation of theoretical and applied training phases and on the job training. Consequently, their licensing process will be mentioned with all requirements. Additionally, the Turkey's situation will be represented with weak points can affect safety and possible suggestions will be discussed.

Keywords: *aircraft maintenance technician 1, maintenance education 2, aviation safety 3*

Modeling of Leaching Process of Copper Extraction from Malachite Using Oxalic Acid

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Abstract

This study is concerned with the leaching process of copper in the presence of oxalic acid (C₂H₂O₄) from the low-grade oxidized copper ore (malachite). The parameters affecting leaching process; acid concentration, time, solid/liquid ratio, particle size, temperature, and stirring speed, were studied in order to determine the optimal process conditions by response surface method (RSM).

Oxalic acid (C₂H₂O₄) solutions were prepared at different concentrations for the leaching process as an organic leaching agent. The malachite (Cu₂CO₃(OH)₂) utilized in the experiments was supplied from Elazığ, Turkey. The sample was crushed, ground and then sieved to the desired particle sizes in accordance with ASTM standard test procedures. All leaching experiments were performed in 250 mL. the covered erlenmeyer flasks in a shaker equipped with an adjustable agitation speed and temperature according to Taguchi method (L₂₅) orthogonal array design in order to assess the effects of acid concentration (0.05-0.6 M), time (10-90 min.), solid/liquid ratio (5-40), particle size (38-300 µm), temperature (20-60 °C), and stirring speed (100-600 rpm).

Based on the results, the maximum copper extraction yield (54.55%) was reached under the optimum experiment conditions; temperature 40 °C, particle size 38 µm, time 90 min., acid concentration 0.4 M, solid/liquid ratio 40 and stirring speed 200 rpm. Analysis of variance (ANOVA) showed a high coefficient of determination value (R²=0.99). In conclusion, the predicted yield of target parameters under the optimal conditions by RSM were similar to the actual results from the confirmation experimental runs. Moreover, the oxalic acid can be utilized as an effective and eco-friendly organic leaching reagent in the leaching process of other oxide and carbonate ores containing valuable metals such as copper, zinc and cobalt etc.

Keywords: Leaching, malachite ore, oxalic acid, response surface methodology

Response Surface Methodology Approach for Optimization of the Copper Leaching From Malachite Using Formic Acid

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Abstract

This study aimed to examine the affecting parameters such as acid concentration, time, liquid/solid ratio, particle size and stirring speed on the leaching process from low-grade oxidized copper ore (malachite) in the formic acid (CH₂O₂) medium and the response surface methodology (RSM) was used to optimize the process parameters.

The malachite (Cu₂CO₃(OH)₂) utilized in the experiments was supplied from Elazığ, Turkey. The sample was crushed, ground and then sieved to the desired particle sizes in accordance with ASTM standard tests. All dissolution experiments were carried out using 6 parameters and each in 5 levels (acid concentration (0.05-0.6 M), time (10-90 min.), solid/liquid ratio (5-40), particle size (38-300 µm), temperature (20-60 °C), and stirring speed (100-600 rpm)) by Taguchi method (L₂₅), and then optimization of the effective parameters by RSM.

In terms of the obtained experimental results, the maximum copper extraction value (66.22%) was achieved under optimum leaching process conditions; temperature 40 °C, particle size 38 µm, time 90 min., acid concentration 0.4 M, stirring speed 200 rpm and solid/liquid ratio 40. The results indicate that the model is in good agreement with the experimental data at a correlation coefficient (R²) of 99.24. In addition, the formic acid can be used as an alternative, economic and environmental friendly organic leaching agent in the leaching processes of other ores containing precious metals.

Keywords: Leaching, response surface methodology, malachite ore, formic acid

Yapay Zeka ve Sanayi İlişkisinin Şu Anki ve Gelecekteki Olası Durumu Üzerine Bir Değerlendirme

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Özet

Yapay zeka temeli teknolojiler, günümüzde etkisini giderek artırmaktadır. Sanayi tarafında yapay zeka kullanımı da artış göstermektedir. Önümüzdeki yıllarda ise bu birliktenin giderek artacağı öngörülmektedir.

Bu çalışmada ulaşım, imalat, otomobil endüstrisi gibi farklı alanlarda yapay zekanın ve yapay zekayla bağlantılı robotik ekipmanların sanayi sektörlerine sosyal ve ekonomik açısından ne tür etkileri olacağı incelenecektir. Kaçınılmaz olarak değişme gösterecek bu alanlarda, değişimin daha az problemlili olabilmesi adına yeni iş modelleri geliştirmeleri gerekeceği de aşıkardır. Bu kapsamda izlenebilecek yollara ilişkin öneriler verilecektir.

Anahtar Kelimeler: *Yapay zeka, endüstri, yapay zeka ve sanayi ilişkisi*

An Assessment about Current and Future Situation of Artificial Intelligence and Industrial Relationship

Abstract

Artificial intelligence-based technologies are increasingly influencing today. Industrial use of artificial intelligence also increases. It is anticipated that this unity will increase in the coming years.

This study will examine the social and economic implications of the industrial sectors of artificial intelligence and artificial intelligence-related robotic equipment in different areas such as transportation, manufacturing, and the automobile industry. In these inevitably changing areas, it is obvious that new business models will need to be developed in order for change to be less problematic. Proposals will be given on ways to be followed in this context.

Keywords: *Artificial intelligence, industry, Intelligence and Industrial Relationship*

Hesaplamalı Akışkanlar Dinamiği Analizi Sonuçlarına Göre Elektrikli Otomobil için Motor Seçimi

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Özet

Bu çalışmada yeni tasarlanan bir aracın sürüklenme kuvvetinin hesaplamalı akışkanlar dinamiği (HAD) analizleri ile bulunması üzerinde durulmaktadır. Sürüklenme kuvveti binek ve yarış araçlarında düz yolda hareket halinde en fazla güç tüketen taşıt dinamiği etmenidir. Bu yüzden sürüklenme kuvvetinin en düşük değere ayarlanması verimlilik açısından önemlidir. Elektrikli araçlarda, motor seçiminin uygun güç değerine göre gerçekleştirilmesi ise hem maliyet hem de ideal güç tüketimi açısından önemlidir. Sonuç olarak bir verimlilik yarışına katılmak üzere tasarlanan elektrikli bir araçta ana tahrik birimi olan elektrik motorunun uygun güç değerinde seçilmesi ve istenen hızlarda en az gücü tüketebilmesi için sürüklenme kuvvetinin HAD analizi ile belirlenmesi amaçlanmaktadır.

HAD analizleri gelişen bilgisayar kapasiteleri ile yaygınlaşmakta ve birçok alanda kullanılmaktadır. Günümüzde birçok bilgisayar destekli mühendislik yazılımı da HAD analizleri için çözümler sunmaktadır. Bu çözümlerde çoğunlukla sonlu hacimler yöntemi kullanılmakta olup nadiren sonlu elemanlar yöntemi kullanılmaktadır. Bu çalışmada ANSYS CFX ile sonlu hacimler yöntemi kullanılarak HAD analizleri yapılmaktadır. HAD analizleri sonucunda elde edilen sürüklenme kuvveti, yuvarlanma kuvveti ve ivmelenme kuvveti değişkenlerine göre tekerlek tahrik kuvveti hesaplanmıştır. Verimlilik yarışları daha çok düz pistlerde yapıldığından tırmanma kuvvetinin ve yüksek hızlara çıkılmadığından devrilme kuvvetinin araca etkilediği varsayılmaktadır. Akışın gerçekleşeceği hacim, Design Modeller içinde hava odasından (Enclosure) araç katı modelinin çıkarılması (Subtract) suretiyle elde edilmektedir. Akış hacmi sonlu küçük hacimlere bölünerek bu hacimlerin bir biri ile ilişkili konumları oluşturulmakta yani modele CFD>CFX ayarı ile ağ atılmaktadır. CFX-Pre arayüzünde akışkanlar modelinin ayarları, türbülans modeli κ - ϵ , akışkan hızı 101 km/sa = 28 m/s seçilerek yapılmaktadır. Akışkan malzeme olarak seçilen hava, 25 °C sıcaklık, 28,96 kg/mol molar kütle, 1,185 kg/m³ yoğunluk, 1004,4 J/kgK özgül ısı kapasite ve 1.831e-05 kg/ms viskozite başlangıç ve sınır şartlarına ayarlanmaktadır.

Belirlenen başlangıç ve sınır şartları altında CFX-Solver Manager ile çözüm yapılmış ve CFX-Post ile sonuçlar görselleştirilmiştir. Yapılan HAD analizleri sonucunda araca etkiyen basınçların ve araç etrafında oluşan akışkan hızlarının düzenli olduğu görülmüştür. Analizler sonucunda araca etkiyen sürüklenme kuvveti 244 N olarak bulunmuştur. Sürüklenme kuvveti, etkin kesit alanı, akışkan yoğunluğu ve akışkan hızı değerlerine göre sürüklenme katsayısı C_d 0,38 olarak hesaplanmıştır. Sürüklenme katsayısı ile aracın farklı hızlarda ne kadar sürüklenme kuvvetine maruz kalacağı hesaplanabilmektedir. 200 Kg kütleli bir araçta yuvarlanma kuvveti 39 N olarak hesaplanmıştır. İvme kuvvetinin göz ardı edildiği durumda 283 N tekerlek tahrik kuvveti hesaplanmıştır. 43 cm çaplı bir tekerlekte C_d sabit tutularak 100 km/sa için 60 Nm, 1234 rpm, 7,87 kW, 80 km/sa için 32,5 Nm 987 rpm, 3,36 kW ve 60 km/sa için de 18 Nm, 741 rpm, 1,4 kW değerleri karşılayacak bir motorun gerektiği hesaplanmıştır.

Anahtar Kelimeler: Hesaplamalı Akışkanlar Dinamiği, Aerodinamik, Elektrikli Araç, Elektrik Motoru

Motor Selection for Electrical Vehicle According to Results of Computational Fluid Dynamics Analysis

Abstract

Computation of drag force of a new designed car via computational fluid dynamics (CFD) has been studied. Drag force is the most power consumer phenomenon in race and passenger cars at a straight road. Hence it is important to minimize the drag force with regard to energy efficiency. Achievement of optimum motor selection in electrical vehicles is a considerable factor on account of cost effective and power consumption. Eventually it is aimed to determine the drag

force of an electrical vehicle designed to attend efficiency challenge to consume min. power and to be selected main energy component motor with suitable power using CFD analysis.

CFD analyses are becoming more common and used in widespread area with the developing capacities of computers. Recently multiple computer aided engineering software perform solutions for CFD analyses. Mostly used approach for the CFD is finite volumes method and rarely one is finite elements method. In this work CFD analyses have been performed using finite volumes method in ANSYS CFX. Wheel excitation force has been determined according to drag force obtained from CFD analysis and rolling force. It is assumed that the hill force and overturning force have not affected car since efficiency challenges are in straight road and low speeds. Flow volume has been obtained by subtracting solid model of car from enclosure. Flow volume have been divided finite small volumes and positional relations of the finite volumes have been formed so the model meshed by CFD>CFX setup. In CFX-Pre setups of fluid model have been set as turbulence model of κ - ϵ , fluid velocity of 101 km/h = 28m/s. The fluid material air has been set to initial and boundary conditions as 25 °C of temperature, 28,96 kg/mol of molar mass, 1,185 kg/m³ of density, 1004,4 J/kgK of specific capacity and 1.831e-05 kg/ms of viscosity.

System have been solved in CFX-Solver Manager under initial and boundary conditions and results have been specified and results visualized in CFX-Post. Pressures affected car and fluid velocities occurred around car were regular according to CFD analysis results. Drag force affected car has determined as 244 N consequence of analyses. Drag coefficient C_d have been determined in value of 0,38 using drag force, effective cross-sectional area, density of fluid and velocity of fluid. Drag force can be determined in different velocities using drag coefficient. Rolling force has been determined 39 N in a mass of 200 Kg car. Wheel excitation force have been determined 283 N in condition of ignored accelerating force. With a 43 cm wheel and constant C_d condition power values have been determined for 100 km/h, 60 Nm, 1234 rpm, 7,87 kW, for 80 km/h 32,5 Nm, 987 rpm, 3.36 kW and for 60 km/h 18 Nm, 741 rpm, 1,4 kW.

Keywords: *Computational Fluid Dynamics, Aerodynamics, Electric Vehicle, Electric Motor*

Computational studies of Bis {1 - [[p-fenoksifenilimino] methilenil] -2-naftalenolato-N, O} Copper

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Abstract

Schiff base compounds have significant medical and pharmaceutical applications. The application areas of these compounds show biological activities including antibacterial, antifungal, anti-cancer and herbicidal activities. Schiff bases have been used as starting materials in the synthesis of their compounds in industrial and biological fields in recent years. Numerous studies give an idea of the use of Schiff bases as a ligand for the synthesis of different metal complexes. The aim of this study is to explore the energetic and structural properties of Schiff base metal complex, Bis {1 - [[p-fenoksifenilimino] methilenil] -2-naftalenolato-N, O} Copper, using the density functional theory calculations.

In this work, we present a combined experimental and theoretical study on the molecular structure of Bis {1 - [[p-phenoxyphenylimino] methylenil] -2-naphthalenolato-N, O} Copper. Molecular structure, atomic charges, molecular electrostatic potential and frontier molecular orbital energies have been investigated of Bis {1 - [[p-phenoxyphenylimino] methylenil] -2-naphthalenolato-N, O} Copper using the density functional theory calculations.

The molecular geometry from X-ray experiment in the ground state has been compared using the density functional theory (DFT)/B3LYP with the LANL2DZ basis set. The calculated results show that the DFT can well reproduce the crystal structure. In addition, DFT calculations of the title compound, mulliken charges, molecular electrostatic potential, frontier orbitals were also performed at B3LYP/LANL2DZ level of theory.

Keywords: Schiff base, DFT, MEP, FMO, Mulliken.

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DFT Computational Studies of (E)-1-((3-chloro-4-methylphenylimino) methyl) naphthalen-2-ol

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Abstract

The properties of the molecular geometry, atomic charges, molecular electrostatic potential (MEP) and frontier orbitals of the title compound have been studied. We also make comparisons between experiments and calculations. The aim of this study is to investigate the electronical properties of the title compound using the density functional theory (DFT) calculations.

The Schiff base (E) -1 - ((3-chloro-4 methylphenylimino) methyl) naphthalen-2-ol was synthesized from the reaction of 2-hydroxy-1-naphthaldehyde with 3-chloro-4-methylaniline . The Structure of title compound has been characterized by X-ray diffraction technique. In this work, quantum chemical calculations of (E) -1 - ((3-chloro-4 methylphenylimino) methyl) naphthalen-2-ol have been performed using the DFT/B3LYP method at the 6-311++G(d,p) basis set. Molecular geometry, molecular electrostatic potential (MEP) and frontier molecular orbitals were investigated at B3LYP/6-31++G(d,p) level of theory.

The calculated results show that the optimized geometry can well reproduce the crystal structure. The MEP map shows that the negative potential sites are on electronegative atoms while the positive potential sites are around the hydrogen atoms. These sites give information about the region from where the compound can have non-covalent interactions. Energy gap between HOMO-LUMO is also computed.

Keywords: Schiff base, DFT, FMO, MEP

Acknowledgment, this study was supported financially by the Research Centre of Amasya University (Project No: FMB-BAP 16-0175).

Fotovoltaik Sistemlerde Kullanılan Panellerin Karşılaştırılması

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Özet

Tüm dünyanın üzerinde çalışmakta olduğu yenilenebilir enerji kaynaklarından biri olan güneş enerjisinden elektrik üretimi yapılan fotovoltaik sistemlerdir. Modüler yapıda olan ve hareketsiz parçalara sahip olan fotovoltaik sistemlerin bakımları zahmetsiz ve diğer sistemlere göre daha uzun ömürlüdür. Fotovoltaik sistemlerde güneş enerjisini direk elektrik enerjisine dönüştürebilmek için kullanılan tekniklerden biri de güneş panelleri ile elektrik üretme tekniğidir. Günümüzde monokristalin, polikristalin, esnek güneş paneli, ince film güneş paneli ve Solimpeks PV-T (Hibrit) panel olmak üzere 5 çeşit güneş paneli bulunmaktadır. Çalışmamızda, fotovoltaik sistemlerde kullanılan panellerin verimlilik, dayanıklılık, iklim şartlarının etkisi, kapladığı alan, ürettikleri güç, kullanım amacı, maliyet açısından karşılaştırılmıştır. Bu karşılaştırmaların gelecekte kurulması planlanan sistemlere ışık tutacağı düşünülmektedir. Karşılaştırmalar sonucunda; ürettikleri güç, verimlilik, dayanıklılık, kapladığı alan gibi özellikler birleştirildiğinde monokristal panellerin kullanılması öngörülmekte fakat bu panellerin maliyetinin diğer panellere göre daha yüksek olduğu tespit edilmiştir. İklim koşulları değişkenlik gösteren bölgelerde maliyeti monokristal panele göre daha düşük olan polikristal panellerin kullanılması daha yararlı olmaktadır. Termal merkezlerde termal sistemlere göre daha verimli ve daha az maliyetli PV-T panel kullanılması kurulacak sistemin maliyetini düşüreceği tespit edilmiştir. Ayrıca, ev uygulamaları gibi küçük güçlü üretim gerektiren tesislerde maliyetleri, monokristal ve polikristal panellere göre daha düşük olan esnek güneş panelleri ve ince film güneş panellerinin kullanılması gerektiği sonucuna varılmıştır.

Anahtar kelimeler: Fotovoltaik Panel, Verimlilik, Güç

Comparison of Panels Used in Photovoltaic Systems

Abstract

One of the renewable energy sources that the whole world is working on is the photovoltaic systems, which are electricity generation from solar energy. Photovoltaic systems with modular construction and inert parts are maintenance-free and have a longer life than other systems. One of the techniques used in photovoltaic systems to convert solar energy into direct electrical energy is the technique of generating electricity with solar panels. Nowadays, there are 5 types of solar panel, monocrystalline, polycrystalline, flexible solar panel, thin film solar panel and Solimpeks PV-T (Hybrid) panel. In our study, the efficiency, durability, effects of climate conditions, the area covered, the power they produce, the purpose of use, and the cost of the panels used in photovoltaic systems are compared. It is thought that these comparisons will shed light on the systems that are planned to be established in the future. As a result of the comparison; When combined with features such as power, efficiency, durability, and coverage area, monocrystalline panels are expected to be used, but the cost of these panels is higher than other panels. In regions with varying climate conditions, it is more useful to use polycrystalline panes with lower cost than monocrystalline panes. The use of PV-T panels, which are more efficient and less costly than thermal systems in thermal centers, has been found to reduce the cost of the system to be installed. In addition, it has come to the conclusion that flexible solar panels and thin film solar panels, which are lower in cost than monocrystalline and polycrystalline panels, should be used in facilities requiring small strong production such as home appliances.

Keywords: Photovoltaic Panel, Productivity, Power.

Ventriküler Destek Cihazı için Multidisipliner Tasarım Yaklaşımı

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Özet

Bu çalışmada kalbin sol ya da sağ ventrikülünün yerine çalışmak üzere implant edilen ventrikül destek cihazı (VDC) topolojik açıdan incelenmekte ve VDC tasarımı için bir yöntem önerilmektedir. Kalp transplantasyonu işlemi öncesi uzun süreli kalp destek ünitesi olarak çalışan VDC, yüksek devirli bir elektrik motoru ile tahrik edilmektedir. Ancak motorun statoru ve rotoru arasından kan geçtiğinden ve bu aralıkta basınç kanatçıkları bulunduğundan motorun topolojisi enerji verimliliğini de etkilemektedir. Bu çalışmada VDC'nin motorunun ve basınç kanatçıklarının tasarımı birlikte ele alınarak hesaplamalı bir yaklaşım önerilmektedir. Yaklaşımın amacı düşük devirde yüksek debi sağlayan ve motordaki hava aralığı direncinin minimuma indirildiği bir tasarım ortaya koymaktır.

Üçüncü nesil VDC tasarımları manyetik yataklama, sürekli akış gibi özelliklere sahiptir. Ancak basınç kanatçıkları motorun hava aralığı denilen stator ve rotor arasındaki akı iletimini sağlayan aralığa yerleştirilmektedir. Bu durum motorlarda önemli bir verimlilik parametresi olan hava aralığı mesafesinin normalden fazla olmasına neden olmakta ve hava aralığı direncinin yüksek olmasından dolayı motor gereğinden fazla güç tüketmektedir. Ayrıca bu aralık maksimum akıyı iletebilecek değerlere göre belirlendiğinden kan akışının geçtiği silindirik hacim de düşük olmaktadır. VDC üzerinde yapılan hesaplamalı akışkanlar dinamiği (HAD) çalışmalarında büyük hacim ve düşük devirde daha yüksek debi elde edildiği görülmektedir. Bu bağlamda basınç kanatçıklarının hava aralığında bulunmadığı bir tasarım üzerinde durularak HAD analizleri yapılmış ve sonuçlar değerlendirilmiştir.

Oluşturulan simülasyon modelinde kanın non-newtonian özelliklerinden molar kütlesi 1e-10 kg/kmol, özkütlesi 1053 kg/m³, dinamik viskozitesi 10 kg/ms, özgül ısı sıçması ise 13,788 J/kgK olarak girilmiştir. İndükleyici ve akış düzenleyici kısımlar için iki sabit domen, basınç kanatçıkları için de bir dönel domen tasarlanarak dönel domenin hızı 6000 dev/dk olarak atanmış, girişte 75 mmHg referans basınç değeri belirlenmiştir. Türbülans modeli κ - ϵ seçilerek HAD çözümleri ANSYS CFX ile yapılmıştır. Elde edilen sonuçlarda 5 L/dk debinin sağlanabildiği görülmüştür. Sonuçlar kayma gerilmesi, basınç ve hız değerlerine göre analiz edilmiş, kan yıkımına sebep olmayacak değerlere ulaşılmıştır. Kanatçık yüksekliklerinin artması, gereken torkun da artmasına neden olmuş ancak hava aralığının düşmesiyle motorda elde edilecek torkun da arttığı hesaplanmıştır.

Anahtar Kelimeler: Ventriküler Destek Cihazı, Kan Pompası, Hesaplamalı Akışkanlar Dinamiği, Elektrik Motoru

Multidisciplinary Design Approach for Ventricular Assist Device

Abstract

In this work ventricular assist device (VAD) which is implanted instead of left/right ventricle is examined topologically and proposed an approach for VAD design. VAD, working long time until the transplantation as heart assist unit, is activated by a high-speed electric motor. However, topology of the motor affected efficiency since blood passes and impeller is positioned behind stator and rotor. In this work design of impeller and motor of VAD have been discussed together and proposed a computational approach. Aim of the approach is to provide high flow in low speed and min. air gap resistance in motor.

Even tough designs of third generation VADs has capabilities like magnetic bearing and continuous flow, impellers are placed to a space named air gap of motor provider place of flux behind stator and rotor of electrical motor. This situation causes the air gap resistance to be bigger than normally so motor consumes more power. Additionally, volume of blood flow is a small value since the gap determined to conduct max flux. Higher values of flow are determined in bigger volume and lower speed of VAD by computational fluid dynamics (CFD) analyses. That's why we have performed CFD analyses of VAD that impellers did not placed in air gap and results were evaluated.

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Non-Newtonian specifications of blood have been assigned as molar mass of $1e-10$ kg/kmol, density of 1053 kg/m³, dynamic viscosity of 10 kg/ms, specific heat capacity of $13,788$ J/kgK in simulation model. Two stationary domain for inducer and flow straightener, one rotational domain for impellers designed and speed of rotational domain has been specified to 6000 rpm. Reference pressure has been specified to 75 mmHg from inlet. Turbulence model has been selected as κ - ϵ , CFD solutions have been performed in ANSYS CFX. According to solutions 5 L/min flow rate can be provided. Results have been analyzed according to shear stress, pressure and velocity values and it is seen that obtained blood demolition have not occurred. However, increase of impeller caused to more needed torque, produced torque has determined to increase by decrease of air gap.

Keywords: *Ventricular Assist Device, Blood Pump, Computational Fluid Dynamics, Electric Motor*

Physicochemical Properties of Naturally Modified Starches

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Abstract

Starch, is a homopolysaccharide, the storage form of carbohydrates in plants. Commercially, It can be obtained from different plants such as corn, wheat, manioc and potato. Compared to proteins and non-starch polysaccharides, lower production costs of starches are very important for food industry. They are used in food industry as humectant, binding agent, thickener, emulsion and foam stabilizer etc. Since native starch usage is very limited, the physically or chemically modified starches is more common in food industry. Nowadays there is a considerable interest on health and the consumers do not prefer chemically modified starch in food products. This study aimed to investigate the physicochemical properties of naturally modified starches. In this respect, swelling power and swelling capacity, gelatinization and retrogradation properties of naturally modified and non-modified starches were reviewed.

Keywords: *Gelatinization, Modified Starches, Retrogradation, Swelling*

Effects of Natural Sweeteners on Biscuit Quality Parameters

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Abstract

Biscuits are described as a bakery product composed of three major components: sugar, fat and wheat flour. Physical and chemical interactions between these main ingredients in the presence of water are responsible for the final products properties. Sucrose is conventional sweetener used to produce biscuits. Flavour, size, stiffness, and surface properties of biscuits are all related with sugar used in the formula. Because health problems related with obesity and diabete, many natural and artificial sweeteners have been developed as alternative sugar. Quality losses of biscuits are found related with the usage of artificial sweeteners. Instead, other sweetener type called natural sweeteners have been used to produce desired biscuits. Sugar alcohols and rare sugars are synergistic effects on final product quality. In this study, we aimed to investigate how partial replacement of sucrose with sorbitol, xylitol, d-psicose had an effect on biscuit quality. For this purpose, biscuits were prepared according to standard recipe obtaining from AACC and colour, volume, height, antioxidant capacity, total phenolic matter content, textural and sensory properties of these were analyzed.

Keywords: *Antioxidant, Biscuit, D-psicose, Sugar Alcohols*

Nanomechanical Characterization of Electrospun PLLA-co-PCL Vascular Grafts by Nanoindentation

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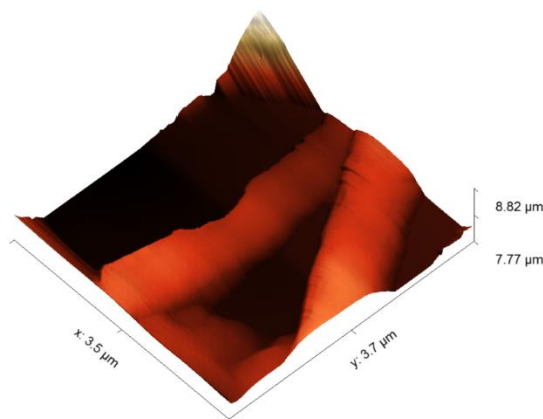
Abstract

The aim of this study is to determine nanomechanical elastic deformation property of nonwoven vascular graft made of the electrospun blends and copolymers of poly(L-lactide) (PLLA) and poly(ϵ -caprolactone) (PCL). Mechanical properties of vascular grafts, which are implemented in traumas with vascular damage in order to maintain blood flow to corresponding tissue, are extremely important due to mechanical stresses during and after the surgical operations.

Blends and copolymers of PLLA with PCL were prepared/synthesized with varying ratios (50:50 to 80:20 LLA: ϵ -CL). Electrospinning conditions such as applied voltage, tip to collector distance, collector rotation rate etc were optimized. Nanomechanical characterization was performed by scanning probe microscopy unit having force spectroscopy setup (ParkSystem XE100, Korea) under standard conditions with ultrasharp SiC probes.

Force-replacement (nN-nm) curves were obtained over the 5 μ m x 5 μ m sample area by nanoindentation of a single sub-micron fiber of electrospun graft. 50% copolymer of PLLA-co-PCL had higher Young Modulus than other copolymers and blends used in this study.

Keywords: vascular grafts, electrospun, PLLA, PCL



Biodegradable cable tie production from poli (l-lactide-co-ε-caprolactone) for use in appendectomy

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Abstract

Acute inflammation of appendix is named as acute appendicitis and it is the most widespread acute complication observed in abdomen. 7% of the population is diagnosed to have appendicitis in one period of their lives and then surgical procedure applied. The only therapy for acute appendicitis is surgical operation (appendectomy). Laparoscopic appendectomy is applied within abdomen by using three ports technique. During this operation carried out under general anesthesia, appendix with infection is dissected from intestines and taken out within endobag or surgical glove through the suprapubic port, in order to avoid harming other tissues or organs. There are several limitations through the complete removal from the intestines and abdomen by laparoscopic appendectomy. One of these limitations is the limitation for movement that is a result of the technique used in laparoscopy. The aim of this study is to develop/produce easily applied biodegradable cable tie for appendectomy in order to minimize the limitations.

PLLA-PCL copolymers will be synthesized by ring opening polymerization of L-Lactide (LLA) and ε-caprolactone (CL) with different ratios (80:20 to 50:50; LLA:CL). These copolymers were characterized by using different techniques (FTIR, DSC, etc.). Mechanical properties were determined with universal tensile test machine.

PLLA-PCL copolymers were successfully produced and they were confirmed by the chemical and physical analyses. One of the most suitable copolymer was selected according to the tensile test results of the samples having 0.5 cm width, 10 cm length and 0.1 cm depth, and cable ties are produced with this copolymer. It's been concluded to be a promising material to be used in cable tie production for use in appendectomy.

Keywords: biodegradable, appendectomy, cable tie, PLLA-PCL

Otomotivde Kullanılan Ultra Yüksek Mukavemetli Sac Metal Malzemelerin Ilık Şekillendirilmesinde Mikro Yapı ve Sertlik Değişimi

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Özet

Otomotiv sektöründe oda sıcaklığında şekillendirilmesi sınırlı olan yüksek ve ultra yüksek mukavemetli sac metal malzemeleri (HSS ve AHSS) yeni nesil çelikler olarak adlandırılmaktadır. Bu malzemelerin en büyük dezavantajı oda sıcaklığında şekillendirilmesi sınırlı olduğu için kullanım oranları oldukça düşüktür. Bu oranı mikro yapıyı bozmadan artırmanın bir yolu ılık şekillendirmeyle mümkün olabilmektedir. Şekillendirme oranının artmasıyla kullanım oranı artacaktır. Bu artışla daha ince kalınlıktaki sacların kullanılmasıyla birlikte araç ağırlığının hafifletilmiş ve yakıt tasarrufu sağlanmış olacaktır. HSS ve AHSS malzemeler mevcut malzemelere oranla 3 kat hatta 4 kat daha mukavemetli olduğu için daha güvenli araçlar imal edilebilecektir. Yapılan bu çalışmada, ılık şekillendirme prosesi işlemine geçmeden önce daha önceden farklı sıcaklık aralıklarında çekme testi yapılarak sıcaklığın malzeme mikro yapısına ve sertliğine olan etkisi incelenmiştir. SEM de bakılan mikro yapıda 400 dereceden sonraki mikro yapıda tane büyümesi ve beklendiği gibi sıcaklığın artmasıyla sertliğin düştüğü gözlemlenmiştir.

Keywords: HSS, AHSS, Mikro Yapı

Otomotivde Kullanılan Ultra Yüksek Mukavemetli Sac Metal Malzemelerin İlk Şekillendirilmesinde Dinamik Deformasyon Yaşlanması (DSA) Oluşum Sıcaklık Aralığının Tespiti

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Özet

Otomotiv sektöründe yeni nesil çelikler olarak adlandırılan yüksek ve ultra yüksek mukavemetli sac metal malzemelerin (HSS ve AHSS) oda sıcaklığında şekillendirilebilirliği oldukça düşüktür. Bu sebepten daha kısıtlı kullanılmaktadır. Bu tür HSS ve AHSS malzemelerin kullanım oranlarını artırma çalışmaları hızla devam etmektedir. Hazırlanan bu çalışma, ılık şekillendirmede şekillendirebilirlik kabiliyetlerini etkileyen önemli bir parametre olan dinamik deformasyon yaşlanması (DSA) sıcaklık aralığının tespiti için 300, 400, 500, 600 ve 700 °C lerde ve tek çekme hızında çekme testleri yapılarak testlerde kullanılan AHSS Mart1xxx malzemesinin dinamik deformasyon yaşlanması sıcaklık aralığını tespiti noktasında yapılan bu çalışmada adı geçen malzemenin belirtilen sıcaklıklarda dinamik deformasyon yaşlanma özelliği göstermemiştir.

Keywords: HSS, AHSS, DSA

Numerical Taxonomy of the Genus *Salvia* (Sage) in East and Southeast Anatolia

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Abstract

This study aims to carry out multivariate statistical analyses on 59 taxa of the genus *Salvia* L. (sage) naturally found in East and Southeast Anatolia in Turkey based on macromorphological, anatomical, palynological and mericarp micromorphological characteristics, to construct an infrageneric grouping in the genus and to understand the phylogenetic relationships between taxa.

For the multivariate correspondence analyses, OTUs (Operational Taxonomic Units) representing different populations of the *Salvia* taxa were investigated and scored on the basis of sixty character states. These analyses were used to obtain dendrograms, applying UPGMA algorithm and the Gower's General Similarity Coefficient, Percent Similarity and Euclidean Distance. Principle Coordinate Analysis (PCO) utilizing the Gower's coefficient on standardized data was conducted on the specimens to see their distribution as three-dimensional plots.

As a result of the numerical analyses, we obtained the dendrograms, in which we could separate seven major clusters. Respectively, these were as follows: *Hemisphace*, *Dryosphace*, *Plethiosphace*, *Aethiopsis*, *Horminum*, *Hymenosphace* and *Salvia* sections. PCO analysis agreed on the findings of the research. The results obtained from the present study support Bentham (1833) and Boissier's (1879) taxonomic decisions on infrageneric delimitation of *Salvia*.

Keywords: Numerical Taxonomy, Phylogeny, *Salvia*, Lamiaceae, Turkey

Numerical Taxonomy of the Genus *Lathyrus* Sect. *Platystylis* (Fabaceae)

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Abstract

The main objectives of the current study are to perform multivariate analyses (e.g. cluster analysis and principle coordinate analysis) on 15 taxa belonging to the genus *Lathyrus* L. sect. *Platystylis* (= *Lathyrostylis*) in Turkey on the basis of macromorphological, anatomical and micromorphological properties, to elucidate the phylogenetic relationships among taxa and to contribute the taxonomic knowledge of the genus.

For morphometric analyses, the specimens stemming from *Lathyrus* collections gathered from different regions of Turkey by the first two authors were selected as OTUs and scored based on forty character states. A similarity matrix was created using Gower's general coefficient similarity index. This similarity matrix was then clustered with the help of UPGMA and the results were shown in dendrograms. Principle Coordinate Analysis (PCO) utilizing the Gower's coefficient on standardized data was also conducted on the specimens to see their distribution as three-dimensional plots. The MVSP software version 3.2 program package was used for the analyses.

As a result of the multivariate analyses, we obtained the dendrograms and PCO plot, illustrating the phylogenetic relationships among the taxa. According to the UPGMA dendrograms, the most similar plants were *L. brachypterus* and *L. hausknechtii*. Moreover, they revealed the close relationships between *L. karsianus* and *L. satdaghensis*, *L. tukhtensis* and *L. variabilis*, *L. armenus* and *L. boissieri*, and *L. cyaneus* var. *cyaneus* and *L. digitatus*. The multivariate PCO analysis showed that there were four groups including the taxa studied.

Keywords: *Multivariate analysis, Phylogeny, Platystylis, Lathyrus, Fabaceae, Turkey*

The Determination of Heavy Metal Levels in *Echium italicum* that is an Important Medicinal and Aromatic Plant

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Abstract

Determination of heavy metal levels within the echium plant. In this study, *Echium italicum* species which were grown naturally in Turkey and were consumed through direct collection from nature, were used as material. In the scope of the experiment, samples of *Echium italicum* plants were taken from in five different localities. The samples has been evaluated mainly according to their cadmium and the heavy metal contents by ICP-OES instrument. In the same time, heavy metal levels of soil samples were analyzed by DTPA method. As a result of our obtained data, the heavy metal levels of *Echium italicum* which was collected from nature, were found to be quite high.

Keywords: *Cadmium, Echium, Heavy metal, Medicinal plant*

Production of Recombinant mKate Protein for Further Researchs in Bioimaging

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Abstract

TagFP635 (mKate) marine anemone (seabass) A far-red fluorescence protein in monomeric structure produced from *Entacmaea quadricolor*. This protein has a bright fluorescence at 588/635 nm which is the maximum peak wavelength for excitation / emission. mKate is a 27 kDa protein that exhibits a rapid maturation at 37 ° C and a high photostability (Shcherbo et al., 2007). All of the new blue fluorescing proteins have been critically assessed for their utility in live cell fluorescent imaging. This work aimed to expression of mKate in bioreactor in high yield using *E.coli* expression system and purification of it.

Transformed *E.coli* cells with pBAD- mKate recombinant plasmid were cultured in 3 liters LB triple medium supplemented with 100 ug/ml ampicillin at 37 °C in bioreactor. When the optical density at 600 nm was 1.5, L- arabinose was added to a final concentration of %0.04 in order to express mKate. After 5 hours, the cells were harvested by centrifugation. Cell pellets were suspended in lysis buffer and disrupted by sonication. Soluble protein was collected using ultra-centrifugation. 6xHis-tag on the N-terminus protein used for purification of recombinant mKate. The expression levels of mKate was assessed using 10% (w/v) SDS-PAGE and UV spectroscopy.

One of the most efficient expression systems for producing recombinant proteins in *E.coli* is a pBAD- system. It is observed that at optimized arabinose concentration (0.04 %) for 5 hours induction resulted high levels of fluorescent protein expression. The method relies on induced expression in the BL21-AI strain of *E.coli* and yields large amounts (20 mg/L) of fluorescent protein from a 3 liters culture. This method provides a quick, high-yield production and can be used to produce any fluorescent protein that is needed in biomedical research especially bioimaging.

Keywords: mKate, Recombinant Protein, Blue Protein

*This study was supported by the Scientific and Technological Research Council of Turkey (TUBITAK Grant Number 114Z956) who provided financial support for this research.

High Yield Bacterial Expression of iRFP720 Protein Using Inducible *E.coli* Expression System in Bioreactor

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Abstract

iRFPs display high brightness in mammalian cells and tissues and are suitable for long-term studies. In particular, studies with iRFP720 proteins yielded bi-color imaging on live cells and mice. iRFPs have advantages in terms of application because they do not require high stability in the cell, low toxic effect and the addition of extra biliverdin-chromophore. Aim of this study is production of recombinant iRFP720 in a large scale in *E.coli* expression system using bioreactor.

In this work iRFP720 gene that cloned into bacterial expression vector pBAD transformed into BL21-AI *E.coli* strain by heat shock iRFP720 expression was optimized by fine adjustments such as induction time and inducer concentration. *E.coli* cells were grown 3 L Lurian-Bertani (LB)-Amp medium in bioreactor. Temperature at 37 °C and pH at 7.00 were controlled. The dissolved oxygen concentration (DO) was maintained at 30% saturation by increasing agitation and O₂-enrichment if required. Production of recombinant iRFP720 was induced at OD₆₀₀=2 with 0.04% (w/v) arabinose. 6xHis-tag on the N-terminus of the protein used for its purification. iRFP720 was characterized by SDS-PAGE and UV spectroscopy.

Our results demonstrated that iRFP720 was successfully expressed in bioreactor in *E.coli* pBAD expression system under the control of araBAD promoter. Optimization of the expression procedure showed that, induction by %0,04 arabinose at OD₆₀₀=2 and 5 hours incubation at 37 °C resulted in the highest expression levels of soluble iRFP720. Expression under optimal conditions as determined by 12% SDS-PAGE and characterized by UV spectroscopy. The expression of iRFP720 resulted in production of a soluble and pure in a yield of 12 mg/L bioreactor cultivation.

Keywords: iRFP720, Recombinant Protein, *E.coli*

*This study was supported by the Scientific and Technological Research Council of Turkey (TUBITAK Grant Number 114Z956) who provided financial support for this research.

İnovasyonun İşletme Mali Performansı Üzerine Etkisi: Arçelik Örneği

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Özet

Değer yaratan yenilik olarak Türkçe karşılığı olan inovasyon, yenilik kavramı ile çok karıştırılmaktadır. Müşterilerin istek ve ihtiyaç problemlerine çözüm getirecek yeni ürün ya da hizmetlerin yeni teknolojik ve pazara ait bilgilerin kullanılarak ticarileştirilmesi inovasyonu yansıtmaktadır. İnovasyonun temel dinamiğini “yeni olan her şey değil, ekonomik ve sosyal bir katma değere dönüşen ya da dönüştürülen yenilikler” oluşturmaktadır. Dolayısıyla ekonomik ve sosyal bir katma değeri olmayan bir şeyin ne kadar yeni, farklı, orijinal ya da yaratıcı olursa olsun inovasyon olarak değerlendirilemeyeceği açıktır. Bu çalışmanın amacı, inovasyonun işletme mali performansı üzerindeki etkisini araştırmaktır. İnovasyonun işletme için gerçekten bir katma değer yaratıp yaratmadığının ortaya konulması ise çalışmanın önemini ifade etmektedir.

Bu çalışmada Türkiye'nin inovatif işletmelerinden “Arçelik”in 2002-2016 yılları arasındaki mali tabloları kullanılarak; inovasyonun işletme mali performansı üzerindeki etkisi ortaya konulacaktır. Çalışmanın başlangıç yılının 2002 seçilmesinin nedeni; bu yılda işletmenin teknoloji ve müşteri odaklı yeni bir döneme adım atmasıdır. Arçelik'in teknolojik ve yenilikçi bir marka olduğunun en iyi şekilde ifade edilmesi için bu yılda logo değiştirilmesine karar verilmiş ve Arçelik için inovatif bir dönemin başladığı ilan edilmiştir. 2002-2016 yılları arasında, Arçelik'in inovasyon çalışmaları meyvelerini vermiştir. Birkaç örnek vermek gerekirse; Arçelik, 2004 yılında dünyanın ilk türk kahvesi makinesi “Telve”yi piyasaya sürmüştür. Ayrıca; “telve” dünyaca ünlü markalarla yarışarak ve tasarım alanının en prestijli ödülllerinden biri olan iF Design Award'un 2005 yılı ürün tasarım kategorisinde endüstriyel tasarım ödülünün sahibi olmuştur. 2014 yılında ise “Ar-Ge Liderliği” ve “Teknoloji Geliştirmede Liderlik” ödülllerinden sonra İnovaLİG İnovasyon Liderleri Ödül Töreni'nde “İnovasyon Stratejisi” kategorisinde şampiyon olarak ödüle layık görülmüştür.

İnovasyonun işletme mali performansı üzerindeki etkisi ortaya koyabilmek adına işletmenin likidite, faaliyet, karlılık, mali yapı hakkında bilgi veren ve finansal tablo kalemleri arasında görece ilişki kurarak değerlendirme yapılmasını sağlayan “oran analizi”nden yararlanılmıştır.

İşletmelerin mali performanslarının ölçülmesinde ve değerlendirilmesinde finansal oranlardan yararlanılmaktadır. İşletmelerin oran analizi sonucundaki durumları doğrultusunda, piyasadaki varlıklarını devam ettirebilme ve rakiplerine göre rekabet avantajı elde etmeleri söz konusu olabilmektedir.

Bu çalışmada da inovasyonun işletme mali performansı üzerindeki etkisi “Arçelik”in 2002-2016 yılları arasındaki mali tablolarından elde edilen oranların analizi ile ortaya konulmuştur. İnovasyon ile mali performans arasındaki ilişkinin tespit edilmesi amacıyla belirlenen finansal oranlar yapılan literatür taraması baz alınarak oluşturulmuştur. Bu bağlamda araştırmada, stok devir hızı, aktif devir hızı, duran varlık devir hızı (yatırım karlılığı), hazır değerler devir hızı, aktif karlılığı, özsermaye karlılığı, hisse başına kazanç ve fiyat/kazanç oranları mali performansın analizi için kullanılmıştır. Sonuç olarak; inovasyonun işletme mali performansı üzerinde belirlenen oranlar doğrultusunda olumlu etki yaptığı tespit edilmiştir.

Anahtar Kelimeler: *İnovasyon, Mali Performans, Oran Analizi*

The Effects of Innovation on Business Financial Performance: The Sample of Arçelik

Abstract

Innovation, which stands for Turkish as a value-creating innovation, is very confused with the concept of innovation. The commercialization of new products or services using new technological and pazare information reflects the innovation that will solve the customers' needs and needs problems. Innovation's basic dynamism is not "everything new, but innovations that have evolved or transformed into an economic and social added value". So it is clear that no matter how new, different, original or creative something that is not an economic and social added value can not be

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regarded as innovation. The purpose of this study is to investigate the impact of innovation on business financial performance. Whether innovation really creates added value for business means that it is important to work.

In this study, using the financial statements of Arçelik, one of the innovative enterprises of Turkey, between 2002-2016; the impact of the innovation on the business financial performance will be revealed. The reason for the 2002 election of the start of the study; this year is a new turning step of the business with technology and customer focus. In order to best express Arçelik's technological and innovative brand, it was decided to change the logo this year and an innovative period was announced for Arçelik. Between 2002 and 2016, Arçelik's innovations gave fruit. To give a few examples; In 2004, Arçelik drove the world's first turkish coffee machine "Telve" to the market. Also; "Telve" won the industrial design award in the 2005 product design category of the iF Design Award, competing with world famous brands and being one of the most prestigious awards in the field of design. In 2014, he was awarded as a champion in the category of "Innovation Strategy" at the InnovaliG Innovation Leaders Award Ceremony after the "R & D Leadership" and "Technology Development Leadership" awards.

In order to be able to demonstrate the impact on the business financial performance of the innovation, it has benefited from the "ratio analysis", which provides information about the liquidity, activity, profitability, financial structure of the business and makes an assessment by establishing a relative relationship between financial statement items

The financial ratios are utilized in measuring and evaluating the financial performances of the enterprises. Businesses may be able to maintain their assets on the market and gain competitive advantage according to their competitors in the direction of the results of the ratio analysis.

In this study, the effect of the innovation on the financial performance of the company was determined by analyzing the ratios obtained from the financial statements of Arçelik between 2002-2016. The financial ratios determined for the purpose of determining the relationship between innovation and financial performance are based on literature review. In this context, stock turnover, asset turnover, asset turnover, turnover, asset profitability, return on equity, earnings per share and price / earnings ratios are used to analyze financial performance. As a result; it has been found that the innovation has a positive effect on the financial performance of the company in accordance with the determined ratios.

Keywords: *Innovation, Financial Performance, Ratio Analysis*

Efficient removal of a basic dye-malachite green dye with biosorbent from aqueous solution

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Abstract

The aim of the study was to efficiently removal of a toxic basic dye from aqueous solutions via *Onopordum turcicum* Danin as bioadsorbent

Batch adsorption studies were carried out to evaluate the potentiality of *Onopordum turcicum* for the removal of malachite green dye from wastewater, on different parameters such as pH, adsorbent dose, contact time and initial MG concentration.

The effective pH was 8.0 for adsorption of MG by the biomass. The equilibrium isotherm was analyzed with the Langmuir and Freundlich models of adsorption. The biosorption data of MG on *Onopordum turcicum* Danin was fitted with Langmuir model with a maximum adsorption capacity was 1110.1 mg/g. The acquired results show that *Onopordum turcicum* was effective in removal of MG dye from aqueous solution.

Keywords: *Onopordum turcicum*, dye removal, biosorption

LabVIEW Based PV Module Training Set Design

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Abstract

Associated with the ever-growing population and energy demand of our world, it seems obvious that conventional energy resources will be dissolve before expected. This situation is most important reason of the increasing focus on researches and developments about renewable energy systems. Renewable energy systems training should be supported by laboratory courses along with theoretical lectures. So, there are many training sets designed for observing the PV panels' operating principles by researchers. In this study, LabVIEW based PV module training set is designed in the Renewable Energy laboratory of Amasya University, Technology Faculty, Electrical and Electronic Engineering Department.

There are used 2x10W mono crystal PV panel and 100W/m² adjustable light source for experiment module. Effect of azimuth angle on sun energy and effect of season changes can be simulated on the experiment module. Open circuit voltage measuring, short circuit current measuring, extracting the I-V characteristic on load and no-load cases. MPPT (maximum power point tracking) experiments can be made for variable states. Designed system includes both hardware and software interfaces. The experimental data can be saved to PC in real time via DAQ card with using LabVIEW graphical programming language.

The prepared experiment set was used by three electric electronics engineering student and evaluation was requested. For the three students separately, 45 minutes were given to perform the above-mentioned experiments. During this period, all of the students could complete the experiments successfully. As a result of the evaluation, it was found that the system was beneficial for the training of PV systems. This study establishes the background of our ongoing e-Lab project about increasing experimental module production for renewable energy systems.

Keywords: LabVIEW, Renewable energy, Training set, PV

Quantitative Determination of Mirtazapine and Its Major Metabolite in Plasma by a Developed and Validated HPLC-UV Method

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Abstract

A new, rapid and sensitive high-performance liquid chromatography method has been developed for the determination of mirtazapine (MIR) and its active desmethyl metabolite (D-MIR) in human plasma. This developed and optimized method was fully validated according to ICH guideline. It presents several advantages, such as rapidity and selectivity and it is especially adapted for the management of poisoning cases leading to concentrations generally greater than the therapeutic range (20-75 ng/mL). MIR and D-MIR values were successfully measured by this method in plasma samples of 5 patients who have diagnosed depression according to DSM IV criteria and treatment under 15 mg/day.

The method is based on a liquid-liquid extraction and reversed-phase chromatography with ultraviolet detection. The separation was achieved on the reverse phase C18 250x4.6mm ODS-3 analytical column using a gradient elution. 0.02 M Na₂PO₄ buffer, triethylamine and acetonitrile (24.9:75.0:0.1: v/v/v) were used as a mobile phase. The mobile phase flow rate was 1.2 mL.min⁻¹ and total run time was below the 12 minute. 10 µL clozapine (20 µg mL⁻¹) as an ISTD and then 200 µL NaOH (0.1 N) for the alkalization of the matrix was added to the 0.5 mL plasma for preparation of validation or patient samples. The mixture was extracted with 5 mL hexane, isoamyl alcohol mixture by rotative shaking during 10 min and then centrifuged at 10 minutes. After centrifugation organic phase was separated to test tube contained 0.1 N HCl. The mixture was shaken with rotative shaker and after then centrifuged. The upper organic phase was discarded and the remaining acidic aqueous phase was loaded to the liquid chromatograph. Calibration curves were linear in the 10 – 250 ng.mL⁻¹ range for both compounds. The method was validated in terms of linearity, accuracy, precision, sensitivity, recovery, and robustness.

The linearity of MIR and D-MIR (r²) were found 0.9981 and 0.9987, respectively. Intra-day and interday assay precision (RSD%) were found as 1.6–9.3 and 1.0–8.1, respectively. The intra-day and interday accuracy of the method were calculated (RE%) as (-4.8)–5.2 and (-2.1)–7.9, respectively. The recoveries of MIR and D-MIR were 95.7%, 106.1%; respectively. The developed method was found robust according to mobile phase flow rate, UV detection, column oven temperature, and mobile phase pH. The method allows not only the therapeutic drug monitoring of the MIR which is the most prescribed tetracyclic antidepressant and its pharmacologically active metabolite but also uses in toxicological screening. MIR and D-MIR levels in plasma samples of 5 patients who were on treatment with MIR were successfully monitored by the developed method. Changes in mirtazapine and desmethyl mirtazapine levels may be due to mainly the polymorphism of the enzymes responsible for their metabolism, also drug-drug interactions, polypharmacy and individual metabolism differences.

Keywords: mirtazapine, desmetil mirtazapine, plazma, liquid-liquid extraction, validation, HPLC-UV

Development of a New Automation System for Hot Air Dryers to Reduce Energy Consumption

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Abstract

Hot air dryers are widely used in agriculture and industry because of their simple structure and ease of operation. Their most important disadvantage is to have high drying costs because of their high energy consumption in case of that commercial energy sources are used for heating process. There is a need of automation systems which provide the opportunity of benefitting the full drying potential of hot air. To satisfy this need, a new automation was designed and manufactured. This automation system has a unique interface prepared with Labview software, considers the values of relative humidity measured at the outlet of dryer cabinet as the controlling input variable, compares this input variable with the lower and upper limits of relative humidity set by a user and directs the flow of drying air by the valves steered by servo motors. The drying time and the temperature of drying air were set constantly to 28 h and 45 °C in order to compare the experimental results obtained from all drying trials. 20 kg tomatoes were used in each trial. At the beginning of each drying trial, the air already in the dryer was heated and used for drying and the ambient air was blocked from entering the dryer. The drying air was flown out from the dryer and the ambient air was flown into the dryer after heating when the measured relative humidity value of drying air at the outlet of dryer cabinet reached the upper relative humidity limit set by a user. In this study, while the lower relative humidity limit was set to the constant value of %40, the upper relative humidity limit was set to %70, %80 and %90 in turn. In addition to these three trials, a reference trial in which ambient air was continually used for drying was conducted. The total electrical energy consumption of dryer and the total moisture loss amount of tomatoes were determined after each trial. The total electrical energy consumption of dryer and the total moisture loss amount of tomatoes were 7.129 kg and 19.5 kWh, respectively for the reference trial in which ambient air was continually used for drying. The reference trial had the total moisture loss amount of tomatoes only 9.42% more than the trial with the upper relative humidity limit of 70% had; however, its total electrical energy consumption was 50% more than that of the considered trial. As a result of these differences, its specific energy consumption was 37.1% more than that of the trial with the upper relative humidity limit of 70%. Increasing the upper relative humidity limit from 70% to 80% or 90% did not reduce the specific energy consumption significantly but lowered the total moisture loss amount of tomatoes. Therefore, in the scope of this study, the trial with the lower and upper relative humidity limits of 40% and 70%, respectively was concluded to be the best drying practice based on that the automation system can be operated.

Keywords: *Dryer Automation, Energy Saving, Energy Consumption, Used Air Circulation and Specific Energy Consumption*

A New Validated Method for Analysis of Clozapine and Its metabolites Norclozapine and Clozapine-N-oxide in Human Plasma

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Abstract

Clozapine (CLZ) is classified structurally as a dibenzodiazepine derivative drug, known as an atypical antipsychotic agent and displays efficacy in the management of schizophrenia and treatment of other psychotic disorders. Although it has a high antipsychotic and therapeutic potential, dose-dependent epileptic seizures and serious risk of fatal agranulocytosis limit the wider use of CLZ. A simple, simultaneous and reliable high-performance liquid (HPLC) method was developed for analysis of CLZ, that is a widely prescribed drug especially for treatment of schizophrenia, may have fatal toxicities in some cases and also its two metabolites norclozapine (NCLZ) and clozapine N-oxide (CLZNO) in human plasma

The separation and quantification were performed by HP Agilent 1100 chromatography system, equipped with a UV detector. The analysis was carried out with a system consist of an isocratic pump, manual injector with a loop volume of 20 µL. Optimum analytic conditions were set after an optimization procedure was performed for column selection, the content of mobile phase (MP) and wavelength. An isocratic high-performance liquid chromatography method with ultraviolet detection at 220nm was utilized. Analytes are concentrated from plasma by liquid-liquid extraction with ethyl acetate, n-hexane and isopropyl alcohol (80:15:5,v/v/v) which allows obtaining good extraction yields (>80%) for all analytes. Separation was performed on a C18 reversed-phase analytical column (3.5 µm, 4.6 x 150mm) using a mixture of acetonitrile and 0.0062 M KH₂PO₄ buffer (containing 0.3% triethylamine, pH 4.5) at the ratio of 40:60(v/v).

Method showed linearity with excellent correlation coefficients ($r^2 > 0.999$) for each analyte. The relative standard deviations and relative errors calculated to present precision and accuracy between and within-day assay were less than 4% for low concentrations. The method was specific and sensitive with detection limits of 23.6 µg/L, 19.3 µg/L and 23.6 µg/L for CLZ, NCLZ and CLZNO respectively. Chromatographic conditions and detection parameters were adjusted in consequence of optimization study. This method was fully validated in terms of linearity, accuracy, precision, sensitivity, recovery, and robustness according to ICH guideline. The procedure described is relatively simple, precise, and applicable for routine therapeutic drug monitoring especially in psychiatry clinics or in toxicology reference laboratories.

Keywords: clozapine, norclozapine, clozapine-N-oxide, HPLC-UV, validation.

Arttırılmış Gerçeklikte Yeni Cihaz Teknolojileri

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Özet

Arttırılmış gerçeklik, gerçek dünya görüntüleri üzerinde sanal objelerin gösterilmesi tekniğidir. Kullanıcıların bu teknikten beklentileri ek bilgiler almak, farklı bir eğitim olanağı olarak yararlanmak veya sadece eğlenmektir. Bu olasılıklar sayesinde arttırılmış gerçeklik günümüzde oldukça ilgi görmektedir. Son zamanlara dek arttırılmış gerçeklik gözlüklerinin yaygın kullanılmamasının nedeni gözlüklerin konforsuz ve yeterli kalitede olmamasıdır. Oysaki mobil cihazlar üzerindeki uygulamalar çok daha fazla ilgi görmüştür. Bu çalışma yeni ve gelecekteki arttırılmış gerçeklik cihazlarını tanıtmak amacıyla yapılmıştır.

Bu çalışmada arttırılmış gerçeklik teknolojisinin ulaştığı son noktalar sunulacaktır. Bilgiler internet taraması ile elde edilmiştir. Teknolojiler dünyada kullanılan projelerde de sıklıkla tercih edilen modeller üzerindedir. Kullanıcı dostu uygulamalar, yeni teknolojiler ve arttırılmış gerçekliğin geleceği tanıtılacaktır. Çalışma bir araştırma makalesi düzeyinde olacaktır.

Araştırma sonucunda tanıtılan teknolojiler sayesinde, yeni geliştirilecek projeler için kullanıcı konforu gözetilen cihaz tercihleri yapılmasına yardım etmek amaçlanmaktadır.

Anahtar Kelimeler: *Arttırılmış gerçeklik, Sanal gerçeklik, Gözlük teknolojileri, Mobil cihazlar*

New Augmented Reality Device Technologies

Abstract

Augmented reality is a technique of showing virtual objects on real world images. Users are expected to receive additional information, using different educational facility, or just have fun with this technology. Owing to these possibilities, augmented reality is increasingly attracted nowadays. Until recently, augmented reality glasses haven't been so popular because they are uncomfortable and they aren't sufficient quality. On the other hand, applications on mobile devices have attracted much more attention. This work was done to introduce new augmented reality devices.

In this study will be presented the newest technologies of augmented reality devices. Given information have taken from internet. Technologies are often preferred models on projects used in the world. User-friendly applications, new technologies and the future of augmented reality will be introduced. The level of this study is a survey.

As a result of the introduced technologies, this study is aimed to give alternatives more comfortable devices for newly developed projects.

Keywords: *Augmented reality, Virtual reality, Glass technologies, Mobile devices.*

A Rule-Based Classification Algorithm Based On Coa

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Abstract

Data mining has an important role in the transformation of information into large data sets. The rule discovery process, which is one of the data mining classification methods, enables large data sets to become meaningful in a short time. In this study, a rule-based classification algorithm is developed using an algorithm called Cuckoo Optimization Algorithm (COA). It has high classification performance on COA datasets with ease of implementation and high accuracy.

Rules are created according to all possibilities of the given data set. These rules are the starting population of GOA. Every rule in the population corresponds to a cuckoo bird. The rule structure is "If P Then D". Where P is the rule's condition and D is the result part (class label). Egg laying radius of cuckoo birds: $\alpha * \frac{\text{Number of current cuckoo's eggs}}{\text{Total number of eggs}} *$

$(y_{\max} - y_{\min})$ the remaining rules are deleted at% p.

It is tried to reach the target by approaching λ best times from the target environment by deviation of ϕ value. The fitness function of the rules in the target region is calculated. The ability to select the most comprehensive, understandable, and valid ones in the rules is considered when creating the fitness function.

A rule-based classification algorithm, developed using a cuckoo optimization algorithm, has been successfully run on few well-known data sets. The performance of the generated algorithm is high when the number of parameters (attributes) in the dataset is small. However, as the number of features increases, lower performances are observed.

Keywords: *Data Mining, Classification Rule, Cuckoo optimization algorithm.*

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Arttırılmış Gerçeklik Geliştirme Araçları ve Google ARCore

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Özet

Arttırılmış gerçeklik, gerçek dünya görüntüleri üzerinde sanal objelerin gösterilmesi tekniğidir. Özellikle mobil cihazlar üzerindeki uygulamalar çok daha fazla ilgi gördüğü için, mobil uygulama geliştiricisi firmalar da arttırılmış gerçeklik için kolay kullanımı olan araçları tercih ederler. Günümüzde ARToolkit ve Unity kullanımı ile işaretçi tabanlı başarılı çalışmalar yapılabiliyor. Ancak, Google işaretçi kullanmayan, kameranın gördüğü herhangi bir düzlem üzerine sanal objeleri yerleştirebilen bir aracı Ağustos 2017'de tanıtmıştır. Bu çalışmada duyurulan bu aracın kullanımı anlatılmıştır.

Bu çalışmada arttırılmış gerçeklik teknolojisinin mobil cihazlar üzerinde hangi aşamalardan geçerek bu güne geldiği ve Unity ile ARCore araçları ile basit projelerin nasıl yapılabildiği anlatılmaktadır.

Bu sunum sonucunda tanıtılan teknolojiler sayesinde, yeni geliştirilecek arttırılmış gerçeklik projeleri için kullanıcı dostu ARCore aracını tanıtmış olacağız.

Anahtar Kelimeler: Arttırılmış gerçeklik, Unity, Unreal Engine, ARCore, Mobil cihazlar

Augmented Reality Development Tools and Google ARCore

Abstract

Augmented reality (AR) is a technique of showing virtual objects on real world images. Especially the applications on mobile devices are very popular, mobile application developers prefer easy use tools for AR also. Nowadays, we can develop successful studies with marker based AR using ARToolkit or Unity. A tool was introduced in August 2017 by Google is a markerless tool for AR, and the tool can put an AR object any flat platform which is the mobile device's camera captured. In this study we are presented usage of this tool.

In this study, we are presented history of mobile AR technologies, how they have come to current point and how simple projects can be realized with Unity and ARCore tools.

Owing to introduced technologies in this presentation, we have showed the user-friendly ARCore tool for planned AR projects.

Keywords: Augmented reality, Unity, Unreal Engine, ARCore, Mobile devices.

Production of Polyethylene Glycol (PEG) Capsules That Includes *Hypericum Perforatum* Oil by Using Electro-Spraying Technique

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Abstract

Electro-spinning and electro-spraying are easy, useful and low cost techniques used for production of micron, submicron and nano scale fibers and particules. Both techniques provides lots of structural and functional advantages. Therefore these techniques have many application areas such as tissue engineering, biomedical, textile, filtration, food packaging, environmental engineering, storage of active materials, etc.

Fundamentally electro-spinning and electro-spraying techniques are composed of certain common components as applied voltage, distance between syringe and collector, flow rate of polymer solution, temperature, humidity, etc. Fiber and particule morphologies can be modified by the changing of these certain parameters.

The parameter that determines fundamental difference between electro-spinning and electro-spraying is the concentration of polymer solution. By the decrease in solution concentration, the stability of the jet structure is spoiled and disorders are observed and therefore slim droplets are formed.

Aim of this work is to encapsulate *Hypericum perforatum* oil into the PEG capsules by using electro-spraying technique. This technique eliminates the need for several additives (salt, surfactants, etc.) that are used in other microcapsule production techniques. Since chloroform is a solvent that deteriorates ester bonds, it also solved *Hypericum perforatum* oil and this situation avoided phase separation during electro-spinning or electro-spraying and maintained homogeneous solution medium.

Several optimization studies have been carried out for the production of capsules. Firstly; different solutions were prepared with different polymer/oil/solvent ratios. Electro-spinning studies were done at optimum conditions at which a homogeneous solution was formed with no phase separation. Then parameters were changed for several optimization experiments and electrspraying could be achieved.

When the microscope slides on which the capsules are formed where investigated by optical microscope and it's observed that oil was successfully encapsulated with PEG. Dimensions of the microcapsules are shows differences depends on the changing parameters (flow rate of the solution, applied voltage, polymer/oil/solvent ratio, distance between syringe tip and collector).

Keywords: *Electro-spraying, Biopolymers, Capsules.*

Effect of Hydrothermally Treated Bran on Bread Quality

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Abstract

Grain is one of the basic food products consumed by humans since ancient ages. Although generally white bread is consumed worldwide, in recent years consciousness of consumers increased about their health and the interest in various kinds of breads contains bran increased. The addition of wheat bran in bread production causes decrease in bread volume, deterioration in pore structure and decrease in shelf life. Hydrolysis is carried out to reduce technological and sensory problems caused by bran and the useful components can be used to make existing health structure wheat bran. Aim of this study is to produce breads with hydrothermally treated wheat bran and to determine the starch fractions which are important in terms of nutrition. The wheat bran was hydrolyzed for 30 minutes at 150°C. Five different levels (10, 20, 30, 50 and 100%) of hydrolysates were used for the production of bread. Chemical properties (proteins, total fat, ash etc), functional properties (antioxidant activity total phenolic and flavanoid content), total glucose (TG), rapid usable glucose (RUSG), total starch (TS), rapid digestible starch (RDS), slow digestible starch (SDS) and resistant starch (RS) contents and starch hydrolysis index (SHI) of the breads were determined. It was found that the highest total phenolic and antioxidant content in breads was determined on 100% hydrolysed breads. The technological and sensory problems in added wheat bran breads (low volume, irregular pore structure, undesirable shell color, etc.) do not appear to breads with hydrolyzate added. With the addition of hydrolyzate, the crust color of the breads is improving. The addition of increasing hydrolyzate results in a decrease TS, RDS and RDG content and increases SDS content in breads. In addition SHI was lower in 100% hydrolysed breads. As a result, the addition of hydrolyzate improves the technological, sensory and functional properties of the white bread.

Keywords: Digestibility, Hydrolyzate, Starch

A Research of Samsun City Floods with Infrastructure Problems

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Abstract

In Turkey after earthquakes; floods are natural disasters that responsible for serious economic and human disasters. Especially floods affecting residential areas leads to significant loss of life and economic losses. The Black Sea Region is one of the most common regions in flood and landslide events due to topography and the annual excess of precipitation. The aim of this study is to investigate the history and the infrastructural reasons of the flood disasters in Samsun from 1960 to 2017 and to determine the typical damages caused by these floods in Samsun.

In this study, a comprehensive literature research was conducted for the past flood records in Samsun city. In this context, the data given in the manuscript has been reached in cooperation with the General Directorate of State Hydraulic Works and Turkish State Meteorological Service.

Due to Samsun city where located in the climate zone with continuous rainfall and floods are located in a region under risk. In the past, frequent floods occurred in the region. When these floods are examined, it is seen that especially the summer rains are causing floods. With increasing rainfall intensity, global climate change is seen to have an effect, but when it comes to the 2012 and 2013 floods, it is seen that even when rainfall values are not in disaster dimension, floods are seen. The reason is that irregular urbanization and inadequate infrastructure.

Keywords: *Flood History, Infrastructure, Samsun, Turkey.*

Formation of Matrices of $S = 1$, $S = 3/2$ Spin Systems in Quantum Information Theory

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Abstract

There are many methods for designing quantum computers, which are generated by rapid progress of computer technology. In this work, it is aimed to find matrices and processors by using an algorithm for spin 1 and 3/2, which can be observed with EPR spectroscopy and used for Quantum Information Processing.

Spin matrices or matrices that can be formed using the basic properties of processors. Some of the spin processors, some of which are known, are the most well-known Pauli spin matrices, which can be found in various sources, but are computed with an algorithm for convenience in practice. Matrix representations for $S = 1$ and $3/2$ are found in the theoretical calculations.

In addition to the $S = 1/2$ spin operators given in the literature, matrix representations of spin processors and spin systems are found for $S = 1$ and $S = 3/2$ using an algorithm. Thus it can be used in theoretical studies and applications in quantum information theory. For other spin systems spin operators can be created.

Keywords: *spin systems, quantum computing, qutrit, quantum information theory.*

Tadilatlı M1 Kategorisi Araçların Pasif Süspansiyon Sistemi Tip Onayı Analizi

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Özet

Bu çalışmada tip onay yönetmeliklerince M1 sınıfı olarak nitelendirilen bir araca sınır değerleri dâhilinde gerçekleştirilen elektrikli taşıt ve benzeri bir tadilat (A.İ.T.M. Ek. V kapsamında) neticesinde süspansiyon sistemi tasarımının değerlendirmesi gerçekleştirilmiştir. Maruz kalınan tadilat ile aracın kütlesi artırılmış ve bu artış sonucunda yolcu konforunun standart sınırlar içerisinde kalıp kalamadığı, yay dayanımı ile yay katsayısı değişkenlerinin analizi yapılarak incelenmiştir. Çalışmada verilerin elde edilmesine temel oluşturacak olan modelleme işlemleri Matlab-Simulink yazılımı yardımı ile gerçekleştirilmiştir. Verilerin değerlendirilmesi çeyrek taşıt modeli oluşturularak yapılan analiz sonucu elde edilen grafikler ile gerçekleştirilmiştir.

Analiz için M1 katagorisindeki 1000 kg lık aracın tadilat ile 1300 kg olması durumu dikkate alınarak serbest süspansiyon sistemi simülasyonu yapılmıştır. Analiz sonucu elde edilen verilerin titreşim değerlerinin ISO 2631 standardına (Mekanik Titreşim ve Şok - Tüm Vücut Titreşime Maruz Kalma Değerlendirilmesi) uyumlu olup olmadığı değerlendirilmiştir. Sonuç olarak tadilat yapılmış taşıtın süspansiyon yayının katsayısı uygun bir yay ile değiştirilerek, sistemde başka değişikliğe ihtiyaç olmadan M1 sınıfı taşıt konfor standardına ulaşabileceği görülmüştür.

Anahtar Kelimeler: –Araç Süspansiyonu, M1 kategorisi taşıt, konfor, Matlab-Simulink Analiz

Type approval analysis of modified M1 category vehicles' passive suspension system

Abstract

With this study, suspension system evaluation will be carried out as a result of an electrical vehicles' and similar modification (A.İ.T.M. Ek. V) carried out within the limit values, which is classified as class M1 in the type approval regulations. The mass of the vehicle has been increased with the alteration of the vehicle and the increase in the passenger comfort has been examined by analyzing the spring resistance and spring coefficient variables. The modeling operations that will form the basis of obtaining the data in the study were realized with the help of Matlab software. The data were again analyzed through the Matlab program and the evaluation of the graphics was performed.

The free suspension system was simulated taking into consideration that the 1000 kg vehicle in the M1 category for the analysis had to be modified to 1300 kg. It was evaluated whether the vibration values of the data obtained after the analysis were in accordance with the ISO 2631 (Mechanical Vibration and Shock - Whole Body Vibration Exposure Assessment) standard. As a result, it has been seen that the modulus of suspension of the modified vehicle can be replaced by a suitable spring, so that the M1 class of vehicle comfort standard can be achieved without any further changes in the system.

Keywords: – Vehicle Suspension, M1 categorized car, comfort Matlab-Simulink, Analysis

Hand Gesture Recognition Using Accelerometer Data

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Abstract

Gestures and facial expressions assist linguistic communication between humans. Specifically hand gestures have a significant role in sign language developed for persons having impaired hearing. Hand is also the main body organ transmitting our commands to computer via accessories: keyboard, mouse, touch screen to name a few. Using hand gestures as a command for the computer is a benefited way in human-computer interaction. Hand gesture recognition is the process to understand meaningful hand moves in 3-D space by evaluating data get from various sensing devices.

An android powered smartphone equipped with accelerometer is used as the sensing device for hand gestures. Participants are requested to make 18 hand gestures predefined in a dictionary by the smartphone. Acceleration values of x, y, z directions belonging to gesture's trace are recorded in a database by a Python script running in android. This database is copied to a PC and recognition work is continued on a Python environment. Gesture traces are selected randomly from three participants for training phase. Similarities between selected traces are calculated by Dynamic Time Warping (DTW) method. Selected traces are clustered by processing similarities according to Affinity Propagation and exemplar traces of each cluster are determined. In testing phase for coarse search of best matched trace with an unknown trace; the unknown trace is compared with exemplars by DTW to find clusters similar to the unknown trace. For fine search; all candidate traces in selected clusters and unknown trace are projected to a lower dimensional subspace by using a generated Random Projection matrix. A relationship between projections is constructed by taking Compressive Sensing paradigm into consideration. The relationship is formulated as a ℓ_1 minimization problem and the best matched trace is found.

One of the goals of this study is to answer whether we get high recognition rates as the implemented recognition model suggests. After various executions of recognition script for chosen three participants; we get recognition accuracies between 80-83% which are 18-15% less than the accuracies of the model's original implementation. This difference may possibly arise from the following reasons:

- Quality of data: Exemplar and traces of a cluster may not belong to the same gesture. This situation is not observed in original simulations; but we faced with this in our work. Also participants' performance may affect data quality.
- Tools are different: In original implementation a wiimote controller is used as a sensing device and recognition simulation is done on a Matlab environment. In our case we used a smartphone and Python environment.
- ℓ_1 minimization is applied independently for relationships in x, y, z directions. This fact has an effect on both works.

Recognition accuracy may be increased by using different accelerometer data and/or a modification of the model. Data acquisition and processing for recognition may be packed in an app for future vision.

Keywords: *hand gesture recognition, accelerometer, data clustering, random projection*

Developing Critical Place Monitoring and Control Device

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Abstract

The aim of the study is to develop a system that is relatively affordable and requires low energy for continuously real-time monitoring of critical places such as system room. This has been achieved in recent years by the using single card computers (SBC) and compatible peripheral equipments. In fact, devices that perform commercially similar tasks has been available for many years, but is not easily accessible due to its high cost. Thus, another aim of the study is to offer the developed device at a reasonable cost.

For the study, raspberry pi was preferred as a SBC. The reason for preference is that you have as many general purpose input output (gpio) pins as possible. The temperature and humidity of the environment is measured by the DHT11 temperature and humidity sensor, taking into account the locations where the ambient temperature is constantly monitored and controlled. Communication between SBC and DHT11 is provided by serial communication protocol. If there is a door that is closed permanently, the infrared sensor is a sensor that is mechanically actuated for this purpose or is based on the switches, in order to record door openings. In addition, when the door is opened against a possible physical sabotage, the camera module takes a snapshot and sends it to the remote server via cable network or gsm module.

In problem scenarios in the monitored environment, the triggering of the systems to be commissioned can be provided by the relay driven by the transistor used as the switching element. The equipments to be triggered separately can be provided by using the idle GPIOs. Again, the problem scenario can be informed through the GSM module and the responsibilities of the environment monitored by the SMS and the safety functions.

Keywords: *critical place monitoring, real-time monitoring, raspberry pi*

Akülü Engelli Araçları İçin Engel Algılayan Çizgiler Arasında Giden Robot Tasarımı ve Gerçeklenmesi

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Özet

Günümüz teknolojisinde robotik sistem ve uygulamaları insan hayatının her alanında hızlı şekilde yer almaya devam etmektedir. Bu çalışmada endüstriyel alanlarda özellikle üretim bölümlerinde yoğun olarak kullanılan ve robotların bir alt türü olan gezgin robot üzerinde çalışma yapılmıştır. Çalışmada, akülü engelli araçlarının sosyal alanlarda istenildiğinde otomatik olarak çizgi takip ederek hareket etmesi, araç önüne çıkabilecek engel durumuna göre hareket sisteminin karar vermesi ve yardımcı kişilerin sistemi uzaktan kontrol etmesi için gezgin robot tasarımı yapılmıştır.

Robotik sistem temel olarak çizgi izleyen robot mantığından oluşmaktadır ve sistem siyah zemin üzerindeki beyaz çizgiyi takip etmek amacıyla tasarlanmıştır. Robotik sistem literatürdeki çalışmalardan farklı olarak onlarda çeşidi olan Arduino kart içerisinde Arduino Nano kart kullanılmıştır ve bu sayede devre kartı boyutu küçük olması sağlanmıştır. Robotun gövdesi 3D yazıcıdan pleksiglas malzeme kullanılarak çıkarılmıştır. Sistemin beyaz şeridi algılaması için QTR-1RC kızılötesi sensör çifti, engelleri algılaması için MZ80 kızılötesi sensör kullanılmıştır. Hareket sistemi olarak ön tarafa iki demir teker, itme ve yön işlemleri için çift motor sürücü kartı ile birlikte iki adet servo motor kullanılmıştır. Sistemin güç ünitesini uzaktan aktif-pasif yapmak için radyo frekanslı model araba kumandası alıcı-verici devresi eklenmiştir. Bunların dışında devre bağlantı kablosu, direnç, led gibi yan devre elemanları kullanılarak sistemin donanımsal yapısı tamamlanmış ardından Arduino kartın programlanması yapılmıştır. Yazılım tasarlanırken, sensörlerden gelen veri doğrultusunda kullanıcıyı bilgilendirici led yakması ve motor yönlendirmelerini yaparken ani hız düşmesi gibi durumlar göz önünde bulundurulmuştur.

Sistemin gerçekleşmesinin ardından yapılan denemelerde düz iki çizgi arasında harekette herhangi bir sorun olmadığı, ancak kavşaklı yollarda bazen robotun çizgilerin dışına çıktığı gözlemlenmiştir. Robotun önüne engel çıkma durumunda yapılan denemelerde doğru tepkime vererek sistem motorlara olan gücü kesmiştir. Anlık durumlara karşı sistemi uzaktan kablosuz kontrol ederek güç ünitesini devre dışı bırakılabildiği görülmüştür. Sistem, akülü engelli araçlarının yapısına göre değiştirilerek kullanılabilirliği görülmüştür.

Anahtar Kelimeler: Engel Algılayan, Robot, Çizgi İzleyen

Design and Implementation of a Robot Detecting Obstacles and Going Between Lines For Electric Powered Wheelchair

Abstract

The robotic systems and applications of today's technology continues to take place rapidly in all areas of human life. This study is about a mobile robot, a sub-genre of robots, especially used in the production sections of industrial areas to a high degree. In the study, a mobile robot is designed for Electric Powered Wheelchairs to move by following the lines automatically in social areas if required, for the motion system to decide considering the obstacles that may appear in front of the vehicle and for helpers to control the system remotely.

Robotic system basically consists of a line following robot logic, the system is designed to follow the white line on the black background. Unlike the works in the literature of robotic systems, Arduino Nano card has been used among dozens of varieties of Arduino card and thus the size of the circuit board is minimized. The body of the robot is printed out from a 3D printer using plexiglass material. QTR-1RC infrared sensor couple has been used for the the system to detect white strip and MZ80 infrared sensor has been used to detect obstacles. Two iron wheels have been used in the front as the moving mechanism and two servos have been used in addition to a dual motor driver card for thrust and direction

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operations. Radio frequency model car control receiver has been added to make the power unit of the system active-passive remotely. In addition, hardware structure of the system has been completed by using side circuit elements such as connection cable, resistance, led and the Arduino card is programmed subsequently. While designing the software, cases such as led lights to inform the user according to data from sensors and sudden speed drops while making motor directions has been considered.

In the tests performed after the implementation of the system, no problem has been observed in motion, but robot has been detected to go out of lines in curved roads sometimes. The system has reacted correctly in the tests performed to observe the situation when an obstacle appears in front of the robot, and the system has turned off the power to motors. It has been observed that, the power unit can be deactivated in case of emergency by controlling the system remotely, without cable. It has been observed that, the system can be used by modifying in accordance with the structure of electric powered wheelchairs.

Keywords: *Detecting Obstacles, Robot, Line Follower*

Gerçek Boyutta Mokatı Yapılmış Otomobilin Kapı Tasarımı Ve 3d Yazıcı İle Üretimi

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Özet

Bu çalışmada tarafımızdan 1/1 mokatı modeli üretilmiş olan elektrikli otomobilin gövde elemanlarının üretiminde, paket tasarım programları kullanılarak gerçek boyutta kapı tasarımı yapılmıştır. Tasarımı yapılan kapının oturma yüzeyleri, kapı kolu, cam mekanizması, kapı kilit mekanizması, kapı menteşesi gibi birçok detay tasarımı gerçekleştirilmiştir. Tasarımı yapılan bu parçaların üretime geçilmeden önce bilgisayar ortamında gövdeye uyum analizi ve testleri yapılarak uyumu sağlanmıştır. Üretim için otomobil üretiminin geleneksel yöntemleri yerine, modern, hızlı ve ekonomik olan 3D yazıcı ile üretim yöntemi kullanılmıştır. Bilgisayar ortamında tasarlanan ve 3D yazıcı üretim datası oluşturulan kapı ve kapı bileşenlerinin 3D yazıcı teknolojisi ile üretimi ve montajı gerçekleştirilmiştir.

Anahtar Kelimeler: Otomobil tasarım, 3D Yazıcı ile üretim, Yüzey Modelleme, Otomotiv kapı tasarımı

Design and Manufacturing of Real-Scale-Mockup-Car Door Via 3d Printer

Abstract

In this study, the actual size of the door was designed by using package design programs in the production of the body elements of the electric car which is produced by us with 1/1 Mocap model. Many detail designs such as the seating surfaces of the designed door, the door arm, the glass mechanism, the door locking mechanism and the door hinge have been realized. Before the production of these designed parts, conformity analysis and tests were performed in the computer environment. Instead of the traditional methods of automobile production for production, modern, fast and economical 3D printers and production methods are used. Door and door components, which are designed in computer environment and produced 3D printer production data, were produced and assembled with 3D printer technology.

Keywords- Automobile door design, Production with 3D printer

Farklı Dolgu Metallerinin Yüksek Mangan Çeliklerinin Sertlik Özelliklerine Etkisi

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Özet

Yüksek manganlı östenitik çeliklerden üretilen parçaların sertlikleri çalışma sonrası çalışma öncesinin iki katına kadar çıkabilmektedir. Yüksek sertliğinin yanında bu parçaların darbelere karşı gösterdiği yüksek tokluk değerleri diğer bir önemli özellik olmaktadır. Bu özellik bu çeliklerin yüksek aşınma isteyen çalışma koşullarında tercih edilme sebebi olarak karşımıza çıkmaktadır. Kazanılan sertlik ile birlikte östenit mikroyapısının kazandırdığı tokluk parçalara yoğun darbe altında uzun süre kullanım imkanı sağlamaktadır. Bu çalışmada değişik kaynak dolgu metallerinin yüksek manganlı östenitik çeliklerinin sertliğine etkisi incelenmiştir. Sanayide yaygın olarak kullanılan kaynak elektrot ve telleri ile aynı kimyasal bileşime sahip numunelere dolgu kaynağı yapılarak ana metal ile en uyumlu sertlik değerlerine sahip olan dolgu metallerinin elde edilmesi amaçlanmıştır.

Aynı kimyasal bileşime sahip yüksek manganlı çelik numuneler Samsun As Çelik Döküm İşleme Sanayi ve Ticaret A.Ş. işletmesinden temin edilmiştir. Döküm, taşlama ve ısıl işlem aşamalarından sonra numunelere dolgu kaynağı yapabilmek için taşlama makinesi ile kaynak ağzı açılmış numuneler sanayide yaygın olarak kullanılan beş farklı dolgu metali ile özel bir kaynak yöntemi olan dolgu kaynağı yöntemiyle kaynatılmıştır. Kaynak işleminden sonra parçalara sertlik testi uygulanmış, alınan sonuç Brinell cinsinden okunmuştur.

Bu çalışmada değişik kaynak dolgu metallerinin yüksek manganlı östenitik çeliklerinin sertliğine etkisi incelenmiştir. Sanayide yaygın olarak kullanılan kaynak elektrot ve telleri ile aynı kimyasal bileşime sahip numunelere dolgu kaynağı yapılmış ve sonrasında ana metal ve dolgu metali üzerinde sertlik testi yapılarak Brinell cinsinden sertlik değerleri bulunmuştur. Bulgular sonucunda ana metal ile en uyumlu sertlik değerlerini ana metal ile benzer kimyasal bileşime sahip olan dolgu metallerinin verdiği görülmüştür.

Anahtar Kelimeler: Sertlik, dolgu metali, yüksek mangan çelikleri

Effect of Different Filler Metals on Hardness Properties of High Manganese Steels

Abstract

The hardness of the parts produced from high manganese austenitic steels can reach up to twice as high as before the work. Besides high hardness, the high toughness values of these parts against the impact are another important feature. This is the reason why these steels are preferred in high abrasion working conditions. Along with the hardness obtained, the toughness gained by the austenite microstructure provides long-term use under heavy impact. In this study, the effect of different weld filler metals on the hardness of high manganese austenitic steels was investigated. It is aimed to obtain filler metals having the hardness values most compatible with the base metal by making filler material to the samples having the same chemical composition as the welding electrodes and wires commonly used in the industry.

High manganese steel samples with the same chemical composition Samsun As Steel Casting Processing Industry and Trade Inc. . After the steps of casting, grinding and heat treatment, the grinding machine and the welded openings were welded with five different filler metals commonly used in the industry and a special welding method, filler welding method, to make fillings to the samples. Partial hardness test was performed after welding, and the result was read in Brinell.

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In this study, the effect of different weld filler metals on the hardness of high manganese austenitic steels was investigated. In the industry, samples with the same chemical composition as the commonly used welding electrodes and wires were made into a filler material, and then the hardness test on the base metal and filler metal was carried out to find the hardness values in Brinell. As a result, it was seen that the filler metals having the same chemical composition as the base metal gave the hardness values most compatible with the base metal.

Keywords: *Hardness, filler metal, high manganese steel*

Thermal Model of Jet Dyeing Machine

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Abstract

Jet dyeing machines are dyeing machines used for dyeing knitted and woven fabrics in the form of tubes or ropes under high temperature and pressure. It is generally used for dyeing and pre-finishing cotton, synthetic or cotton-synthetic blends.

The thermal model of the jet dyeing machines used in the textile sector will be created and the thermal characteristics according to the seasonal temperature changes will be compared using different control systems and the heating costs in case of using different energy sources will be examined.

In the study, thermal model was created by using Matlab Simulink program, and the thermal characteristics of open-close, PID and fuzzy logic controllers and jet dyeing machine were investigated by giving seasonal temperature changes through the model. The energy costs of the jet dyeing machine are calculated using different energy sources.

In the study, the thermal model of the jet dyeing machine was formed and desired results were obtained.

Keywords: *Jet Dyeing Machine, Thermal model, Control Systems*

Some Transactions Made with Hadamard Transition in Qutrit Systems

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Abstract

Computer technology has begun to be thought of as an atomic-sized computer design with a rapid progress. For this reason, it is important to establish logic gates and algorithms for quantum computers. In this work, the Hadamard transition, which can be used for the qutrit systems known as triplet state in quantum information theory, is discussed. It is intended to do some operations on the Hadamard gates in qutrit systems for use in quantum information theory.

In this study, some operations were performed on the Hadamard matrix for the qutrit systems (3x3 complex matrix) according to the subject. The Hadamard gate was considered for qubit systems. Considering the Hadamard passage for qutrit systems, one and two qutrit systems were found. The results were compared by performing operations on the matrix.

Some operations have been done on the Hadamard gates in qutrit systems for use in quantum information theory. When applied to state functions for qutrit systems, it appears that pure states, like in qubit systems, are compounded by including other states of the system. Unlike qubit systems, it has been shown that monolithic SWAP gates can be formed in qutrit systems. The Hadamard matrix and the other powers of the inverse do not provide a separate property, only repetition. Hadamard transition, which is widely used in quantum information processing processes, is used in many algorithms and logical information processing processes without attaining quantum fuzzy states. In this work, theoretically, successful results have been obtained by applying Hadamard gates on qutrit systems and studies in this area are continuing.

Keywords: qutrit, qubit, hadamard, quantum computing.

Versatile Home Design

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Abstract

The development of technology has made remote access quite easily. Smart home automation is very popular nowadays in order to enable people to live comfortably, peacefully and happily. To facilitate of human life, many systems such as electrical household appliances, lighting, garden irrigation, doors used in homes are controlled manually. In addition to these, home security will be provided by taking precautions against the hazards that many occur at home. It is aimed to control the household appliances used here from a single center. The heating of the house is important for the environment. Room temperature is between 16-18 C for bedrooms and 19-21 C for living rooms. A 1-degree reduction in ambient temperature during winter can save up to 5-7% on fuel consumption. When the amount of moisture is in the 50-55% range, the thermal balance is at the optimum level and energy saving is achieved. In addition, it is targeted to use rainwater in the cleaning and garden watering. Additionally, 20% of the electricity used in houses is used for lighting. In our intelligent automation system, rain sensors will be installed underneath the machines in order to be able to detect possible water leaks in devices that need water and will give audible and illuminated warning in the event of possible leakage. Remote control of the system will be provided via Bluetooth over an application over the phone. Electricity will be generated by the solar panels by taking advantage of the daylight of the system, which aims at energy saving. Amount of energy is stored to the battery in the night for garden and the front door lighting. According to the work published by the World Energy Council; Electricity can be generated from wind power in areas with wind velocities above 5.1 m/s. The intelligent system will be a messenger of dangerous events that can occur as it facilitates the use of home devices. The aim of the system is to save energy and to facilitate human life by means of a streamlined home.

Keywords - *Smart Home, Automation*

Some Systems of Quantum Computing

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Abstract

We have searched for systems that can be realized after the introduction of the concept of computer design using the laws of quantum mechanics. In this work, quantum electrodynamics, fullerenes, molecular magnets, NMR and EPR spectroscopy, biradikals, light polarization, and superconducting devices have been mentioned in quantum computers.

Quantum Electrodynamics, Fullerenes, Molecular Magnets, Boundaries, NMR and EPR Spectroscopy, Light Polarization and Superconductors are mentioned in quantum computers. These systems have been tried to be shown separately.

As a result, the fullerenes from the systems in which the quantum computer can be realized are mainly in the systems in which quantum computation can be carried out, in particular with magnetic resonance spectroscopy, for a number of reasons such as being stable, being able to place atoms in the fullerenes. Another system is superconductors, which can be realized if the temperature is high. It is thought that light polarization can be a powerful system in which the polarizable light can be processed by quantum computing. EPR, NMR spectroscopy, quantum electrodynamics, molecular magnets, and biradikals, where quantum computation can be performed, are promising as physical structures.

Keywords: *fullerenes, quantum elektrodynamics, superconductors, biradikals.*

A New Approach for In-Wheel Asynchronous Motor of Electric Vehicle

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Abstract

The main purpose of this study is regarding to design an in-wheel motor for an electric vehicle. Besides, the geometric optimization studies of designed asynchronous motor has been realized to achieve maximum performance. It is aimed to develop a design that provides optimum efficiency without saturating, and reaches faster reaction to higher revolutions by the studies of optimization for asynchronous motor.

In this study, performance characteristics of asynchronous motors in different geometric dimensions were investigated using the ANSYS RMXprt program. Investigated performance characteristics relates to nominal moment and rated torque, starting torque, breakdown torque, power factor, efficiency and magnetic flux on the rotor and stator. Furthermore, it is accepted as a performance parameter that how much time the motors in different geometries arrive at nominal speed. This asynchronous motor is tried to evaluate in terms of the performance parameters. The obtained findings in the experiments were investigated. Then, the geometry of the asynchronous motor were tried to optimize. A new motor model with hybrid geometry has been proposed for this optimization. By using experimental results from calculating motor performance, an interpolation graph was created. A performance curve for this motor is fitted through the generated interpolation graph. The motor performance has been tried to investigate engine performance by this curve on interpolation graph.

Asynchronous motors in different geometric constructions have been investigated in studies up to this division. Moreover, the performance specifications of this motor in a limited package have been tried to be evaluated. It is predicted that better results can be obtained a motor with hybrid geometry from obtained findings. Therefore, some analysis has been done to confirm the proposed model. These analyzes were performed in accordance with the results obtained from the asynchronous motor models, and the performance of the proposed motor model was tried to be compared. This motor model with hybrid geometry has been shown to optimize the performance characteristics in a limited package on in-wheel motors. Future work for this motor with hybrid geometry, which were calculated analytically by using the result of analysis, has been planned to investigate performance characteristics on the 3D platform by using finite element method.

Keywords: *Electric vehicle, Electrical machines, Asynchronous motor, In-wheel motor*

Kalitenin İyileştirilmesi Amacıyla İstatistiksel Kalite Kontrol Yöntemlerinin Kullanılması Üzerine Havacılık ve Uzay Sektöründe Bir Uygulama

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Özet

Kalite, rekabet ortamın çok önemli bir unsurdur ve firmaya stratejik bir avantaj sağlamaktadır. Bu konuda firmaların kendilerini mükemmelleştirmesi gerekmektedir. Kaliteyi yükseltmenin yolu ise kalitesizliği önlemektir ve bunun temelinde de değişiklik yatar. Bunun içinde birden bire değil sürekli gözlem yaparak sistemi, süreci ve ürün kalitesini geliştirmek gerekmektedir. Ürün kalitesini geliştirmek içinde istatistiksel kalite kontrol tekniklerinden faydalanılır. İstatistiksel kalite kontrol” en az maliyetle, zamanında ve doğru veri üretmektir. Bir üretim veya hizmet sürecinin olağan biçimde devam edip etmediğinin istatistiksel tekniklerle kontrolü, olağan dışı bir durum varsa bunun fark edilebilmesi ve nedenlerinin belirlenerek ortadan kaldırılmasıdır.

Bu çalışmada bir havacılık ve uzay fabrikasında üretilen A400M Kargo tipi askeri uçağa ait iskelet gövde parçasının bir yıllık üretim miktarından belirli bir örneklem miktarı alınarak, hata oranları saptanmış, hataların kaynağı bulunarak, mevcut standartlara uyup uymadığı Minitab 17 programı kullanılarak belirlenmiştir. Üretimde yapılan hatalar sonucu ortaya çıkan hatalı ürün sayısının, alt ve üst kontrol sınırları dâhilinde olup olmadığı ve müşteri spesifikasyon aralığına uygunluğu değerlendirilmiştir. Elde edilen sonuçlar neticesinde çözüm önerisi geliştirilmiştir.

Anahtar Sözcükler – Süreç, Örneklem, Süreç Yeterliliği, Makine Yeterliliği, Spesifikasyon

Design and Investigation of In-Wheel Asynchronous Motor with Conical Geometry for Electric Vehicle

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Abstract

The purpose of this study is to optimize the package geometry in wheel motors for an electric vehicle. In this context, it is aimed to analyze and design in-wheel asynchronous motor with an conical geometry for an electric vehicle. Thus, an asynchronous motor with a conical geometry and in-wheel asynchronous motor with a radial flux have been evaluated to ensure that maximum performance by comparing performance against each other within the package boundaries. In this way, an optimization opportunity may be born to increase the performance of the in-wheel asynchronous motor for an electric vehicle.

In this article, electric vehicle technologies and vehicle dynamics are investigated. The required performance characteristics for a two-passanger electric vehicle have been determined after the research studies and calculation of vehicle dynamic. An asynchronous motor design for the required performance requirements was realized by using the Ansys RMXprt program. The package analysis for the designed asynchronous motor was performed and the minimum and maximum package sizes were created for the in-wheel asynchronous motor. The analysis of these two in-wheel asynchronous motor in the Ansys RMXprt program have been investigated within minimum and maximum package metrics. 3D motor models have been created for these two in-wheel motors within minimum and maximum package metrics. Transient analyzes were performed in the Ansys Maxwell program for these two 3D in-wheel motors. The main subject of this work is regarding to the motor with conical geometry which is designed as a tapered geometry in 3D according to the minimum and maximum dimensions. Transient analyzes were performed in the Ansys Maxwell program for the designed in-wheel asynchronous motor with tapered geometry. After the transient analysis, these 3 motors (motor with minimum diameter, motor with maximum diameter and motor with tapered geometry) were tried to be compared with each other in terms of performance characteristics.

The required motor performance parameters of an electric vehicle were determined. An suitable asynchronous motor for the required performance parameters was designed. This asynchronous motor was redesigned and analyzed appropriately to fit the in-wheel package dimensions. The package size is considered to be the maximum size. It was then analyzed for the smallest motor dimensions that would provide motor performance requirements. In here, another asynchronous motor with tapered geometry was designed and analyzed within the maximum and minimum motor diameters. These 3 types motor were analyzed in terms of the rated torque, the rated revolution, the starting torque, the breakdown torque, the power factor, the efficiency and the magnetic flux on the rotor and the stator. It has been seen that every motor has advantages and disadvantages in the study. In this context, an asynchronous motor with a conical geometry may provide optimization for the desired properties.

Keywords: *Conical Motor, Tapered Motor, Finite Element Method, Electrical machines, Asynchronous motor, In-wheel motor,*

Augmenting computing capabilities of mobile devices with computation offloading using an online learning algorithm.

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Abstract

In this study it is aimed to augment mobile devices with resourceful local or cloud services. Although recent improvements have enhanced capacities of the mobile devices such as memory, CPU and storage, they currently do not reach the pace of development of mobile software applications especially computation intensive ones. Mobile devices can overcome their resource constraints by dynamically offloading the computation intensive parts of a mobile application to either a powerful surrogate server or cloud servers.

The component of a mobile application such as methods, objects, services and classes can be selected as a component to be offloaded to a rich local or cloud server. One of the important parts of the computation offloading is the location transparency which means that each device calls the desired method as local method even if the requested object resides in the remote server. For accomplishing location transparency, Proxy and Factory design patterns are implemented together. Through Proxy and Factory design patterns each component calls both local and remote object's method transparently. The annotated computation intensive parts of an application can be offloaded at runtime according to parameters such as the data required for method input, memory requirement and network bandwidth. A mobile device can offload computation intensive parts to a local server in which there can be limited devices to use this resource and a cloud server in which high network (WAN) latency can result in counterproductive offloading conditions. If offloading can improve application performance in terms of response time or battery consumption, it will be productive and eligible for offloading. To achieve productive offloading, a novel online learning algorithm which is based on data size of method input and network bandwidth is implemented.

In order to achieve offloading of the computation intensive parts of the mobile applications, a mobile application firstly should be profiled and information about each component is to be collected. Through proxy and factory design patterns profiling information is collected at runtime for online learning algorithm. In this study, a local HP server including two virtual machines is implemented. First one is 1 CPU core- 2 GB ram and the second one is 2 CPU core and 4 GB ram. For cloud server an Amazon EC2 VM is implemented. In the server, Android x86 is running to fulfill the computation offloading tasks. A mobile Optical Character Recognition (OCR) application is implemented in the Android OS in order to verify the programming model and online learning algorithm. The properly determining offloading decision improved the application performance and decreased the battery consumptions. The response time is saved by % 45-55 and the energy consumption is also saved by % 40 – 60 through offloading computation intensive parts of the mobile application. On the other hand, some offloading conditions are only profitable for doing computation in local server not in the cloud server.

Keywords: *Computation Offloading, Mobile Cloud Computing, Online Learning.*

Kablosuz İşbirlikli Ağlarda Farklı Birleştirme Metotlarının Sistem Performansı Üzerindeki Etkisinin İncelenmesi

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Abstract

Kablosuz ağların tabiatı gereği vericiden alıcıya gönderilen işaretler çok sayıda farklı kanal üzerinden alıcıya ulaşmaktadır. Farklı kanallar üzerinden alıcıya ulaşan işaretlerin her biri ayrı ayrı sönümlenme etkilerine maruz kalabilmektedir, bu da sistemin performansı üzerinde olumsuz yönde etkiye neden olmaktadır. Bu şekilde meydana gelen performans düşüşü ile mücadele etmek için farklı teknikler uygulanmaktadır. Bu tekniklerden biri de çeşitleme tekniğidir. Çeşitleme tekniği sönümlenme etkileri ile mücadele etmek için kullanılan oldukça etkili bir tekniktir. Çeşitleme tekniğinde gönderilmek istenen işaretin birden fazla kopyası alıcıya ulaştırılır. Alıcı elde ettiği işaret kopyalarını farklı birleştirme metotları ile birleştirebilmekte ve sistemin performansını artırmaktadır. İşbirlikli kablosuz ağlar da birden fazla anten içerdikleri için uzaysal çeşitleme etkisi sağlamaktadırlar. Bu çalışmada bir alıcı, bir aktarıcı ve bir verici içeren bir kablosuz işbirlikli ağın farklı birleştirme teknikleri ile ortaya koyduğu performans incelenmiştir. Elde edilen neticeler göstermektedir ki gelen işaretleri birbirlerine ekleyerek birleştirme sağlayan en sade yöntem olan eşit oran birleştiricisi en kötü performansı sergilemiş, buna karşılık gelen işaretlerin SNR değerlerine göre birleştirme sağlayan SNR birleştiricisi en iyi performansı sergilemiştir. Fakat yüksek performans sergileyen birleştirici yüksek işlemsel karmaşıklığa yani sistemsal açıdan yüksek enerji tüketimine yol açmaktadır.

Anahtar Kelimeler – işbirlikli ağ, birleştirici, aktarım stratejisi, işaret-gürültü oranı birleştiricisi, çöz ve aktar.

Karınca Kolonisi Algoritması ile Yazılım Proje Takvimi Oluşturma

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Özet

Yazılım proje takvimi, yetkinlikleri göz önünde bulundurularak eldeki insan kaynaklarının görevlere tahsis edilmesi, görevlerin projenin ihtiyaçlarına göre uygun sırada işlenmesi, görev sürelerinin tahmin edilmesi, gerekli harcamaların görevlerle ilişkilendirilmesi süreçlerini kapsar. İnsanların görevlere atanması, bu problemin çözümünü karmaşık yapar. Problemin durum uzayı çok büyüktür. Bu gibi karmaşık problemlerde durum uzayını daraltmak için çeşitli yapay zeka optimizasyon algoritmaları kullanılabilir. Bu çalışmada yazılım proje takviminin efektif bir şekilde oluşturulabilmesi için karınca kolonisi optimizasyon algoritması uygulanmıştır. Bu algoritma ile kaynakların görevleri tamamlama zamanı ve görevleri yapabilirliği dikkate alınarak, proje takvimindeki görevlerin en kısa sürede tamamlanması için uygun çözümün elde edilmesi amaçlanmıştır.

Yazılım proje takvimi oluşturulması süreci, belirleyici olmayan zor polinom yapıdadır (NP-hard). Kaynaklara görevlerin atanmasında problemin durum uzayı çok büyüktür ve çözümü zaman alıcıdır. Karınca kolonisi optimizasyon algoritması, durum uzayını küçültmek için kullanılan algoritmalarından birisidir. Karıncalar yiyeceğe ulaşırken, feromon denilen bir sıvı salgırlar. Arkadan gelen karıncalar, gidecekleri yol tercihini yaparken feromon miktarının fazla olduğu yolu tercih ederler. Feromon miktarı belirli bir süre sonra da buharlaşmaya başlar. Böylelikle önceden verilmiş kararların önem derecesi azaltılmış olur. Yiyecek bulma sürecinde zaman geçtikçe, yiyeceğe giden en kısa yolda karıncaların yoğunlaştığı görülür. Bu davranıştan esinlenilerek karınca kolonisi optimizasyon algoritması geliştirilmiştir. Bu çalışmada karınca kolonisi optimizasyon algoritmalarından maksimum-minimum karınca sistemi kullanılmıştır. Feromon güncellemeleri turun en iyi olan karıncası ve o ana kadar tüm turlardaki en iyi karınca tarafından belirli aralıklarda gerçekleştirilmektedir. Amaç, proje takvimindeki tüm aktiviteleri en kısa sürede gerçekleştirecek uygun insan kaynaklarının hangileri olduğunu belirlemektir. Karıncaların yiyeceğe ulaşma sürecinde üzerinden geçtikleri yollar, seçilen insan kaynaklarına karşılık gelmektedir. Turun sonunda karıncaların seçtiği insan kaynaklarının tüm aktiviteleri bitirme süreleri değerlendirilerek uygun feromon güncellemeleri ve buharlaştırmaları gerçekleştirilir. Bu işlem, belirlenen maksimum sayıda tekrarlanarak karıncaların efektif süreyi elde etmesi sağlanır.

Çalışma oluşturulan test verileri ve karınca kolonisi algoritması için önerilen parametreler kullanılarak gerçekleştirilmiştir. Tasarlanan karınca sisteminde başlangıçta ortamda feromon izi bulunmamaktadır. Bu nedenle ilk proje ekibi rastgele belirlenerek, minimum değeri üreten karıncanın gittiği yollar için feromon güncellemesi gerçekleştirilir. Sonraki turlarda projeye dahil edilecek insan kaynağının seçimi, karıncanın mevcut feromon izlerini yorumlaması ile gerçekleştirilir. Global feromon güncellemesinin de katkısıyla, zamanla karıncaların seçimini yaptıkları insan kaynaklarının, minimum süreyi üretebilecek insan kaynakları olduğu gözlenir. Algoritmanın stokastik özelliği nedeniyle her zaman en iyi çözüme ulaşmak mümkün olmamakla beraber, bu durumlarda ideal çözüme yakınsanmaya çalışıldığı gözlenir. Gerçekleştirilen çalışma ile kaynakların görevleri tamamlama zamanı ve görevleri yapabilirliği dikkate alınarak, yazılım proje takvimindeki tüm aktiviteleri en kısa sürede gerçekleştirecek uygun insan kaynaklarını belirlemek için rastgele başlangıç noktasından ideal çözüme yakınsayacak şekilde karınca kolonisi algoritmasının kullanılabilmesi gözlenmiştir. Sonraki çalışmalarda proje takviminin daha fazla parametre içerecek şekilde benzer yapay zekâ algoritmaları ile oluşturulması hedeflenmektedir.

Anahtar Kelimeler: Yazılım Proje Yönetimi, Yazılım Proje Takvimi, Karınca Kolonisi Algoritması, Yapay Zekâ Optimizasyon Algoritması

Constitution Of Software Project Scheduling with Ant Colony Algorithm

Abstract - Software project scheduling includes the processes of assigning human resources to tasks while taking their competencies into consideration, processing tasks in an order according to the needs of the project, estimation of the duration of tasks and associating required budget with tasks. Assigning human resources to tasks makes the solution

space too complex. The state space of the problem is too large. In such complex problems, artificial intelligence algorithms can be a solution to narrow the state space. In this study, ant colony optimization algorithm is applied in order to create a software project schedule in an effective way. With this algorithm, it is aimed to obtain the most appropriate solution to complete tasks in the project schedule as soon as possible, taking the time and the ability of the resources to complete tasks into consideration.

Software project schedule constitution process is a difficult non-deterministic polynomial. In the state of assigning tasks to resources the state space is too large and the solution is time consuming. Ant colony optimization algorithm is one of the algorithms used to reduce the state space. While the ants are reaching to their food, they release a fluid called pheromone. The following ants prefer the route which is higher in the amount of pheromone when choosing which path they will go. The pheromone starts to evaporate after a certain period of time, thus; the importance of the prior decisions gets reduced. As time goes on in the process of finding food, it can be observed that in the shortest path to the food has a higher density of the population of the ants. Inspired by this behavior, ant colony optimization algorithm has been developed. In this study, 'maximum-minimum ant method' was used out of all the ant colony optimization algorithms. In certain periods, the pheromone updates are done by the best ant in that particular tour and the best ant of all tours until then. The aim is to identify the appropriate human resources that will carry out all activities in the project timetable as soon as possible. The paths in which the ants go through in the process of reaching food correspond to the selected human resources. At the end of the tour, the completion times of all activities of the human resources selected by the ants are evaluated and appropriate pheromone updates and evaporations are made. This process is repeated at the maximum number of times which is determined before to come up with the most effective duration.

The study was performed by using the test data generated and the parameters recommended for the ant colony algorithm. In the designed ant system, initially there is no pheromone trace in the environment. For this reason, the first project team is determined randomly and the pheromone update is made according to the paths in which the ant producing the minimum value follows. The selection of the human resource to be included in the project on subsequent tours is carried out by interpreting the current pheromone traces of the ants. With the contribution of the global pheromone update, it is observed that the human resources in which the ants select over time are the human resources that can produce the minimum duration. Because of the stochastic nature of the algorithm, it is not always possible to achieve the best solution. However, it has been observed that the algorithm tries to converge to the best solution, and the ant colony algorithm can be used to approximate the ideal solution from the random starting point to determine the appropriate human resources to perform all the activities in the software project schedule as soon as possible, taking the task's completion time and the availability of tasks into consideration. In the next studies, it is aimed to construct the project schedule in a way that includes more parameters with similar artificial intelligence optimization algorithms.

Keywords: *Software Project Management, Software Project Schedule, Ant Colony Algorithm, Artificial Intelligence Optimization Algorithms*

Real-time Parental Voice Recognition System For Persons Having Impaired Hearing

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Abstract

Persons having impaired hearing do not live a comfortable life because they can't hear sounds when they are asleep or alone at home. In this study, a parental voice recognition system was proposed for those people. Persons having impaired hearing are informed by vibration about which one of their parents is speaking. By this means, the person having impaired hearing real timely perceives who is calling or who is speaking to him. The wearable device that we developed can real timely perceive parental voice very easily, and transmits it to person having impaired hearing, while he/she is asleep or at home.

A wearable device has been developed for persons having impaired hearing to use easily at home environment. Our device is placed on user's back, and just a ring-sized vibration motor is attached to the finger of person. Our device consists of Raspberry Pi, usb sound card, microphone, power supply and vibration motor. First of all, the sound is received by a microphone, and sampling is made. According to the Nyquist Theorem, 44100 samples are made per second. Normalization during preprocessing phase, Mel Frequency Cepstral Coefficients (MFCC) during feature extraction stage, k nearest neighbor (knn) during the classification phase were used. Statistical or Z-score normalization was used in the pre-processing phase. By means of normalization of the data, it is ensured that each parameter in the training input set contributes equally to the prediction of the model. MFCC is one of the feature extraction methods that are frequently used in voice recognition applications. MFCC represents the shorttime power spectrum of the audio signal, and models the manner of perception of human ear. Knn is an educational learning algorithm, and its aim is to classify the existing learning data when a new sampling arrives. The sound data received via microphone were estimated through preprocessing, feature extraction and classification stages, and the person having impaired hearing was informed through real time vibrations about to whom this voice belongs.

This study was tested on 2 deaf, 3 normal hearing persons. The ears of normal hearing persons were covered with a earphone that gives out loud noise. Persons having impaired hearing estimated their mothers' voice by 76%, and fathers' voice by 81% accuracy in real-time tests. The success rate decreases due to the noise of environment especially while watching tv. In the tests performed while these persons are asleep, a person having impaired hearing perceives his/her mother's voice by 78%, and father's voice by 81% accuracy. In this study it was aimed for persons having impaired hearing to perceive their parents' voice and accordingly have a more prosperous standard of living.

Keywords: *Wearable Processing, MFCC, Raspberry Pi, Vibration for Deaf*

Velocity Estimation of Turkish National Permanent GNSS Network- Active Points Located at Central Anatolia Region

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Abstract

Turkey is located in a region of which Eurasia, Anatolia and Arab tectonic plates are intersect. The movement of these plates relative to each other causes changes in cm levels per year at the locations of the geodesic points. In this study, in the 2005.00 epoch and the ITRF2008 reference system, the current coordinates and velocities of Turkish National Permanent GNSS Network- Active (TNPNGN-Active) points located at Central Anatolia Region were determined with Bernese v5.2 GNSS software. The coordinates and velocities of these points have been compared with coordinates and velocities which were published by General Directorate of Land Registry and Cadastre and investigation of accuracy of these coordinates and velocities have been done. For this purpose, differences between coordinates and velocities which were determined by evaluation of GNSS observations and published by General Directorate of Land Registry and Cadastre have been put forth.

7-year (2009-2015) GNSS data were processed via Bernese v5.2 GNSS software. At processing, 22 station have been used. 11 of them are TNPNGN-Active points and others are IGS stations. To process GNSS data, used RINEX data were downloaded from IGS and CORS-TR websites. To start Bernese v5.2 GNSS software, necessary files were downloaded via a programme which prepared on MATLAB programme language. In addition, solutions obtained from Bernese v5.2 GNSS software were combined via a command of which name is "combine normal equation system" at Bernese v5.2 GNSS software. After combining of the solutions, the coordinates and velocities obtained from Bernese v5.2 GNSS software at 2005.00 reference epoch were compared with the coordinates and velocities published by General Directorate of Land Registry and Cadastre.

At the results of the comparison, in the directions of X and Y axes and in the direction of Z axis max coordinate differences obtained as 3.298 cm and 4.445 cm, respectively. in the directions of X and Y axes and in the direction of Z axis max velocities differences obtained as 0.138 cm and 0.349 cm, respectively. it is seen that there are not significant differences between velocities determined by Bernese v5.2 GNSS software and published by General Directorate of Land Registry and Cadastre. From which it's concluded that in the desired epoch, point coordinates and velocities can be determined by both methods.

Key words: Velocity estimation, GNSS, Bernese v5.2, TNPNGN-Active

Otomatik Ayarlamalı Sinir Hücresi ile Adaptif Kesir Dereceli PID Kontrolör Tasarımı

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Özet

Bu çalışmada, otomatik ayarlama nöronları (oto-nöron) kullanarak adaptif kesir dereceli PID (FO-PID) kontrolörün katsayılarının kendiliğinden ayarlanmasına yönelik bir çalışma sunulmaktadır. Katsayıların kendiliğinden uygun bir şekilde ayarlanması yani adaptif kontrol, pratik kontrol uygulamalarında dayanıklılık için çok önemlidir. Çünkü parametre belirsizlikleri ve dış etkenlerden sistemin katsayılarının değişmesi kontrolörün dayanıklılığını olumsuz yönde etkileyebilir. Kesir dereceli PID kontrolörün adaptive özelliğine sahip olabilmesi için, bu çalışmada önerilen yöntemi kullanarak kontrolörün oransal, integral ve türevsel kazanç katsayıları çevrimiçi olarak belirlenir.

Oto-nöronlar meyilli azalım (gradient descent) optimizasyonu ile kontrolörün kazanç katsayılarını en uygun şekilde herhangi bir ön eğitime gereksinim olmadan ayarlarlar. Bu nedenle hatayı azaltarak kontrolörün performansını artırırlar. Kontrol işlemi sırasında kontrol edilen sistemin parametrelerinde bozulma gerçekleşirse, bu bozulmaya karşı oto-nöronlar kontrolör katsayılarını otomatik olarak adapte ederler. Ayrıca bu çalışmada FO-PID kontrolörün Tutsin yöntemi kullanarak ayrık zaman domeninde modellenmesi gerçekleştirilir.

İki simülasyon örneği önerilen adaptif kontrol yönteminin performansını göstermek için MATLAB/Simulink kullanılarak oto-nöron içeren FO-PI, FO-PD, FO-PID kontrolörlerin tasarımı gerçekleştirilmiş ve birim basamak cevapları sunulmuştur. Önerilen yöntem sayesinde, pratik kontrol uygulamaları için FO-PID kontrolörün uygulanabilirliği kolaylaştırılmıştır.

Anahtar kelimeler: Kesir dereceli PID kontrolör, otomatik ayarlamalı nöron, adaptif kontrol, dayanıklılık

Abstract – In this work, we present a study for the automatic adjustment of the coefficients of the adaptive fractional PID (FO-PID) controller using auto-tuning neurons (auto-neurons). Adaptive tuning of the coefficients automatically, in other words adaptive control, is very important for robustness in practical control applications. Because parameter uncertainties and changes in the parameters of the system from external factors can negatively affect the robustness of the controller. In order to have the adaptive feature of the fractional PID controller, proportional, integral and derivative gain coefficients of the controller are determined online using the method proposed in this study. With auto-neuron gradient optimization, the controller adjusts the gain coefficients optimally without any pre-training needs. This improves the controller's performance by reducing the error. If deterioration occurs in the parameters of the system controlled during the control process, the auto-neurons automatically adapt the controller coefficients against this deterioration. Also in this study, the FO-PID controller is modeled in the discrete time domain using the Tutsin method. The proposed method thus facilitates the applicability of the FO-PID controller for practical control applications. In order to demonstrate the performance of the adaptive control method proposed in the two simulation examples, the design of FO-PI, FO-PD, FO-PID controllers containing auto-neuron using MATLAB / Simulink and unit step answers are presented.

Keywords: Fractional PID controller, self-tuning neuron, adaptive control, robustness

Bilişsel Radyo Sistemleri için Özdeğer Tabanlı Algılama Yöntemlerinde Performans Analizi

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Özet

Günümüzde spektrum yetersizliği nedeniyle kıt kaynak durumundaki spektrumun en verimli şekilde kullanılması gerekmektedir. Bu ihtiyacı karşılayan önemli teknolojilerin başında bilişsel radyo sistemleri gelmektedir. Bilişsel radyo sistemleri için özdeğer tabanlı algılama yöntemleri, hesaplama maliyetinin az olması nedeniyle çok fazla tercih sebebidir. Bu çalışmanın amacı bilişsel radyo sistemleri için özdeğer tabanlı algılama yöntemlerinin detaylı performans analizlerinin yapılmasıdır.

Yapılan çalışmada çok antenli haberleşme sistemleri için belirli bir spektrum bölgesinde, birincil kullanıcı işaretinin varlığını tespit eden algılama yöntemleri kullanılmıştır. Rasgele oluşturulan sıfır ortalamalı birincil kullanıcı ve gürültü işaretleri kullanılarak en doğru şekilde spektrum algılanmaya çalışılmıştır. Yöntemde çoklu antenler tarafından alınan haberleşme işaretlerinin, kovaryans matrislerinin özdeğerleri kullanılarak spektrum algılama yapılmıştır.

Yapılan simülasyonlarda en büyük – en küçük özdeğer tabanlı algılama yönteminin diğer (genelleştirilmiş en çok olabilirlik yöntemi, en büyük özdeğer- enerji algılama yöntemi, enerji algılama yöntemi) yöntemlere göre daha başarılı sonuçlar verdiği gözlenmiştir.

Anahtar Kelimeler: Bilişsel radyo, Spektrum verimliliği, Tracy-Widom dağılımı, Özdeğer tabanlı algılama.

Performance Evaluation of Eigenvalue Based Detection Methods for Cognitive Radio Systems

Abstract

Nowadays, due to spectrum inadequacy, it is necessary to use the spectrum of the scarce source in the most efficient way. Cognitive radio systems are at the forefront of important technologies that meet this need. Eigenvalue-based detection methods for cognitive radio systems are the reason for much preference because of the low cost of computation. The purpose of this study is to perform detailed performance analyzes of eigenvalue detection methods for cognitive radio systems.

For the multi-antenna communication systems in the work done, detection methods are used to detect the presence of the primary user mark in a certain spectrum area. It has been tried to perceive the spectrum in the most accurate way by using randomly generated zero mean primary user and noise signals. In the method, the communication signals received by multiple antennas are spectrally perceived using eigenvalues of covariance matrices.

It has been observed that the largest - smallest eigenvector detection method gives more successful results than the other methods (generalized maximum likelihood method, greatest eigenvalue - energy detection method, energy detection method) in simulations made.

Keywords: Cognitive Radio, Spectrum Efficiency, Tracy-Widom Distribution, Eigenvalue Based Spectrum Detection

Real-Timely Decrease of Snoring in Patients with Severe Degree of Obstructive Sleep Apnea Syndrome Using SNORAP

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Abstract

The decrease and/or removal of snoring complaint, a significant social and familial health problem, is an important medical issue that needs to be solved interdisciplinary for sleep medicine. Surgical techniques and technological studies related to this topic have been mentioned in a few articles. SNORAP, developed by Yağanoğlu et al (2017), is a wearable device that operates just by the application of vibration to the patient. SNORAP is a device designed to improve the sleep health of snoring patients especially with Sleep Disordered Breathing (SDB). In this study, the detection of snoring sound at patients with severe degree obstructive sleep apnea syndrome (OSAS), and the effect of SNORAP device on snoring sound in these patient group were investigated.

SNORAP consists of Raspberry Pi, Grove, microphone, vibration motor and screen. It uses the SNORAP audio fingerprint (AF) method to detect the snoring sound. AF is a short digital summary of the quick index and audio object that can be used to introduce the short and unlabeled part of the audio signal to correspondences at audio database, and similar elements. First of all, SNORAP performs sampling by receiving audio data with a microphone. Secondly, spectrograms are obtained from the audio data. Thirdly, peak points are found, and the summarization of fingerprint is created. Finally, SNORAP detects whether this is a snoring sound or other sounds, through database. SNORAP was applied to 2 voluntary patients (male, mean age: 49, body mass index average: 27.5) diagnosed with severe OSAS in company with Polysomnography (PSG). The experimental protocol was performed in the form of a night sleep test to the volunteers, by using and without using SNORAP, with a week interval, in a sleep and electrophysiology laboratory under the supervision of the responsible physicians and technicians. The resulting data were analyzed by a sleep medicine physician, in accordance with the 2007 American Academy of Sleep Medicine (ASSM) criteria. PSG, known as a night sleep test, has sensors that measure body systems for all purpose. This study was conducted especially on the basis of snoring sensor of PSG.

Patients who diagnosed as severe OSAS, accepted to sleep laboratory two times for a night-sleep test, first with SNORAP, later without SNORAP. The snoring parameters of the first volunteer patient whose number of snoring 716 and average severity 50 μ V before using SNORAP was high, decreased after using SNORAP (number of snoring: 98, average severity of snoring: 3,52 μ V). The snoring parameters of the second volunteer patient whose number of snoring 1738 and average severity 62,5 μ V before using SNORAP was high, decreased after using SNORAP (number of snoring: 81 , average severity of snoring: 1,40 μ V).

Keywords: *Snoring, Severe Degree Obstructive Sleep Apnea Syndrome, Audio Fingerprint, Wearable Processing, SNORAP.*

Yapay Sinir Ağları ile Tr81 Bölgesi Yıllık Elektrik Enerjisi Tüketiminin Tahmini

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Özet

Bu çalışmada, TR81 (Zonguldak, Karabük, Bartın) bölgesinin yıllık elektrik enerjisi tüketimi tahmini yapay sinir ağları (YSA) kullanılarak yapılmıştır. Bölgedeki elektrik enerjisi tüketimini tahmin etmek için YSA modelinin girişi olarak nüfus, ithalat, ihracat ve bina yüzölçümü verileri kullanılmıştır. Oluşturulan YSA modelinin tahmin performansı ortalama karesel hata, ortalama mutlaka hata ve korelasyon katsayısı hesaplanarak incelenmiştir. Ortaya çıkan sonuca göre YSA modelinin TR81 bölgesinin elektrik tüketimi tahmini için geçerli olduğu ve yüksek doğruluk sağladığı tespit edilmiştir. Uygunluğu ispat edilen bu YSA modeli kullanılarak, 2016-2020 yıllarına ait TR81 bölgesi elektrik tüketim öngörüsü gerçekleştirilmiştir. Yapılan çalışmanın, bölgede ileride yapılacak veya yapılması planlanan enerji yatırım projelerine yardımcı olacağına kanaat getirilmiştir.

Anahtar Kelimeler – Yapay sinir ağları, Elektrik tüketim tahmini, TR81 bölgesi, hata testleri, Makine öğrenmesi

Abstract— In this study, the annual electricity consumption estimate of the TR81 region (Zonguldak, Karabük, Bartın) was estimated using by artificial neural networks (ANN). Population, import, export and building area data were used as inputs for the ANN model to estimate electricity consumption in the region. The estimation performance of the generated ANN model was investigated by calculating the mean square error, the mean absolute error and the correlation coefficient. According to the result, it is determined that ANN model is valid and provides high accuracy to estimate the electricity consumption of the TR81 region According to the result, it is determined that the TRA region of the ANN model is valid for estimating electricity consumption and provides high accuracy. It is also carried out the electricity consumption forecast for TR81 region for 2016-2020 using this improved ANN model. It is believed that this study would be helpful for the energy investment projects of this region that is carried out or planned in the future.

Keywords—Artificial neural networks, Electricity consumption estimation, TR81 region, Fault tests, Machine learning

Farklı Oranda Nano Silika İçeren Kür Uygulamalarının Çimento Bağlayıcı Kompozitlerin Dayanımına Etkisinin İncelenmesi

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Özet

Bu çalışma ile farklı oranlarda nano silika içeren solüsyonlarda kür edilen çimento bağlayıcı kompozitlerin farklı yaşlarda basınç dayanımına tabi tutulması sonucu su içerisinde kür edilen numunelere göre dayanım artışının ne oranda olduğu test edilmiştir. Geliştirilen yeni nesil kür solüsyonunda %0,5, %1, %2 ve %3 oranlarında nano silika kullanılmıştır. Üretilen bir seri numune kontrol amacıyla sadece su içerisinde kür edilmiştir. Çimento bağlayıcı kompozitlerin üretiminde ASTM standartlarına göre F ve C sınıfı özellikler gösteren uçucu küller kullanılmıştır. Buna göre farklı özellikte uçucu kül içeren çimento bağlayıcı kompozitlerin farklı oranlarda nano silika solüsyonu içerisinde kür edilmesi ve su içerisinde kür edilmesi sonucu gelişen dayanım artışları ortaya konmuştur. Deneysel çalışmalardan elde edilen sonuçlara göre en yüksek dayanım değerleri %2' lik orana sahip solüsyon içerisinde kür edilen numunelerden elde edilmiştir

Anahtar Kelimeler: Bağlayıcı Kompozitler, Çimento, Kür, Nano Silika.

Abstract

In this study, the difference between the increase rate of compressive strengths of cement-bonded composites at various ages cured in water and solutions containing different amount of nano-silica has been investigated. In the new generation curing solution developed, 0.5%, 1%, 2% and 3% of nano silica were used. A series of samples were cured in water only for control purposes. In the production of cement-bonded composites, fly ashes which are classified by ASTM standards as class F and C were used. In this way, the increase in strength of cement-bonded composites containing fly ash in different properties are cured in water and solution with different nano silica amount has been revealed. According to the results obtained from the experimental studies, the highest strength values were obtained from the samples cured in the solution with the 2% ratio of nano silica.

Key Words: Cement, Cure, Cement-Bonded Composites, Nano Silica.

Automatic Data Download Program in Determination of a Regional Ionosphere Model

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Abstract

Global Navigation Satellite System (GNSS) signals pass through the various layers of the atmosphere until they reach the receiver on earth. One of these layers is the ionosphere. Ionosphere can be expressed as an atmosphere layer consisting of gases irradiated with solar rays and located at an altitude of 60 km to 1100 km from the earth, which has significant effects on the signals used by satellite-based positioning, shortwave communication and communication systems. One of the important parameters that express the characteristic of the ionosphere is the Total Electron Content (TEC), which is a function of the electron density changing with solar radiation. The TEC value cannot be obtained directly from GNSS measurements, but it can be estimated with the produced combinations.

In this study Bernese v5.2 GNSS software developed by Bern University Astronomy Institute (AIUB) was used in determining the TEC values for the regional ionosphere model. Before proceeding to the determination of TEC values with Bernese v5.2 GNSS software, according to the values of GPS day / week and year / day of year, some files in the Bernese format should be downloaded from the internet and copied to the DATAPOOL folder created by the installation of the software. For this purpose, to overcome difficulties to collect manual data, to prevent the difficulties that may arise, a program of which name is the Data Download Program (VIP) in MATLAB was prepared, it provides to automatically retrieve Bernese format files from their respective websites. Using the obtained results, regional TEC values were calculated with Bernese v5.2 GNSS software.

Bernese v5.2 GNSS software was used in determining the regional TEC values. The data for the stations used in the evaluation were obtained from IGS and CORS-TR websites. In order to be able to evaluate, Bernese format files which are needed according to the values of year/month/day have been provided automatically from websites via the Data Download Program (VIP) in MATLAB. In Bernese v5.2 GNSS software, the TEC values of the regional ionosphere model were calculated by the PPP_DEMO.PCF automated processing using the files obtained with the VIP program. PPP_DEMO.PCF automated processing is an extended version of PPP which has some features such as generating ionosphere models, pseudo kinematic positioning, and high-rate troposphere estimation.

In this study, Bernese format files needed to create an ionosphere model by creating an interface with MATLAB GUI are displayed in one window. Thanks to this GUI, according to entered date (year, month, day), the users can see that the program calculated GPS week/day and year/day of year, and that according to calculated values, Bernese format files and data of IGS and EUREF stations to be used for evaluation can be automatically downloaded from relevant websites and copied to DATAPOOL folder by the program. Because it is visual in the interface, the users are getting rid of adverse factors like distractibility, decrease in interest, and loss of time.

Key words: *GNSS, Bernese, MATLAB, Total Electron Content (TEC), Ionosphere*

Zaman Gecikmesine Sahip Kesir Dereceli Bir Kontrol Sisteminde Optimizasyon Metodu Kullanılarak PID Kontrolör Tasarımı

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Özet

Bu çalışmada, zaman gecikmesine sahip kesir dereceli bir sistemin kontrolü için, PID kontrolör tasarımı gerçekleştirilmesi hedeflenmektedir. Zaman gecikmesi gerçek sistemlerde çoğunlukla karşılaşılan bir durumdur. Dolayısı ile zaman gecikmesi içeren sistemlerin modellenmesi de son derece önemli bir konudur. PID kontrolörler basit yapıları, güvenilebilir, iyi bilinen ve dayanıklılıklarından dolayı kontrol sistemi tasarımında sıklıkla tercih edilirler. Bu çalışmanın önemi, PID kontrolörün zaman gecikmesine sahip kesir dereceli bir sistem için tasarlanması ve PID parametrelerinin hesaplanmasında kullanılan optimizasyon yöntemidir.

Bu çalışmada bir optimizasyon metodu sunulmaktadır. Günümüz dünyasında, bilgisayar teknolojisindeki gelişmeler neticesinde, zor olarak değerlendirilen matematiksel hesaplamalar kolaylıkla yapılabilmektedir. Kesir dereceli yaklaşımların tamsayı dereceli yaklaşımları için çeşitli metotlar kullanılır. Bu metotlardan bazıları Matsuda, Oustaloup, Chareff, Carlson, Krishna şeklindedir. Bu çalışmada Matsuda'nın 4.dereceden tamsayı yaklaşım modeli kullanılmıştır.

Optimizasyon işlemi mevcut alternatifler arasından en iyisini seçme işlemidir. PID kontrolör parametrelerinin elde edilebilmesi için Matlab/Simulink ortamında bir model oluşturulmuştur. Modeldeki kontrol sisteminde oluşan hata en küçük değerine ulaştığında, PID kontrolör parametreleri elde edilebilir. Hata, bir kontrol sisteminde giriş sinyali ile çıkış sinyali arasındaki fark olarak tanımlanabilir. Hatayı minimize etmek için integral performans kriterleri kullanılır. Matlab Optimizasyon Toolbox'ta minimizasyon ya da maksimizasyon için kullanılacak komutlar bulunmaktadır. Fminsearch, fmincon, fsolve gibi fonksiyonlar bunlardan bazılarıdır. Bu metotla, en küçük hata değerini sağlayan kontrolör parametreleri esas alınarak tasarım gerçekleştirilir.

Kesir dereceli yaklaşımların en büyük avantajı gerçek sistemleri tamsayı dereceli yaklaşımlara göre daha iyi ifade edebilmesidir. Zaman gecikmesi ise gerçek sistemlerde karşılaşılan bir durumdur. Denetlenen sistemin hem kesir dereceli hem de zaman gecikmesi içermesi bu çalışmayı önemli kılmaktadır. Zaman gecikmesine sahip kesir dereceli sistemler Matlab/Simulink ortamında modellenerek, en uygun şekilde PID kontrolör ile denetlenmesi gerçekleştirilmiştir. Bu çalışmada, denetlenen sistem çıkışlarından elde edilen birim basamak cevap eğrileri sunulmuştur. Ayrıca kontrol sistemlerinin geçici durum davranışlarının değerlendirilmesi için zaman parametreleri ve yüzde aşma değerleri tablolar halinde sunulmuştur. Yöntemin başarısı grafiklerden görülmektedir.

Anahtar Kelimeler: PID kontrolör, Optimizasyon, Kesir dereceli kontrol sistemleri

PID Controller Design Using Optimization Method for Fractional Order Control Systems with Time Delay

Abstract

In this paper, it is aimed to implement a PID controller design for the control of a fractional order system with time delay. Time delay is often the case in real systems. Therefore, modeling of time delayed systems is also an extremely important issue. PID controllers are often preferred in control system design because of their simplicity, reliability, well-known and robustness. The importance of this study is the design of the PID controller for a fractional system with time delay and the optimization method used to calculate the PID parameters.

In this paper, an optimization method is presented. As a result of the developments in computer technology, difficult mathematical calculations can be done easily in today's world. Various approximation methods are used for integer

order approximations of fractional order transfer functions. Matsuda, Oustaloup, Chareff, Carlson, Krishna are some of these methods. In this paper, Matsuda's fourth-order integer approximation model is used.

Optimization is the process of selecting the best among the available alternatives. A model was created in Matlab / Simulink environment to obtain PID controller parameters. The PID controller parameters can be obtained when the fault occurring in the control system reaches the minimum value. The error can be defined as the difference between the input signal and the output signal in a control system. Integral performance criteria are used to minimize the error. In Matlab Optimization Toolbox, there are commands that can be used for minimization or maximization. Functions such as Fminsearch, fmincon, fsolve are some of them. With this method, the design is carried out based on the controller parameters providing the smallest error value.

The major advantage of fractional order approaches is that they can express real systems better than integer order approaches. Time delay also exists in real systems. The fact that the system to be controlled has both a fractional order and a time delay makes this study valuable. Fractional order systems with time delay are modeled in Matlab / Simulink environment and controlled with PID controller in the most suitable way. In this study, unit step response curves obtained from controlled system outputs are presented. In addition, time parameters and percent overshoot values are presented in tabular form in order to evaluate the transient behavior of control systems. The success of the method is evident from the graphs.

Keywords: *PID controller, Optimization, Fractional order control systems*

CERTAIN RINGS and GROUP CODES

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Abstract

In this study, the structure of certain rings is introduced and information about their ideals is given. Also the group code structure is mentioned.

The operations and the structures of the finite chain rings are discussed. The ideals of these rings are classified. New structures are needed to write new and better codes in coding theory. It is studied to give the existing codes and the substructures of the codes to be written with the structures written here. Moreover it is mentioned about the good codes which can be written in the more basic structure with the group codes which are not very preliminary in the coding theory.

It is revealed how the structures of the rings can be referenced to the newly writable codes. The significance of group codes in the coding theory is studied to be indicated and their correlations are made.

Keywords: *Group Codes, Codes over Rings, Linear Codes, Rings.*

Development of the Road Analysis System to Provide the Fuel Efficiency Awareness in the Vehicles

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Abstract

In this study acceleration-deceleration parameters of vehicles are measured by using mems based accelerometer depending on the road condition. In this way, the driving characteristics of the driver can be observed. After determining a rating system based on classes of vehicle acceleration, drivers can be compared their driving characteristics with this system. The vehicle drives can be encouraged to use with low acceleration. When specified acceleration level is exceeded, visual and audible warning system is activated and the driver is alerted. The drivers are encouraged to use the vehicle with low-level acceleration. It means leads to a reduced fuel consumption, reduced exhaust emissions and longer life of the vehicle.

The data recording and transfer system consists of 3 parts; microcontroller data acquisition unit, data transfer unit and software. The system includes Arduino Mega microcontroller, 2x12 character LCD display, ADXL345 acceleration sensor, SD memory and data transfer circuit. All of the power is fed from a 12V battery source. In the system, the acceleration changes in the X, Y and Z axes of the vehicle are measured in real time with the accelerometer and recorded on the SD card during driving. The measurements were carried out at varying speeds (20km / h-30km / h-40km / h) on a track that with 3 obstacles (barriers) about 120m long. Drive speed and road obstacle conditions are analyzed in 3-axis in the Cartesian coordinate system. Besides, in order to examine and compare the performance of the developed analysis system, the vehicle's shock absorber test was performed. During the test, the real test device used in the industry and the developed system were connected together to a car and the shock absorber test was carried out simultaneously. The results were plotted and proved to be quite similar to each other. So, the developed economic system could be an alternative to the test methods used in the industry.

Thanks to the designed system, acceleration control can be provided in the cars. The drivers are alerted by the warning system to reduce their acceleration and thus do not make unnecessary acceleration or deceleration depending on the road conditions during driving. Thus, unnecessary fuel consumption can be avoided, which can be caused either by driver use or by roadside faults. The design can be controlled with accelerometer and software to be added to the Electronic Control Unit (ECU) in the newly manufactured vehicles. Moreover, once the average acceleration value reaches the limit value, the ECU can reduce the acceleration by controlling the fuel system through the software to be developed. With this system, an acceleration rating system standard to be prepared according to vehicle class will be established. According to this standard, the comfort of public transportation is increased by restricting acceleration to public transport vehicles. Private fleet companies can improve their fuel consumption by limiting the driver's use of accelerated vehicles. This will provide a safer traffic environment. Automotive factories can optionally offer average acceleration monitoring systems to customers to drive their vehicles with minimal fuel consumption in urban traffic.

Keywords: Accelerometer, microprocessor, road analysis, shock absorber, fuel efficiency.

Kesir Dereceli Kontrol Sistemlerinde Referans Modele Dayalı PID Kontrolör Tasarımı

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Özet

Kesir dereceli sistemler son yıllarda ilgi çeken bir konudur. Fiziksel sistemlerin modellenmesinde, kesir dereceli sistemlerin tamsayı dereceli sistemlere göre daha başarılı bir modelleme gerçekleştirdikleri bilinmektedir. Bu çalışmada, kesir dereceli bir sistem optimizasyon yöntemi kullanılarak klasik PID kontrolör ile denetlenmiştir. Bir referans model belirlenir ve denetlenecek sistem çıkışı referans model çıkış karakteristikleri ile aynı yapılıdır. Sonrasında istenen birim basamak cevabı çıkışı elde edildiği zaman, PID kontrolör parametreleri belirlenir. Denetlenecek sistem çıkışının uygun kontrolör tasarımıyla elde edilebileceği gösterilmiştir.

Çalışmada, PID kontrolör parametrelerinin elde edilmesi optimizasyon yöntemiyle gerçekleştirilmiştir. Optimizasyon bir gerçel fonksiyonu minimize ya da maksimize etmek amacı ile fonksiyona değerler yerleştirerek sistematik bir şekilde problem çözüm işlemlerini tanımlar. Çalışmada, referans sistem ile denetlenen sistem arasındaki hata minimize edilerek optimum PID parametrelerinin elde edilmesi amaçlanmıştır. Hatayı minimize etmek için integral performans kriterlerinden yararlanılmıştır. Optimizasyon için Matlab/Simulink ortamında bir model oluşturulmuştur. Optimizasyon sürecinde oluşturulan bir yazılım dosyasıyla PID parametreleri belirlenir.

Çalışmada referans olarak alınan sistem ikinci mertebeden bir sistemin transfer fonksiyonudur. Bu transfer fonksiyonu ayarlanması gereken iki parametreye sahiptir. Bu parametreler doğal frekans (ω_n) ve sönüm oranıdır (ζ). Bu iki parametre ayarlanarak istenilen birim basamak cevap eğrisi elde edilebilir. Kontrolör, çıkış cevabına göre uygun referans model kullanılarak tasarlanmıştır. Kesir dereceli sistemin tamsayı dereceli modelinin elde edilmesinde Matsuda'nın 4.dereceden yaklaşımı kullanılmıştır.

Çalışmada, kesir dereceli bir sistem için ideal bir zaman cevabına göre PID kontrolör tasarımı gerçekleştirilmiştir. Farklı doğal frekans (ω_n) ve sönüm oranı (ζ) değerleri için referans modeller oluşturulmuştur. Bu model transfer fonksiyonlarına göre optimizasyon işlemi gerçekleştirilerek, PID kontrolör parametreleri elde edilmiştir. Hesaplanan PID kontrolör parametrelerinin kesir dereceli kontrol sistemine uygulanmasıyla, elde edilen birim basamak cevapları sunulmuştur. Yüzde aşma değeri ve zaman parametrelerinin referans model ve denetlenen sistem çıkışlarında hemen hemen aynı değerler olduğu görülmüştür. Optimizasyon yönteminin başarısı elde edilen grafiklerden ve oluşturulan tablolardan görülmüştür.

Anahtar Kelimeler: PID kontrolör, Optimizasyon, Kesir dereceli kontrol sistemleri

PID Controller Design Based on Reference Model in Fractional Order Control Systems

Abstract

Fractional order systems are a topic of interest in recent years. In the modeling of physical systems, fractional order systems are known to perform a more successful modelling than integer order systems. In this paper, a fractional order system was controlled with a classical PID controller using optimization method. A reference model is determined and the system output to be controlled is made the same as the reference model output characteristics. After that when the desired output step response is obtained, PID controller parameters are determined. It has been shown that the system output to be controlled can be obtained by designing the suitable controller.

In this paper, PID controller parameters were obtained by optimization method. Optimization describes problem-solving processes in a systematic way by minimizing or maximizing a real function and placing values in the function. In this study, it is aimed to obtain the optimum PID parameters by minimizing the error between the reference system and

controlled system. Integral performance criteria were used to minimize the error. A model was created for optimization in Matlab / Simulink environment. PID parameters are determined by m-file used in the optimization process.

In the study, the reference model is a transfer function of a second order system. This transfer function has two parameters that need to be set. These parameters are natural frequency (ω_n) and damping ratio (ζ). By setting these two parameters, desired unit step response curve can be obtained. The controller is designed by using the appropriate reference model according to the output response. Matsuda's fourth-order approximation was used to obtain an integer order model of the fractional order system.

In the study, a PID controller design was performed according to the ideal time response for a fractional order system. Reference models for various natural frequency (ω_n) and damping ratio (ζ) values were established. PID controller parameters are obtained by optimizing according to model transfer functions. By applying the calculated PID controller parameters to the fractional order control system, the unit step responses are obtained. It is seen that the percent overshoot value and the time parameters are almost the same values in the reference model and the controlled system outputs. The success of the optimization method can be seen from the graphs obtained and from the given tables.

Keywords: *PID Controller, Optimization, Fractional Order Control Systems*

İdeal Hayvan Yetiştiriciliği İçin Veri Madenciliğine Dayalı Bir Kds Çalışması

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Özet

Bu çalışmada, herhangi bir coğrafyanın iklimsel ve coğrafik özellikleri dikkate alınarak yetiştirebilecek en uygun hayvan türünün belirlenmesi amaçlanmıştır.

Çalışmada, çözüm metodolojisi olarak veri madenciliği metotlarından biri olan sınıflandırma işlevine ait karar ağacı yöntemi kullanılmıştır. Belirtilen yöntemin veriler üzerinde uygulanmasında ise SPSS Clementine 12.0 programında yararlanılmıştır.

Hayvan yetiştirilmesi planlanan bölge için uygun ve verimli hayvan türleri kullanıcıya sunulmuştur.

Anahtar Kelimeler: Hayvan Yetiştiriciliği, Veri Madenciliği, Karar Destek Sistemi.

A Decision Support System Study Based On Data Mining For Ideal Animal Culture

Abstract

In this paper, it is aimed to determine the most appropriate animal species that can cultivate by considering the climatic and geographical characteristics of any geography.

In the study, the decision tree method of the classification function, which is one of the data mining methods, was used as the solution methodology. SPSS Clementine 12.0 program was used to apply the above method on the data.

Appropriate and efficient animal species are presented to the user for the region where animal husbandry is planned.

Keywords: Animal Cultivate, Data Mining, Decision Support System.

İstanbul Çeşidi Vişnenin (*Prunus cerasus* L.) Bazı Fiziksel Özellikleri ve Renk Değerlerinin Belirlenmesi

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Özet

Tarımsal ürünlerin hasat, temizleme, sınıflandırma ve depolama işlemlerinde kullanılacak makine-ekipmanların tasarlanmasında ve ürünlerin hasat olgunluğu, kalite farklılığı gibi parametrelerin belirlenmesinde kullanılan en önemli kriter; ürünlerin fiziksel özellikleri ve renk değerleridir. Bu çalışmada İstanbul çeşidi vişnenin bazı fiziksel özellikleri ve renk değerleri belirlenmiştir. Meyvenin uzunluk, genişlik, kalınlık ve geometrik ortalama çap değerleri sırasıyla, 19.02, 17.23, 16.68 ve 17.56 mm olarak belirlenmiştir. Ürünün tek tane ağırlığı (3.76 g), küresellik (% 92.41), yığın hacim ağırlığı (630 kg/m³), tane hacim ağırlığı (962.37 kg/m³), tek meyve hacmi (3.72 cm³), yüzey alanı (9.72 cm²) ve porozite değeri ise % 34.54 olarak belirlenmiştir. Çalışmada vişnenin sürtünme katsayısı değerleri araştırılmıştır. Dinamik sürtünme katsayısı değerleri kontrplak, galvaniz metal, sunta ve lastik yüzeylerde sırasıyla 0.56, 0.57, 0.54, 0.64 olarak belirlenmiştir. Vişnenin özellikle hasat esnasında önem arz eden ürünün saptan kopma kuvveti ise 2.97 N olarak belirlenmiştir. Meyvenin ölçülerek belirlenen birincil renk değerleri L, a ve b ile hesaplanarak belirlenen ikincil renk değerleri olan kroma (C), kırmızılık indeksi (b/a) ve hue° değerleri belirlenmiştir. Meyvenin L; parlaklık (17.79), a; kırmızı-yeşil (14.29) ve b; sarı-mavi (0.75) olarak belirlenmiştir. Ürünün kroma, kırmızılık indeksi ve hue° değerleri ise sırasıyla 14.34, 0.04 ve 2.15° olarak belirlenmiştir.

Anahtar Kelimeler: Vişne, fiziksel özellikler, renk değerleri

Determination of Some Physical Properties and Color Values of İstanbul Variety Cherry (*Prunus cerasus* L.)

Abstract

The physical properties and color values of the products is the most important criterions to design of machinery-equipment used in harvesting, cleaning, sorting and storage of agricultural products, also it will use to determine the parameter s such as harvest maturity and quality difference. In this study, some physical properties and color values of the İstanbul variety are determined. The length, width, thickness and geometric meandia meter values of the fruit were determined as 19.02, 17.23, 16.68 and 17.56 mm, respectively. The product had a single grain weight (3.76 g), sphericity (92.41 %), bulk volume (630 kg/m³), grain volume weight (962.37 kg/m³), single fruit volume (3.72 cm³), surface area (9.72 cm²) and the porosity value was determined as 34.54 %. The friction coefficient values of the girdle were investigated in the study. Dynamic friction coefficient values were determined as 0.56, 0.57, 0.54, 0.64 on plywood, galvanized metal, chipboard and tire surfaces respectively. Especially, the significant breaking force which is important during the harvesting of the cherry is 2.97 N. The chromaticity (C), redness index (b/a) and hue° values of these cond color values determined by calculating the primary color values determined by measuring the fruit with L, a and b values were determined. fruits L; brightness (17.79), a; red-green (14.29) and b; yellow-blue (0.75). Product's chroma, redness index and hue° values were determined as 14.34, 0.04 and 2.15° respectively.

Keywords: Cherry, physical properties color values

Grafen Takviyesinin Titanyum Matris Kompozitlerin Sertliğine ve Mikroyapısına Etkisi

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Özet

Son yıllarda, grafen sahip olduğu olağanüstü mekanik, elektrik ve ısı özelliklerinden dolayı literatürdeki en popüler malzemedir. Günümüzde, araştırmacılar grafen takviyeli metal matris kompozitlerinin malzemelerin özelliklerini iyileştirmeye yönelik çalışmalara yoğunlaşmışlardır. Bildiğimiz kadarıyla biyomedikal, havacılık ve otomotiv gibi titanyum uygulamalarında grafenin kullanımı azdır. Bu çalışmada grafen katkısının titanyumun sertlik ve mikroyapısı üzerindeki etkisi araştırılmıştır.

Bu çalışmada, saf titanyum (43µm) matris malzemesi olarak ve grafen nanotabakalar ise (GNPs) katkı malzemesi olarak kullanılmıştır. Titanyum matristeki GNPs oranı ağırlık %0, 0.15, 0.3, 0.45 ve 0.6 olarak belirlenmiştir. Kompozitleri üretmek için toz metalürjisi yöntemi uygulanmıştır. Vakum altında sinterleme işleminden sonra kompozitlerin sertlik ve mikroyapıları sırasıyla Arşimet yöntemi, mikro vickers sertlik testi ve taramalı elektron mikroskobu (SEM) yöntemiyle incelenmiştir.

Sonuçlara göre, en yüksek yoğunluk (%91) ağırlık %0.15 GNPs katkılı numuneden elde edilmiştir. Sertlik test sonuçlarına göre, saf titanyum sertliği 304HV iken, GNPs katkılı numunenin sertliği 410 HV'ye kadar çıkmıştır. SEM görüntülerinde saf titanyum numunelerinde küçük gözenekler tespit edilmiştir. Diğer yandan, ağırlık %0.15 GNPs katkılı titanyum kompozitte yüksek yoğunluk, güçlü partikül bağları ve fazlar arası etkileşimler analiz edilmiştir. Sonuç olarak, eser miktarda GNPs katkısı titanium kompozitin sertliği ve mikroyapısı üzerinde iyileştirici bir etki göstermiştir.

Anahtar kelimeler: *Grafen, titanium, kompozit, sinterleme, mikroyapı, sertlik*

The Effect of Graphene Reinforcement on Hardness and Microstructure of Titanium Matrix Composites

Abstract

In recent years, graphene is the most popular material in literature due to its extraordinary mechanical, electrical and thermal properties. Nowadays, the researchers concentrated on graphene reinforced metal matrix composites to enhance the materials' properties. According to our knowledge, graphene is rarely used in titanium applications such as biomedical, aerospace and automotive. In this study, the effect of graphene concentration on titanium hardness and microstructure were evaluated.

In this study, the pure titanium powder (43µm) and graphene nanoplates (GNPs) were used as the matrix and reinforcement material. The GNPs ratio in titanium matrix was determined as 0, 0.15, 0.3, 0.45 and 0.6% by weight. The powder metallurgy process steps were applied to fabricate composites. After sintering under vacuum, density, hardness and microstructure of the composites were investigated by Archimedes method, micro-vickers hardness tester and scanning electron microscopy (SEM), respectively.

The results showed that, the highest density (91%) was obtained for 0.15% wt. GNPs added samples. According to the hardness results, while the pure titanium hardness was 304 HV, the hardness reached to 410 HV for 0.15% wt. GNPs added composites. From the SEM images, small pores were detected in the pure titanium samples. On the other hand, highly dense, strong particle bonding and well interphase interactions were analyzed for 0.15% wt. GNPs added titanium composites. In conclusion, a trace amount of GNPs has a positive effect on the enhancement of titanium hardness and microstructures.

Keywords: *Graphene, titanium, composites, sintering, microstructure, hardness*

Bilişsel Radyo Sistemleri için Kör Spektrum Algılama Yöntemlerinin Farklı Haberleşme Kanallarındaki Performans Analizi

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Özet

Günümüzde kablosuz haberleşme sistemlerinde hizmet standardının artmasıyla beraber spektrum kıtlığı problem ortaya çıkmıştır. Bu problemin üstesinden gelmek amacıyla mevcut frekans spektrumunun en verimli şekilde kullanılması ihtiyacı gerekmektedir. Bilişsel radyo teknolojileri belirtilen bu problemlere çözüm olmak amacıyla orta çıkan teknolojilerin bütün olarak tanımlanır. Bilişsel radyo sistemlerinde ilk adım mevcut spektrumun dolu/boş durumunun algılanmasıdır. Bu algılama için kör yöntemler uygulama kolaylığı ve hesaplama maliyeti açısından çok fazla tercih sebebidir. Bu çalışmada kör spektrum algılama yöntemlerinin farklı haberleşme kanallarındaki performans analizleri yapılmıştır.

Çalışmada rasgele oluşturulan sıfır ortalamalı birincil kullanıcı ve gürültü işaretleri kullanılmıştır. Çoklu antenler tarafından alınan işaretlerin kovaryans matrislerinin özdeğerleri kullanılarak spektrum algılama yapılmıştır. Algılama olasılığı için uluslararası haberleşme komitesi tarafından izin verilen algılama olasılığı sınır değeri kullanılmıştır. Simülasyonlar MATLAB ortamında gerçekleştirilmiştir.

Bilindiği üzere kablosuz haberleşme kanalını tam olarak karşılayan kanal, weibull sönümlü kanaldır. Simülasyon sonuçlarına bakıldığında özdeğer tabanlı algılama için en iyi algılama performansının rayleigh sönümlü kanalında olduğu görülmektedir. Fakat gerçek uygulamalarda rayleigh kanal kablosuz kanalı tam olarak karşılayamadığından weibull kanal sonuçları dikkate alınmalıdır. Ayrıca simülasyon sonuçlarına göre nakagami-m sönümlü kanalı için algılama performansı en başarısız olduğu görülmüştür.

Anahtar Kelimeler: Bilişsel radyo, Spektrum verimliliği, Rayleigh Sönümlü Kanal, Weibull Sönümlü Kanal, Nakagami-m Sönümlü Kanal.

Performance Evaluation of Blind Spectrum Detection Methods for Different Communication Channels in Cognitive Radio Systems

Abstract

In today's wireless communication systems, the problem of spectrum shortage has emerged with the increase of service standard. In order to overcome this problem, it is necessary to use the existing frequency spectrum most efficiently. Cognitive radio technologies are defined as the whole of the emerging technologies in order to solve these problems. The first step in cognitive radio systems is the detection of the full / empty state of the current spectrum. Blind methods for this perception are the reason for much preference in terms of ease of implementation and cost of calculation. In this study, performance analyzes of different communication channels of blind spectrum detection methods are performed.

A randomly generated zero-mean primary user and noise signals are used in the study. Spectrum sensing was performed using the eigenvalues of the covariance matrices of the signals received by the multiple antennas. The generalized likelihood ratio detection is based on the detection probability limit value allowed by the international communication committee. Simulations were performed in MATLAB environment.

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As it is known, the channel that fully models the wireless 802.11 communication channel is the Weibull fading channel. Looking at the simulation results, it is seen that the best detection performance for the eigenvector detection is in the Rayleigh fading channel. However, weibull channel results should be taken into account when real applications do not fully accommodate rayleigh channel wireless channels. Moreover, according to the simulation results, the detection performance for the nakagami-m damped channel was found to be the most unsuccessful.

Keywords: *Cognitive radio, Spectrum efficiency, Rayleigh Fading Channel, Weibull Fading Channel, Nakagami-m Fading Channel.*

On Muffler Design for Transmitted Noise Reduction

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Abstract

This paper is the results of an undergraduate final term project. The aim of project was to investigate the passive noise reduction methods in mufflers. Also, another aim of this study is to examine and design mufflers with various geometries. This is learn the effect of geometry on noise transmission loss maximization performance of mufflers. Four-poles method is used to determine the noise transmission loss. Two different cross-sectional geometries are considered for the mufflers, i.e. rectangular and circular. These mufflers are produced and tested. A noise transmission test bench is used for the measurement of noise transmission loss of these mufflers. The analytical results from simulation are compared with the experimental results. The effect of geometry of mufflers on the maximization of the transmitted noise loss are investigated and reported. The results of this study can help students to learn the basics of muffler design for noise reduction applications. Furthermore, it shows the effect of geometry on the acoustic performance of mufflers.

Keywords – Muffler, Noise Reduction Loss Maximization, Design, Production.

Handwriting Digit Classification with Complex Valued Neural Network

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Abstract

Complex numbers in engineering are playing an important role in facilitating mathematical operations and solving them in less time. With some transformations, real numbers can easily be converted to complex numbers. One of these transformations, FFT, can be used to extract complex number-valued features of images. In this study, number classification is done by using complex valued artificial neural networks.

In order to use images in the complex valued artificial neural network, complex valued numbers with frequency information are obtained by FFT transformation. Since the complex numbers obtained by the FFT transform cannot be used in classical sigmoid artificial neural networks, it is necessary to adapt artificial neural networks to complex numbers. Therefore, the weights and the activation function should be adapted to complex numbers.

Properly designed complex valued artificial neural networks have been trained appropriately to attempt to classify handwritten numbers correctly. In the test phase, it has been shown that the complex valued artificial neural network performs better than the classical artificial neural networks.

Keywords: *Complex Valued Neural Network, Digit Classification, FFT*

Flood Modeling by GIS Tools

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Abstract

In this study flood risks of Samsun Degirmen stream determinate by MIKE 11 and GIS.

In this study, MIKE powered by DHI software used for numerical 1D modeling of study area. The hydrological and hydraulic data for the study area were obtained from the Turkish General Directorate of State Hydraulic Works. ArcGIS program was used for creating a triangulated irregular network data (TIN).

The flood inundation maps demonstrated that some areas, from the upstream to downstream of the Degirmen stream basin is affected from 100 year and 500 year return period events.

Keywords: MIKE 11, Flood modeling, GIS, Samsun, Turkey.

Quasi-Cyclic Codes over the Field F_p

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Abstract

In this study, images of cyclic codes in two variable rings with coefficient field F_p are detected.

In this study a special ring in two variables is defined under certain conditions. The Gray images of the cyclic codes over this ring are investigated. Relations between the codes over this ring and the codes over a finite chain ring in one variable are obtained via a Gray map. Another Gray map from the finite chain ring to a finite field is defined and then the images of cyclic codes are obtained.

It is presented the finite ring $F_p + vF_p + uF_p + u^2F_p$ where $u^3 = 0$, $v^2 = 0$ and $uv = vu = 0$. It is obtained that the Gray image of a cyclic code over R with length n .

Keywords: Codes Over Rings , Quasi-Cyclic Codes, Gray Map, Finite Field.

Estimation of Digital Elevation Model by Artificial Intelligence Methods

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Abstract

The digital elevation model (DEM) is a numerical structure used to show the surface of the earth that is changing continuously. Determination of features such as land slope, curves of slope, and basin area is very important in terms of engineering field. In order to determine these properties, DEM is needed and the surface needs to be determined with proper accuracy. Altitude information is required along with horizontal and vertical position information, and intermediate values are determined by various methods for DEM. In this study, Samsun province Mert River Basin and the intersection of the city boundaries were chosen as the study area. Heights (denoted as Z) from the points where the horizontal and vertical coordinate information (X, Y) obtained from the existing maps belonging to the field are estimated using Multilayer Artificial Neural Networks (M-ANN) and Adaptive Neuro Fuzzy Inference System (ANFIS). Gradient Descent and Levenberg-Marquardt Methods were used as learning algorithms in M-ANN. Three different combinations have been tried in the study and they are: (i) X coordinate information; (ii) Y coordinate information; (iii) X and Y coordinate information. The mean absolute error (MAE), root mean square error (RMSE), mean absolute relative error (MARE), and the coefficient of determination (R^2) were used as comparison criterion. Of the total data from 14362, 70 % comprising a total of 10053 series was used to develop relevant models and the remaining 30 % including 4309 series was used to test the accuracy of the models. It is observed that the Y coordinate information is more effective in predicting altitude than the determination coefficients (0.599 and 0.602) for the first and second combinations in the results of the M-ANN and ANFIS analysis. According to MAE, MARE, RMSE and R^2 criteria, It is observed that Levenberg-Marquardt method AVV model provides better harmony (appropriate lineage) than ANFIS and Gradient Descent method ANN in elevation model. As a result of this study, we have reached the conclusion that artificial intelligence methods can be an alternative method for DEM.

Keywords: *Digital Elevation Model, ANN, ANFIS, Samsun.*

İmalat Çeliklerinin Tornalanmasında Kesme Parametrelerinin Yüzey Pürüzlülüğü Üzerine Etkisinin Analizi Ve Optimizasyonu

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Özet

Bu çalışmada, imalat çeliklerinin tornalanmasında işleme parametrelerinin yüzey pürüzlülüğü üzerine etkileri araştırılmıştır. Bu amaçla AISI 1040 ve AISI 1050 imalat çelikleri üzerinde tornalama yöntemiyle işleme deneyleri yapılmıştır. Tornalama deneyleri, Taguchi'nin L18 dikey dizinine göre üç farklı seviyede belirlenerek kesme hızı (150, 210 ve 270 m/dk), ilerleme (0,04 0,08 ve 0,12 mm/dev) ve (0,5 1 ve 1,5 mm) talaş derinliklerinde yapılmıştır. İşleme deneyleri kuru kesme şartlarında CNC torna tezgâhında gerçekleştirilmiştir. Kesme parametrelerinin yüzey pürüzlülüğü üzerine etkisini belirlemek amacıyla varyans analizi (Anova) yapılmıştır. Elde edilen deney sonuçlarına göre yüzey pürüzlülüğü üzerinde en etkin parametrenin %52,19 ile ilerleme hızı olduğu tespit edilmiştir.

Anahtar Kelimeler – İmalat Çeliği, Yüzey Pürüzlülüğü, Anova

Analysis And Optimization Of Effects On Surface Roughness Of Cutting Parameters On Turning Of Carbon Steels

Abstract

In this study, the effects of cutting parameters on surface roughness were investigated in turning of carbon steel. For this purpose, the turning tests were conducted on AISI 1040 and AISI 1050 carbon steels. The turning experiments were designed based on Taguchi's L18 orthogonal at three different levels which are cutting speeds (150, 210 and 270 m/min), feed rate (0.04, 0.08 and 0.12 mm/rev), and depth of cut (0.5, 1 and 1.5 mm). The turning tests were carried out on a CNC lathe under dry cutting conditions. The effects of cutting parameters on the surface roughness were determined through variance analysis (ANOVA). According to the obtained tests results, it was determined that the most efficient parameter for surface roughness is feed rate (57.6%).

Keywords – Carbon Steels, Surface Roughness, Anova

The Analysis of OCC and PI Control Method for Isolated Fly-Back Converter using PEM Fuel Cells

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Abstract

PI control and One Cycle Control (OCC) techniques of Fly-back Converter has been analyzed using PEM Fuel Cell. Fly-back converters can both step-up and step-down the input voltage. These converters have been used various fields due to their properties of simply design and low cost especially low input-high output facilities. As Fly-back converters are running, they have to be preserve output voltage values according to not only changes of input and reference voltage also changes of loads values. This paper aims at designing of a Fly-Back converter by using PI Control and OCC techniques for constant voltage that is supplied by PEM Fuel Cell.

This paper discusses the design and simulation results of Fly-Back converter between using of PI control method and One Cycle Control method for providing 400 V DC constant output voltage for 40V DC input voltage via PEM full cell. The design has been implemented as changes of input voltage, reference voltage and load values. For voltage sources, the values have been changed both increasing and decreasing 50% of values, on the other hand load has been changed 25% as voltage values. Design and simulation have been applied on Simulink to same body and compared to behavior of systems. According to system behavior both related methods have been compared in scope of rise time, settling time and percent overshoot, respectively.

PI controller is very sensitive against to changes of the related values so sudden changes have not caused little percent overshoots. But when system arrives at steady state position, it runs stable. While maintaining the working of system, the power cannot be constant for 500W in case of changes of loads and system cannot get balanced output power. As the system is being designed, both primary and secondary values of transformer have to be planned within the working field, otherwise, when the V_{in} is given unintended values, transformer is not be saturated. On the other hand, OCC is very as sensitive as and gives response against to changes of the related values so sudden changes cause an ideal percent overshoots. But OCC systems cannot arrive at steady state position very fast according to PI control. Also at steady state position, it runs stable with some oscillation. The same position for power seems to PI control the same reasons. Therefore, PI control of fly -back converter is suitable way to get intended response and design within low cost as long as the design criteria has been calculated very well.

Keywords: Fly-back Converter, PI Control, OCC, PEM Full Cell

Equivalence of Codes over Finite Chain Ring

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Abstract

Equivalence of Codes are constructed classification on finite rings according to odd codes, even codes and recurrent codes. It is determined that the codes are odd codes or even codes and the relationship with the Hadamard codes was studied. In this study, some matrices is written with the elements on the finite rings. Codes are generated with these matrices. The relationship between the generated codes and the perfect codes is revealed.

Keywords –Odd codes, Even codes, Gray map, Hadamard codes, special matrices.

Designing and Manufacturing of a Modal Analysis Test Bench – Part one: Harmonic Shaker Development

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Abstract

Designing and manufacturing of an educational modal shape generator and analyzer is the main aim of this study. A group of undergraduate students has developed a test bench for the modal analysis of a cantilever beam. A harmonic exciter is designed and manufactured. Its name set as Ankara Yildirim Beyazıt University first version or AYBU1. This is used to excite the example. The harmonic shaker is the most expensive part of such test bench. Therefore, an educational version of common harmonic shakers will be designed and produced. The total price of final product shall be low as well.

Keywords – *Modal Analysis, harmonic shaker, vibration, design*

Alzheimer Hastalarında El Fonksiyonlarının Bilgisayar Analizi İle Değerlendirilmesi

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Özet

Alzheimer hastalığı (AH) yaşlı insanlarda önemli bir işlevsel bozukluk kaynağıdır. AH'daki fonksiyonel bozukluğun gelişimi üzerine yapılan araştırmalar öncelikle bilişsel bozukluğun rolü üzerine odaklanmıştır. Bu çalışmalar günlük yaşamın bozulmuş işlevsel faaliyetleri ile bilişsel bozuklukların ciddiyeti arasında önemli bir ilişki bulmuş ancak nadiren işlevsel bozukluğa katkıda bulunan diğer faktörleri değerlendirilmiştir. Bu çalışmanın amacı Alzheimer Hastalarında(AH) el fonksiyonlarını hem reaksiyon zamanı hem de beceri açısından değerlendirmek ve kognitif fonksiyonlarla ilişkisini incelemektir.

Çalışmaya hafif ve orta derecedeki AH tanısı almış olgular ile yaş ve cinsiyet bakımından aynı sağlıklı olgular alınmıştır. 4 erkek ve 5 kadından oluşan 9 Alzheimer'lı , 3 kadın ve 5 erkekten oluşan 8 sağlıklı olgu olmak üzere toplamda 17 kişi çalışmaya dahil edilmiştir. Sağlıklı kişilerle Alzheimer'lı hastalar el fonksiyonları yönünden değerlendirilmiştir. Alzheimer'lı grupta erkeklerin yaş ortalaması 82, kadınların yaş ortalaması 71.6'dır. Gruplara Bilgisayarlı Analiz Testi(BAT), dokuz delikli peg testi ile el kas kuvveti değerlendirilmiştir. Sağlıklı grup ile hasta grup arasındaki el fonksiyonu, reaksiyon zamanı ve kas kuvveti ilişkisine bakılmıştır.

Peg Testi sonuçlarına göre hasta ve sağlıklı grup arasında istatistiksel açıdan anlamlı farklılık vardır(p <0.05). Kas kuvvetleri ölçülen hasta ve sağlıklı grupları arasında, istatistiksel olarak anlamlı bir farklılık vardır (p<0.05). Bağımsız gruplar t testine göre BAT değerleri arasında hasta ve sağlıklı gruplar açısından istatistiksel olarak anlamlılık yoktur(p>0.05). BAT değerleri açısından sağlıklı ve Alzheimer'lı grup benzerdir diyebiliriz. Bu sonucu hasta sayısının az olmasına bağlayabiliriz. Olgu sayısı daha fazla olan bir grupta yapılan çalışmada BAT testinin daha objektif sonuçlar vereceğini düşünmekteyiz.

Bu bulgular AH el fonksiyonlarının ve kas kuvvetinin anlamlı derecede azaldığını göstermektedir. El fonksiyonlarının azalması günlük yaşam aktivitelerinde zorlanma ve kısıtlanmaya neden olmaktadır. Ve aile üzerindeki yükü arttırmaktadır. Amacımız, erken dönemde hastanın el fonksiyonlarını bilgisayarlı analiz ile kolay bir şekilde yapmak ve el rehabilitasyonu ile hastaların el fonksiyonlarını korumaktır. Çalışma devam etmektedir.

Anahtar Kelimeler: Alzheimer, el fonksiyonu, değerlendirme, bilgisayarlı analiz

Evaluation of Hand Functions in Alzheimer's Patients with Computer Analysis

Abstract

Alzheimer's disease (AD) is an important functional disorder in elderly people. Research on the development of functional impairment in AD focuses primarily on the role of cognitive impairment. The daily life of these studies found a significant relationship between impaired functional function and cognitive impairment severity, but other factors contributing to functional impairment were assessed. The aim of the study is to evaluate hand function in Alzheimer's patients (AD) both in terms of response time and cognitive functions.

Including mild and moderate AD cases to study. 9 male and 5 female Alzheimer patients were included in the study. A total of 17 healthy patients and 3 healthy and 5 healthy male patients were included in the study. Healthy people and

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Alzheimer's disease were evaluated in terms of hand functions. In the Alzheimer group, the average age of men is 82 and the age range of women is 71.6. Groups were given Computerized Analysis Test (BAT), nine-hole peg test and hand muscle strength assessment. The relationship between hand function, reaction time and muscle strength between the healthy group and the patient group was examined.

According to Peg Test results, there is a statistically significant difference between patient and healthy group. ($P < 0.05$). There was a statistically significant difference between patients and healthy groups whose muscle forces were measured ($p < 0.05$). There was no statistically significant difference between BAT values according to independent groups t test for patients and healthy groups ($p > 0.05$). We can say that BAT values are healthy and Alzheimer's group is similar. This can be attributed to the small number of patients. We think that the BAT test will give more objective results in studying in a larger group

These findings indicate that AH hand function and muscle strength decrease significantly at the end of the day. Decreased hand function causes strain and restriction in daily life activities. And it increases the burden on the family. Our aim is to make the hand functions of the patient in an easy way by computerized analysis in the early period and to protect the hand functions of the patients with hand rehabilitation. The work is ongoing.

Keywords: *Alzheimer, hand function, assesment, computer analyses*

6 Sigma Süreç Yeterlilik İndeksi ile Adaptif PID Denetleyici Tasarımı

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Özet

Oransal-İntegral-Türevsel (PID) denetleyici, kolay tasarımı sebebiyle, günümüzde özellikle endüstriyel proses kontrollerinde sıkça kullanılmaktadır. PID denetleyicinin performansı, Oransal (Kp), İntegral (Ki) ve Türevsel (Kd) katsayılarının optimize edilmesine bağlıdır. Sistem parametrelerinin çevresel etkilerden ötürü değişmesi durumunda, Kp, Ki ve Kd katsayılarının yeni şartlara göre güncellenmesi, PID denetleyicinin performansını sürdürülebilirliği bakımından önemlidir. Bu çalışmada, sabit mıknatıslı doğru akım motorunun (PMDC) değişken yük durumlarında kontrolörünün sağlanması için, katsayılarının 6 sigma süreç yeterlilik indeksi ile otomatik olarak ayarlanması gerçekleştirilmiştir.

6 sigma süreç yeterlilik indeksi kullanılarak, kontrol sisteminin hata oranı, bir başka deyişle süreç yeterliliği hesaplanmış ve elde edilen bu değere göre PID denetleyicinin katsayıları otomatik olarak ayarlanarak yük değişimlerinin olumsuz etkisi giderilmiştir. Bu sayede adaptif PID denetleyici yapısı elde edilmiştir. Önerilen yöntem ile geleneksel PID denetleyicinin performans karşılaştırılması işlemi, MATLAB/Simulink programında, PMDC motorun farklı atalet momenti değerlerinde gerçekleştirilmiştir.

Yapılan çalışmalar sonucunda, önerilen yöntem sayesinde, PID denetleyicinin katsayıları adaptif olarak ayarlanmış ve PMDC motorun yük değişimlerinden daha az etkilenmesi sağlanmıştır.

Ahatar kelimeler: 6 sigma, süreç yeterliliği, adaptif PID denetleyici, dayanıklılık

Abstract

Nowaday, The Proportional-Integral-Derivative (PID) controller is frequently used in industrial process controls due to its easy design. The performance of the PID controller depends on the optimization of Proportional (Kp), Integral (Ki) and Derivative (Kd) coefficients. If the system parameters changes due to environmental influences, it is important to update the Kp, Ki and Kd coefficients according to the new conditions in order to maintain the performance of the PID controller. In this study, in order to ensure that the controller of the permanent magnet direct current motors (PMDC) under variable load conditions, the coefficients were automatically adjusted with the 6 sigma process capability index. Using the 6 sigma process capability index, the error rate of the controlled system, in other words process capability was calculated, and the coefficients of the PID controller are automatically adjusted according to the obtained value to eliminate the negative effect of the load changes. So, adaptive PID controller structure was obtained. In the MATLAB / Simulink program, a performance comparison of the proposed PID controller with the proposed method was performed at different moments of inertia of the PMDC motor.

Keywords: 6 sigma, process capability, adaptive PID controller, robustness

Complex event processing on collected sensors' data using Arduino

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Abstract

In this study, a Complex Event Processing (CEP) mechanism is designed for information gathered through sensors. The sensors such as light, temperature, humidity, sound and motion are equipped to an Arduino uno board and the collected data is processed according to a decision tree to give the proper information to mobile users who are registered to the desired events.

Arduino uno board is used to collect the sensor information through various sensors connected to the board. To produce a decision tree model and inform users via mobile phone CEP tool is developed. The tool is implemented on the Android devices. The light, temperature, humidity, sound and motion sensors are equipped to an Arduino board and the system starts to collect the sensor information which were later sent to an Amazon EC2 cloud server. The Arduino board is connected to a local server via an ESP8266 WiFi module and then the collected data is sent to a central server with defined labels. The mobile users are registered to the desired events through publish-subscribe mechanism which were implemented on the central cloud server in Java. Whenever an event is occurred the result will be sent to the subscribed mobile users. An alarm including event information popped up on the mobile users' smartphones.

Sensor information is sent to a cloud server where meaningful information is extracted through decision trees. A general publish-subscribe based event system was developed for various systems. For example, these systems are used in greenhouses, factories, homes and in various environments.

Keywords: *Complex Event Processing, Publish-Subscribe, Arduino, Event based Framework*

Sabit Hızlı Rüzgâr Türbinlerinde Kullanılan Bir Sincap Kafesli Asenkron Generatörün Şebeke Bağımsız Olarak Çalıştırılması ve Simülasyonu

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Özet

Ülkemizde enerji üretimi ve tüketiminde arz-talep dengesine katkıda bulunabilmek adına alternatif enerji kaynakları daha etkin kullanılmalıdır. Çevrenin temiz kalabilmesi amacıyla termik kaynakların (doğalgaz, linyit, kömür vs.) kullanımı sonucu açığa çıkan gaz emisyonlarının en aza indirgenmesi gerekmektedir. Yenilenebilir enerjinin güvenli, verimli, kaliteli, ucuz ve kesintisiz olması istenmektedir. Yenilenebilir enerji dönüşümünde görev alan rüzgâr türbinlerinin kurulum maliyetlerinin yüksek olması nedeniyle çalışmamızda, rüzgâr konusunda eğitici bir materyal oluşturmak amacıyla yenilenebilir enerji kaynaklarından olan rüzgâr enerjisi ile bir rüzgâr türbini vasıtasıyla elde edilen mekanik gücün, bir şebeke bağımsız Sincap Kafesli Asenkron Generatör (SKAG) miline uygulanmasına ait simülasyon çalışması gerçekleştirilmiştir.

Gerçekleştirilen simülasyon çalışması sonucu elde edilen verilerin MATLAB/Simulink programı ile simülasyonu ve parametrelerin net olarak incelemesi amacıyla LabView programı yardımıyla görsel bir çalışma hazırlanmıştır.

Bu çalışma ile simülasyonuna ait veriler Yapılan çalışmada alternatif enerji kaynağı olan rüzgâr enerjisinin, Danimarka kopsepti kısa devre rotorlu bir endüksiyon generatörlü rüzgar türbini oluşturduğu mekanik enerjinin generatöre aktarılması sonucunda belirli bir katsayıda aktif güç şebekeye aktarılmış olup MATLAB/Simulink yardımıyla kurulan düzenekten elde edilen parametreler, görsel bir şekilde Labview programı yardımıyla ekrana yansıtılmıştır.

Anahtar Kelimeler: sabit hızlı rüzgar türbini, endüksiyon generatörü, simülasyon.

Network Isolated Operation and Simulation of Caged Asynchronous Generator Which Used in Fixed-Speed Wind Turbines

Abstract

Alternative energy resources must be used to contribute supply-demand balance in energy production and consumption in our country. In order to keep environment clean, as a result of the use of thermal resources (natural gase, lignite, coal, etc.), emerged gase emissions must be minimized. It is the most wanted that the renewable energy must be safe, efficient, high quality, cheap and uninterrupted. Construction costs of the wind turbines which are duties on the renewable energy conversion are very expensive, therefore in order to generate an educational wind energy material in our study, renewable energy sources as wind power and mechanical power which obtained from the wind turbine applied to the shaft of the Caged Asynchronous Generator which is isolated from the network has been realized.

A visual study has been prepared with the help of LabView program in order to see the simulations and parameters clearly with the MATLAB / Simulink program of the obtained data.

In this study, as a result of transferring the mechanical energy that the alternative energy source, wind energy, which is a Danish type squirrel caged induction generator connected wind turbine, is transferred to the generator, the active power is transferred to the network and the parameters obtained from the system established with MATLAB / Simulink are visualized and it is reflected on the screen with the aid of the Labview program.

Keywords: fixed-speed wind turbine, induction generator, simulation.

3B Yazıcıda Farklı Doluluk Oranlarının PET-G Malzemeden İmal Edilen Ürünlerin Mekanik Özelliklerine ve Yüzey Pürüzlülüğüne Etkisinin İncelenmesi

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Özet

Günümüzde üç boyutlu (3B) yazıcıların geliştirilmesi ve düşük maliyetle halka kolaylıkla ulaşması sağlanmıştır. Bu kapsamda, PET-G (Polietilen tereftalat glikol) malzeme en önemli mühendislik polimerleri arasında yer almakta olup, işlenebilirlik, renklendirilebilirlik ve mekanik özelliklerinden dolayı tercih edilen bir malzemedir. 3B ürünlerin mühendislik uygulamaları açısından daha faydalı olması için imal edilen ürünlerin mekanik özellikleri ve yüzey kalitesi hakkında fikir sahibi olmak gerekmektedir. Bu nedenle, bu çalışmada 3B yazıcıda doluluk oranlarının PET-G malzemeden imal edilen ürünlerin mekanik özelliklerine ve yüzey pürüzlülüğüne etkilerinin incelenmesi amaçlanmıştır.

3B yazıcıda farklı doluluk oranlarında (% 20, % 50 ve % 80), 2600 mm/s işleme hızında ve diğer çalışma parametreleri aynı koşullarda olmak üzere PET-G malzemeden ürünler imal edilmiştir.

İmal edilen ürünlerin tek eksenli çekme testleri, sertlik ölçümleri ve yüzey pürüzlülüğü ölçümleri gerçekleştirilmiştir. Testler sonucu elde edilen veriler üzerinden karşılaştırma yapılmış ve sonuçlar analiz edilmiştir.

Anahtar Kelimeler: 3B yazıcı, PET-G, Doluluk oranı, FDM.

Investigation of 3D Printing Occupancy Rates Effect on Mechanical Properties and Surface Roughness of PET-G Material Products

Abstract

Recent developments in 3D printing are attracting wide spread interest due to easily accesible with lower cost. The present paper aims to investigate printing occupancy rates effect on mechanical properties and surface roughness of PET-G G (Polietilen tereftalat glikol) material products. Pet-G material was preferred because of its malleability , colorability and mechanical properties.

PET-G products were printed at different printing occupancy rates (20%, 50% and 80%), at processing speed of 2600 mm/s and all other operating parameters fixed same conditions on 3D printer.

Uniaxial tensile tests, hardness measurements and surface roughness measurements of the printed products were carried out. The results were analyzed and compared .

Keywords –3 D Printer, PET-G, Printing Occupancy Rate, FDM.

3B Yazıcıda Farklı Doldurma Şekillerinin PET-G Malzemedeki İmal Edilen Ürünlerin Mekanik Özelliklerine ve Yüzey Pürüzlülüğüne Etkisinin İncelenmesi

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Özet

Üç boyutlu (3B) yazıcıların imalat alanında kullanılmasında; az sayıda üretilen ya da karmaşık şekillere sahip ürünlerin imalatı, artık malzemenin önüne geçilmesi, prototipleme ve tasarım aşamalarında daha çeşitli imkanlardan yararlanılması konusunda önem arz etmektedir. Bu kapsamda, 3B yazıcılarda kullanılan hammaddelerden biri olan PET-G (Polietilen tereftalat glikol); dayanıklı, yüksek şeffaflıkta, kokusuz özelliklere sahip olmasından dolayı tercih edilmektedir. Bu nedenle, bu çalışmada 3B yazıcıda ürünlerde doldurma şeklinin mekanik özelliklerine ve yüzey pürüzlülüğüne etkilerini incelemek amaçlanmıştır.

Endüstride imal edilen ürünlerin mekanik özellikleri malzemenin yapısı kadar imalat şekli ve koşullarının etkisi de önemlidir. 3B yazıcılarda imalat yöntemi olarak günümüzde en yaygın kullanılan FDM (Fused Deposition Modelling) yöntemidir. Bu yöntemde imalat koşulları için doldurma şekli ürünlerin mekanik özelliklerine ve yüzey pürüzlülüğüne doğrudan etki etmektedir. Bu bağlamda, 3B yazıcıda PET-G malzemedeki farklı doldurma şekillerinde (rectilinear, triangular, full honeycomb), 3000 mm/s işleme hızında ve diğer çalışma parametreleri aynı koşullarda olmak üzere ürünler imal edilmiştir.

İmal edilen ürünlerin tek eksenli çekme testleri, sertlik ölçümleri ve yüzey pürüzlülüğü ölçümleri gerçekleştirilmiştir. Testler sonucu elde edilen veriler karşılaştırılmış ve sonuçlar analiz edilmiştir.

Anahtar kelimeler: 3B yazıcı, PET-G, FDM, doldurma şekli.

Investigation of 3D Printing Filling Structures Effect on Mechanical Properties and Surface Roughness of PET-G Materials Products

Abstract

3D printing filling structures at prototyping and design stage are increasingly important issue for products with complicated shapes. The objective of the present study is to investigate 3D printing filling structures effect on mechanical properties and surface roughness of PET-G (Polyethylene terephthalate glycol) material products. PET-G material was preferred because of its durability, high transparency and odor characteristics.

A variety of methods are used to manufacture products. Each has its advantages and drawbacks. One of the these methods to adopt for his investigation was FDM (Fused Deposition Modeling) 3D printing methods. The FDM method was considered that it has a direct effect on the mechanical properties and surface roughness of the product. The experiments were carried out using PET-G materials with different printing filling structures (rectilinear, triangular, full honeycomb),.

Uniaxial tensile tests, hardness measurements and surface roughness measurements of the printed products were carried out. The results were analyzed and compared.

Keywords: 3D Printer, PET-G, FDM, printing filling structures.

Üç Fazlı Senkron Bir Makinenin Değişken Yük Durumları için Geçici Hal Sonlu Eleman Analizi

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Özet

Mekanik enerji kaynağına göre senkron makineler, buhar türbinlerinde yüksek veya hidrolik santrallerde ise düşük devirlerde işletilebilmekte olup bu devirlerde makinenin çalışma karakteristiklerinin boşa ve değişken yük durumlarında incelenmesi sistem planlaması için önemlidir. Bu karakteristiklerin çıkarılmasında sonlu eleman analizi yöntemi kullanılarak çoklu makine parametreleri dinamik olarak değerlendirilip senkron makinelerin davranışları incelenebilir. Bu çalışmada ANSYS Maxwell yazılımı ile boyutlandırılması yapılmış 3 faz senkron bir makinenin değişken yük durumlarında verimlilik, belirlenen devirlerde indüklenen gerilim, faz akımları ve faz gerilimleri, tork miktarı gibi değerler elektriksel açı değişimine bağlı olarak incelenmiştir.

Mekanik enerjiyi elektrik enerjisine çeviren en temel elektrik makinesi olan senkron makineler alternatör çalışması, elektrik enerjisini mekanik enerjiye çeviren senkron makineler senkron motor çalışması gerçekleştirir. Senkron makineler, rotor devri ile stator devri eşit olup stator sargılarında alternatif akım, rotor sargılarında ise doğru akım bulunan ve rotor hızı senkron devirle dönen veya döndürülen elektrik makinelerdir. Senkron makinelerin paralel bağlı kullanılmasıyla üretim kapasiteleri yüz binlerce megavatlara çıkabilen santraller oluşturulabilmektedir.

Üç fazlı senkron makinenin çoklu parametreye bağlı dinamik çözümü analitik yöntemlerle karmaşık ve zordur. Senkron makinenin analizinde, lineer olmayan makine bileşenleri sistemini daha küçük alt parçalara bölerek çözüme ulaşma yöntemi olan Sonlu Eleman Analizi (SEA) kullanılmıştır. Sonlu eleman metodu, lineer olmayan malzemelerin tanımlanabilmesi ve karmaşık fiziksel parçaları kolay modelleyebilmesi gibi özelliklerinden dolayı elektrik makinelerinin analizinde tercih edilen sayısal yöntemlerin başında gelir.

Yapılan analiz ile değişken yük durumlarında verimlilik, belirlenen devirlerde indüklenen gerilim, faz akımları ve faz gerilimleri, tork miktarı gibi değerleri elektriksel açı değişimine bağlı ayrı ayrı ortaya koyulmuştur.

Bu çalışmada üç faz senkron makinenin değişken devirlerde çalışma karakteristiklerinin boşa ve değişken yük durumlarında incelenmesi yapılmıştır. Sonlu eleman analizi yöntemi kullanılarak yapılan analizlerde makinenin çoklu parametreleri dinamik olarak değerlendirilip senkron makinelerin davranışları ANSYS Maxwell yazılımı kullanılarak incelenmiştir. Bu çalışma ile boyutlandırılması yapılmış 3 faz senkron bir makinenin değişken yük durumlarında verimlilik, belirlenen devirlerde indüklenen gerilim, faz akımları ve faz gerilimleri, tork miktarı gibi değerleri elektriksel açı değişimine bağlı ayrı ayrı ortaya koyulmuştur. İncelemesi yapılan makine için değişken yük ihtiyacı olan bir elektrik şebekesini besleyecek olan üretim düşünüldüğünde makine analiz sonuçlarının enerji üretim planlanmasında önemli bir planlama unsuru olarak kullanılabilmesi söylenebilir.

Anahtar Kelimeler: 3FSG, değişken yük, sonlu eleman analizi, geçici durum analizi, Ansys Maxwell

Transient State Finite Element Analysis of a Three Phase Synchronous Machine for Variable Load Cases

Abstract

According to the mechanical energy source, synchronous machines can be operated at high speeds in steam turbines or at low speeds in hydraulic power plants and it is important for system planning to study the working characteristics of the machine in no-load and variable load situations at these cycles. In the derivation of these characteristics, multi-machine parameters can be evaluated dynamically and the behaviors of synchronous machines can be examined by using the finite element analysis method. In this study, the efficiency of the 3-phase synchronous machine resized with

ANSYS Maxwell software is investigated in terms of the efficiency of the variable load cases, the induced voltage, the phase currents, the phase voltages and the amount of torque.

Alternators are the most basic synchronous electric machines that convert mechanical energy into electrical energy, while synchronous motors are synchronous machines that convert electrical energy into mechanical energy. Synchronous machines are electric machines with alternating current in stator windings, direct current in rotor windings and rotating or rotating synchronously with rotor speed. By using synchronous machines in parallel, the production capacities can be increased to hundreds of thousands of megawatts.

Multi-parameter dynamic solution of three-phase synchronous machine is complex and difficult with analytical methods. In the analysis of the synchronous machine, Finite Element Analysis (SEA), which is the solution reaching method, is used by dividing the nonlinear machine components system into smaller subcomponents. The finite element method is one of the preferred numerical methods in the analysis of electrical machines due to its ability to identify nonlinear materials and to easily model complex physical parts.

By the analyzes, efficiency in variable load cases, induced voltage in determined cycles, phase currents, phase voltages and torque amounts are presented separately according to the electrical angle change.

In this study, three phase synchronous machine operating characteristics are investigated in no-load and variable load cases at variable speeds. In the analysis using the finite element method, the machine's multi-parameters were evaluated dynamically and the behaviors of the synchronous machines were examined using ANSYS Maxwell software. In this study, the efficiency of a 3-phase synchronous machine with variable load, induced voltage, phase currents, phase voltages and torque amounts at specified cycles are presented separately according to the electrical angle change. It can be said that the analysis results can be used as an important planning element in the energy production planning when it is considered that the machine under review is used in the production, which will feed an electric grid, which requires variable load.

Keywords: 3-PSG, variable load, finite element analysis, transient analysis, Ansys Maxwell

Pençe Kutuplu Senkron Bir Generatörün Geçici Hal Sonlu Eleman Analizi

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Özet

Pençe kutup alternatörler, ısı akı yoğunluğu düşük, manyetik akı yoğunluğu ve verimliliği yüksek olan ve maliyet açısından en uygun generatör tipidir. Otomobillerde sürekli artan güç ihtiyaçları düşünüldüğünde verimleri maksimum %80-82 olan pençe kutuplu alternatörlerin daha yüksek güçlerde ve daha yüksek yakıt verimliliği değerlerine göre üretilmesi elzemdir. Bu çalışmada, ağırlıklı olarak otomobil endüstrisinde kullanılan pençe tip alternatörlerin sonlu eleman analizi yöntemi kullanılarak, çoklu makine parametreleri dinamik olarak değerlendirilip alternatör davranışları incelenmiştir. ANSYS Maxwell yazılımı kullanılarak yapılan analizde alternatörün belirlenen devirlerde indüklenen gerilim, faz akımları ve faz gerilimleri, tork miktarı gibi değerler elektriksel açı değişimine bağlı olarak incelenmiştir.

Pençe tip alternatörlerin çoklu parametreye bağlı dinamik çözümü analitik yöntemlerle karmaşık ve zordur. Bu makinenin analizinde lineer olmayan makine bileşenleri sistemi daha küçük alt parçalara bölmek suretiyle çözüme ulaşma yöntemi olan Sonlu Eleman Analizi (SEA) kullanılmıştır. Sonlu eleman metodu lineer olmayan malzemelerin tanımlanabilmesi ve karmaşık fiziksel parçaları kolay modelleyebilmesi gibi özelliklerinden dolayı elektrik makinelerinin analizinde tercih edilen sayısal yöntemlerin başında gelir.

Bu çalışmada, pençe tip alternatörlerin ANSYS Maxwell yazılımı ile sonlu eleman analizi yöntemi kullanılarak çoklu makine parametreleri dinamik olarak değerlendirilip alternatörün davranışları incelenmiştir. Yapılan analizde alternatörün stator sargılarında indüklenen gerilim, rotor konumuna göre meydana gelen elektriksel açı değişiminin alternatörün çalışma gerilim sınır değerleri içerisinde olduğu ortaya koyulmuştur. Alternatörün belirlenen güç faktörlü değişken yüklenme durumu için belirli devirlerde yapılan düşük frekans sonlu eleman geçici hal analizi neticesinde indüklenen faz gerilimlerinin değişimi gösterilmiştir.

Bu çalışmada pençe kutuplu alternatörün değişken devirlerde çalışma karakteristiklerinin boşa ve değişken yük durumlarında incelenmesi yapılmıştır. Sonlu eleman analizi yöntemi kullanılarak yapılan analizlerde makinenin çoklu parametreleri dinamik olarak değerlendirilip davranışları ANSYS Maxwell yazılımı kullanılarak incelenmiştir. Bu çalışma ile boyutlandırılması yapılmış pençe kutuplu alternatörün belirlenen devirlerde indüklenen gerilim, faz akımları ve faz gerilimleri, tork miktarı gibi değerler elektriksel açı değişimine bağlı ayrı ayrı ortaya koyulmuştur. İncelemesi yapılan makine için sürekli güç ihtiyacı artan otomobilleri besleyecek olan üretim düşünüldüğünde sonlu eleman analiz sonuçlarının alternatör boyutlandırılması ve tasarımında önemli bir planlama unsuru olarak kullanılabileceği söylenebilir.

Ahtar Kelimeler: pençe tip alternatör, değişken devir, SEA, geçici durum analizi, Ansys Maxwell

Transient State Finite Element Analysis of Claw-Pole Synchronous Generator

Abstract

Claw-pole alternators are the most suitable generator type in terms of cost, which has low heat flux density, high magnetic flux density and high efficiency. Considering the ever-increasing power needs of automobiles, it is necessary that the claw-pole alternators with a maximum efficiency of 80-82% are produced with higher power and higher fuel efficiency values. In this study, alternator behaviors were dynamically investigated by evaluating multi machine parameters of claw-pole generators used in automobile industry by means of finite element analysis method. In the analysis using ANSYS Maxwell software, the values of induced voltage, phase currents, phase voltages and torque in the alternator are determined according to the electrical angle change.

Multi-parametric dynamic solution of claw-type alternators is complex and difficult with analytical methods. In the analysis of this machine, Finite Element Analysis (FEA), which is the solution reaching method, is used by dividing the nonlinear machine components system into smaller subcomponents. The finite element method is one of the preferred numerical methods in the analysis of electrical machines due to its ability to identify nonlinear materials and to easily model complex physical parts.

In this study, multi-machine parameters of claw-type alternators were evaluated dynamically using ANSYS Maxwell software and finite element analysis method and alternator behaviors were investigated. According to the results of the analysis, the voltage induced in the alternator stator windings is found to be within the limit values of the alternator operating voltage, the electrical angle change which occurs according to the rotor position. It is proposed that the alternator changes the induced phase voltages at a certain frequency for the determined power factor variable load case as a result of the low frequency finite element transient analysis.

In this study, the characteristics of the claw-type alternator at variable speeds are investigated in no-load and variable load cases. In the analysis using the finite element method, the machine's multi-parameters were evaluated dynamically and their behavior was examined using ANSYS Maxwell software. In this study, the induced voltage, phase currents, phase voltages and torque amounts of the claw-pole alternator are determined separately according to the electrical angle change. It can be argued that if the production of the inspected machine is to feed the cars with the ever-increasing need for power, the results of the analysis of the finite element method can be used as an important planning element in the resizing and design of the alternators.

Keywords: *claw-type alternator, variable speed, FEA, transient analysis, Ansys Maxwell*

Behavior of Composite and Box Profile under Impact Force

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Today, in order to have the desired behavior under the loads that the structures can encounter, it needs to be done in accordance with the regulations and standards. The Regulation on Buildings to be Made in Earthquake Regions (DBYBHY), which was updated in 2007, was prepared taking into account the burdens to be exposed to the construction. These regulations are divided into two classes, statically and dynamically, and accounted for. Static loads are expressed as constant loads that do not change over time, while dynamic loads represent load conditions that are time parameters. One of the most important dynamic loads is the earthquake load, but the structure can be exposed to other dynamic effects such as earthquake and impact. This effect can be caused by the impact of the coming event of the destruction of the neighboring building for any reason, and as a consequence of the explosion of the heating boiler, we are faced with this effect. Although such stocks are included in DBJIC, such effects are likely. This is why the building has to be taken into consideration during the design phase and the loading conditions to be evaluated. In this study, position-time, velocity-time, acceleration-time graphs of steel beam with hollow box case and steel box with hollow box case filled with concrete were investigated.

Keywords: *Impact, steel, composite*

Authentication with Iris Recognition Based on a 3-Tier Security Analysis Approach

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Abstract

Audit controls are made using the tools such as ID, magnetic card, password, pin code to enable people to access to areas requiring access permission. This situation with increasing the number of security measures forces people to remember more than one password. In addition, it is becoming compulsory for a person to have more than one type of card in order to be able to identify himself / herself. Increasingly reliable and practical detachment of such measures has increased the interest of researchers in biometrics systems, which is the recognition method of self-identification by using their own structural features. Our goal in this study is to authenticate with one of these biometric systems, iris recognition.

In the study, eye color in the first layer, ratio of the diameter of the iris to the diameter of the eye blade in the second layer, and tissue analysis in the third layer is examined. If you cannot match any of the images previously saved in the database to any layer, you cannot switch to the other layer. The project works in real time. With a camera supplied, iris images were taken from different people and a database was created. By using image processing techniques, images in this database are processed and an iris code is created which acts as a key. The snapshots taken from the live eye are compared with the data in the database through the generated iris code to determine whether they match. The difference between this work and other work that has been worked on in this area is that the authentication process is performed with a different algorithm approach by increasing the number of security layers. Thus, it is aimed to reach reality more securely and in a short time. In the literature, only studies of iris tissue have been studied in the definition of iris. Other factors have not been evaluated in studies. In this study, the ratio of the eye color and iris diameter to the eyelash is also examined by taking into account. These factors are examined correctly after matching the iris texture.

The study is conducted in a short time and with a high success rate. In order to be able to introduce themselves with this work, the necessity of carrying many cards with them and memorizing many passwords has been prevented. It provides savings and financial benefits to institutions and individuals. There is not much study about the recognition of iris in the country, and the necessary software in this area is generally supplied from abroad. With this study, it is aimed to increase the interest of researchers in this field and to eliminate this deficiency in the country.

Keywords – *Biometric security, pattern recognition, authentication, augmented security.*

Dört Teker Tahrikli Kayarak Yönlendirilen Mobil Robotun Gövde Hızı ve Yönelme Açısının Kesir Dereceli Kayan Kipli Kontrolcü İle Kontrolü

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Özet

Bu çalışmada dört teker tahrikli kayarak yönlendirilen mobil robotun (4TT KYMR) gövde hızı ve yönelme açısının kontrolü için Kesir Dereceli Kayan Kipli Kontrolcü (KDKKK) yapısı benzetim ortamında test edilmiştir.

Mobil robotun gövde hızı ve yönelme açısı her bir motorun açısal hızı kullanılarak hesaplanmaktadır. Tasarlanacak olan KDKKK ile mobil robotun yörünge izleme ve konum kararlılığı için her bir motorun tork işareti üretilecektir. KDKKK'nün performansını kıyaslamak için aynı referanslar kullanılarak mobil robota parametreleri iyi ayarlanmış bir PI kontrolcü de uygulanmıştır.

Benzetim çalışmalar KDKKK'nün geleneksel PI kontrolcüye göre yörünge izleme doğruluğu ve hata büyüklüğü açısından daha iyi sonuçlar verdiğini göstermiştir.

Anahtar Kelimeler: Mobil Robot, Kesir Dereceli Kayan Kipli Kontrolcü.

Speed and Direction Angle Control of Four Wheel Drive Skid-Steered Mobile Robot by Fractional Order Sliding-Mode Control

Abstract

In this study, a Fractional Order Sliding Mode Controller (FOSMC) structure was simulated to control the body speed and direction angle of a four Wheel drive skid-steered mobile robot (4WD SSMR).

The body velocity and orientation angle of the mobile robot are calculated using the angular velocity of each motor. The torque signal of each motor for the mobile robot's trajectory tracking and position stability will be generated by the FOSMC. To compare the performance of the FOSMC, a PI controller with well-tuned parameters was applied to the mobile robot using the same references.

Simulation studies have shown that the FOSMC provides better results in terms of trajectory tracking accuracy and error levels than the conventional PI controller.

Keywords: SSMR, Fractional Order Sliding Mode Control.

PVD Kaplama Tekniği ile Elde Edilen İnce Filmlerin Ortodontik Uygulamalardaki Etkisinin Araştırılması

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Özet

Ortodontik tedavi sırasında karşılaşılan ark teli üzerindeki sürtünme kuvvetleri bazı durumlarda istenmemekte ve bu kuvvetler tedavi sırasında oluşan en önemli problemlerden biri olmaktadır. Bu kuvvetler dişlerin hareketini ve tedavi süresini etkileyen önemli bir faktördür. Sürtünmeyi etkileyen çok sayıda faktör bulunmaktadır. Bunlardan başlıcaları; braket, ark teli ve bunların birbirlerine bağlanması ile ilgili faktörlerdir. Sürtünmenin; ark teli malzemesine, telin kesit yüzeyinin şekli ve boyutuna, ark teli ve braketin yüzey özelliklerine bağlı olduğu gibi her ikisinin birbirine bağlanma sırasındaki ligasyon materyali ve metoduna da bağlı olduğu görülmektedir. Bu çalışmanın amacı; düşük sürtünme katsayılı kaplama tabakaları elde ederek ark teli ve braket arasındaki sürtünmeyi azaltmak ve buna bağlı olarak ortodontik tedavinin kalitesini artırmak ve süresini kısaltmaktır.

PVD (Fiziksel buhar biriktirme) metodu ile elde edilen sert seramik kaplamalar biyomedikal alanlarda (protez, cerrahi aletler, diş hekimliği malzemeleri gibi) yüksek sertlikleri, aşınma dirençleri, korozyon dirençleri, biyo uyumlulukları sebebiyle kullanılmaktadır. Bu çalışmada reaktif magnetron sıçratma metodu ile TiCN kaplanmış ark teli ve braketlerin özellikleri ve performansları incelenmiştir. Klinik uygulamalarda en çok kullanılan konvansiyonel paslanmaz çelik Roth braket (0,018 inç) ile farklı boyutlarda (0,016" ve 0.017" x 0.025") β-Ti, Ni-Ti ve paslanmaz çelik ark telleri deney numuneleri olarak seçilmiştir. Kaplama sonrası numunelerin karakterizasyon çalışmaları kapsamında kaplama kalınlığı tespiti, pürüzlülük, nanosertlik ölçümleri, SEM, AFM, EDX, XRD analizleri yapılmıştır. Sürtünme kuvvetleri CSEM marka Revetest cihazı kullanılarak tespit edilmiştir. Bu amaçla yapılan çalışmalar iki aşamada gerçekleştirilmiştir; birinci aşamada farklı kesit ve taban malzemesine sahip kaplanmış ve kaplanmamış ark tellerinin sürtünme katsayılarını belirlemek için karşı eleman olarak 100Cr6 malzemedeki rulman çeliği kullanılmıştır. Araştırmanın ikinci aşamasında ise sürtünme kuvvetleri kaplanmış-kaplanmamış braketlerle, kaplanmış-kaplanmamış ark tellerinin farklı kombinasyonları için ölçülmüş ve sürtünme katsayıları hesaplanmıştır.

Kaplamanın ark telleri üzerindeki etkisini inceleyen araştırma sonucuna göre kaplanmış ark tellerinin kaplanmamış ark tellerine göre sürtünme katsayısı değerlerinde önemli derecede düşüşler kaydedilmiş ayrıca β-Ti ve Ni-Ti ark tellerinin paslanmaz çelik ark tellerine göre daha düşük sürtünme katsayısı verdiği ortaya konmuştur. Braket-ark teli kombinasyonlarında ise kaplanmış ark teli-kaplanmamış braket ikilisinin en düşük sürtünme katsayısını verdiği tespit edilmiştir. Diş hareketini etkileyen en önemli faktör sürtünme kuvvetidir. Sürtünme kuvvetine etki eden faktörlerle müdahale edilebilirse ortodontik tedavinin süresi ve başarısı ile ilgili olumlu tahminler yapmak mümkün olacaktır.

Keywords: PVD kaplamalar, TiCN, ortodontik ark telleri, braketler, sürtünme.

Researching of the Effect of Thin Films Obtained by PVD Coating Technique in Orthodontic Applications

Abstract

The friction forces on the archwires encountered during orthodontic treatment are undesirable in some cases and these forces are one of the most important problems during treatment.

These forces are an important factor affecting the movement of the teeth and the duration of the treatment. There are a number of factors that affect friction. These factors are mainly; brackets, arcs, and their connection to each other. The frictional resistance related to the bracket, archwire and methods of ligation to each other. It is seen that the friction depends on the material of the archwire the shape and size of the cross-sectional surface of the wire, and the surface

properties of the archwire and bracket, as well as related to the ligation material and method of bonding each other. The purpose of this study is; to reduce the friction between the archwire and bracket by obtaining low friction coefficient coating layers, thereby increasing the quality and shortening the duration of the orthodontic treatment.

PVD (Physical vapor deposition) hard ceramic coatings have been widely used in the field of biomedical applications - such as surgical tools, implants, and materials used in dentistry because of excellent properties such as high hardness, good wear, corrosion and oxidation resistance, chemical stability and good bio-conformity .

In this study, the properties and performance of archwires and brackets in which TiCN coated by using dc reactive magnetron sputtering method were investigated. Test specimens of β -Ti, Ni-Ti and stainless steel archwires were selected in different sizes (0.016 "and 0.017" x 0.025 ") with conventional stainless steel Roth brackets (0.018 inches) which are the most used brackets in clinical applications. The characterization of coated and uncoated specimens was carried out with roughness, nanohardness tests, SEM, AFM, EDX and XRD analysis. Then, the friction coefficients of TiCN coated and uncoated archwires determined in dry sliding conditions using suitably arranged CSEM revetest scratch tester and friction coefficients were calculated. The experimental studies were carried out with two stages. In a first stage, 100 Cr6 balls were used as counterparts. During the test, the friction coefficients between the balls and archwires were determined. In two stages in order to simulate mouth conditions, the friction coefficients between brackets and archwires were measured at the same conditions.

The experiment results have shown that TiCN coated wires generally had significantly lower coefficients of friction than uncoated wires. The friction coefficients of the TiCN coated β -Ti, Ni-Ti archwires were determined superior to the stainless steel. Also, the effects on the friction of coated archwires and brackets surfaces were evaluated and compared the coefficients of friction of stainless steel brackets combined with β -Ti, Ni-Ti and stainless steel archwires. The results show that the smallest friction coefficient is found for the coated archwires-uncoated brackets combination. The most important factor affecting tooth movement is the friction force. If the factors affecting the friction force can be intervened, it will be possible to make positive predictions about the duration and success of the orthodontic treatment.

Keywords: *PVD coatings, TiCN, orthodontic archwires, brackets, friction*

ODE (Open Dynamics Engine) Based Walking Control Algorithm for Six Legged Robot

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Abstract

In the walking control algorithms, if standard gaits are used, many dynamic effects such as inertial effects, external forces (gravity and friction) are neglected. Furthermore, neglecting dynamic effects does not have much effect on walking performance if masses of robot parts are not too large. On the other hand, as the size of the robot is increased, the masses of the parts will also increase, so dynamic effects will not able to be ignored.

Open Dynamics Engine (ODE) is the most popular rigid algorithm in robotic applications. The use of ODE in a real take into account during the walk.

In this study, an ODE based walking control of a six-legged mobile robot was performed and the balancing performance for 30 second linear trajectory of three different gaits (tripod-quadropod –tetrapod) has given in results.

Keywords: *ODE (Open Dynamics Engine),*

Design and Experimental Applications of Material Classification Prototype System

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Abstract

Progress in the field of robotics has greatly influenced industrial automation technology. The material classification process is one of the important parts of this technology. Through the experimental system, it was aimed to classify materials in different shapes and properties. The proposed prototype system is aimed at a system that adopts industry 4.0 for high level automation applications.

Robot manipulator-based system is proposed for the mentioned purpose. The proposed prototype system consists of a fixed rapid traversing conveyor, 6 DOF industrial robot manipulators, Labview software and Universal gripper elements. On the other hand, Labview is an image processing software developed with the graphical programming language and the camera system is trying to predict the position with the 2D image of the material. Classification process was performed by analyzing the field information and shape properties of the materials to be classified with the developed image processing techniques. In the proposed system, use the universal gripper to hold and move the stone. A universal gripper is a holder that takes the shape of an object when it is pressed against the target object, and then grasps and holds the object with the applied vacuum. The system basically consists of three units. The first unit is the computer on which the image processing techniques are applied, the belt conveyor where the transport of the second unit materials is made, and the third unit is the 6 DOF industrial robot and the universal gripper where the holding and moving process is carried out.

In this study, materials of different shapes and sizes were classified by image processing. Furthermore, most importantly pick and place was taken from one position with a single robot manipulator and gripper. With the realized gripper design, different objects with different shape and surface properties can be easily held and released. Two different methods have been used when determining the material type in the works performed. From these methods, the classification is done by calculating the area of the material and making use of the area differences between different types of materials. The second is to classify the materials by scanning in the instantaneous image of the system which has been taught and the taught images of the materials to determine the type of program. Shaping has yielded more accurate results when the field values of the materials to be classified are close to each other but different in shape. Conversely, if the materials are similar to each other but have different field values, classification by particle analysis and field value is more accurate.

Keywords: *Image Processing, Labview, Industrial Robot Manipulator, Universal Gripper.*

Hastaneye Yatırılan Erişkin Hastalarda Vücut Isılarının Aksiller ve Timpanik Ölçüm Yöntemlerle Karşılaştırılması

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Özet

Bu çalışmada hastane kliniklerinde rutin olarak kullanılan ve aynı zamanda evlerde de yaygın olarak kullanılan cilde temas eden aksiller (dijital) termometre ile cilde temas etmeyen timpanik membran ölçüm yapan termometre (dijital) vücut ısısının ölçümünde, ölçüm parametrelerinin birbiri ile korelasyonunun belirlenmesi, aynı zamanda uygulayan ve uygulatan açısından konforu ile vücut ısısının en kısa zamanda doğru bir şekilde tespit edilmesi amacı ile yapılmıştır. vücut ısısının tespit edilmesi olgu girişiminde ve tedavinin uygulama yönteminde önemli bir veridir. Normal vücut ısısı 36.3-37.2 aralığındadır, bu aralığın dışındaki parametre hipotermi ve hipertermi olarak adlandırılır, bu durum fizyolojik ve biyokimyasal bir sapmadır.

Bu çalışma Osmangazi Üniversitesi Tıp Fakültesi Araştırma Hastanesi Enfeksiyon Kliniğinde Mart-Haziran 2017 tarihleri arasında yatmış olan hastalar dahil edilmiştir (rutin olarak klinikte yapılan, vücut ısısı ölçümleri kullanılmıştır). 61 kadın-50 erkek toplam 111 hastaya ait vücut ısılarının ölçülmesi suretiyle çalışılmıştır. Enfeksiyon servisine yatırılan erişkin hastaların (18=<..) timpanik membran ve aksiller bölgelerindeki vücut ısıları eş zamanlı olarak her iki termometre ile ölçülmüştür. Ölçüm materyali olarak Covidien marka timpanik termometre ve mikro life TM3001 marka aksiller termometreler kullanılmıştır. Termometrelerin kalibrasyonları yapılarak, her 10 günde bir Tıbbi Biyokimya Laboratuvarında doğrulamaları yapılmıştır. Vücut ısı ölçüm periyotları, hastaları takip eden hekim tarafından belirlenmiş olup çalışma boyunca takip edilmiştir. Ölçüm şekli Covidien marka timpanik termometre membrana yakınlaştırılarak 2 sn. kadar sinyal alınması beklenmiş ve dijital ekrandaki skala kayıt edilmiştir. Mikro life TM3001 marka termometre ise aksiller bölgeye konarak 3 dk. kadar beklenerek dijital ekrandaki skala kayıt edilmiştir. karşılıklı olarak termometrelerle ölçülerek kayıt altına alınmıştır. Ölçüm periyotları form düzenlenerek (yaş, Cinsiyet, Tanı, Hastanede kalış süresi) ve istatistiksel analizleri yapılarak termometrelerin ölçüm doğrulukları, kullanım konforları (uygulayan ve uygulatan) açısından değerlendirilmiştir.

Termometreler, vücut ısısı ölçümlerinde önemli birer ekipmandırlar. Isı ölçümü yapılırken, hastayı rahatsız etmeyecek ölçüm yapan hemşirelik hizmetleri için de uygulaması pratik ve rantabl olmalıdır. Yapılan ölçümler sonucu timpanik membran ölçümü zaman açısından kısa ve ortalama vücut ısı değerine daha yakın bulunmuştur. Ölçüm konforu hasta/hemşire bakımından daha iyidir. Fakat bu ölçümde bazı ölçüm yanlışlıkları olma olasılığı yüksektir. Şöyle ki, hasta yatar pozisyondaysa ölçümden önce oturur veya ayakta duruş pozisyonunda 11-12 dakika dinlenmesi gerekir ki gerçek anlamda termometrenin skala değeri doğru olarak algılsın. Özellikle yatalak durumdaki hastaların vücut içi sıcaklığın değerlendirilmesinde endike olabilir. Aksiller termometrelerde ölçüm skala değeri timpanik membran termometresine göre -0.2 santigrat derece daha düşük göstermektedir. Aynı zamanda hastanın aksiller bölgede stabil tutması da güçtür. Hemşireler açısından bekleme süresi fazla olduğundan (üç dakika) kullanım konforu daha düşüktür. İstatistiksel çalışmalarda görüldüğü gibi timpanik membran ve aksiller termometreler arasında ölçüm skalası bazında çok önemli bir fark vardır $P < 0,05$ den olduğu görülmektedir. Gece ve gündüz ölçümlerinde her iki termometrede de anlamlı farklılıklar mevcuttur. Cinsiyet bakımından kadın/erkek vücut ısılarında çok önemli bir fark yoktur. Fakat kadınlarda her iki termometrede de erkeklere göre vücut ısıları biraz daha yüksek seyretmektedir. Bu da kadınların fizyolojik/hormonal parametrelerindeki farklılıktan kaynaklandığı düşünülmektedir. Evlerde aksiller termometre kullanımı daha uygundur.

Anahtar Kelimeler: Termometre, Vücut iç Isısı, Aksiller, Temporal

Is technology a tipping point for employment?

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Abstract

New technologies have always caused concern among people. Due to the fast advancing technology and the fact that robots are a part of everyday life, people are wondering whether they are going to be employed. In recent times, the most important argument is that technology will destroy a large number of jobs. In this study, the impact of technology on employment is analyzed by regression equation using 10 independent variables and stated that whether future occupations will be able to take the place of disappearing occupations. This study aims to understand the effects of robots and technology on employment.

According to the IFR (International Federation of Robotics) , 22 countries with relatively more robots in the manufacturing industry are selected. In this context, the other factors are also taken into account and their employment effects are analyzed. Number of robots (nor), innovation index (ii) and high technology export (hte), network readiness index (nri), availability of latest technologies (alt), firm-level technology absorption (fta), capacity for innovation (ci), ICT use for business-to-business transactions (ICT), impact of ICTs on business models (ICT2), share of workforce employed in knowledge-intensive activities (wf, as percent) are chosen as independent variables. Employment (emp) is considered as dependent variable in this study. The regression equation is constructed using the variables.

According to the regression equation, R square is founded as 0.83. But adjusted r square is founded as 0.67. Independent variables can explain more than 67% of the dependent variable meaning. Considering the all independent variables together, it is observed that there is an effect on employment but this effect is not direct. The results show that employment is not only affected by technological factors. Many other reasons for employment need to be analyzed. For happiness index, regression analysis is done. R square is founded as 0.86. It can be said that technology has a powerful influence on happiness only when this value is taken into consideration. However, when adjusted r square is taken into account, it is seen that independent variables can explain more than 70% of the dependent variable meaning as a whole due to the large number of independent variables. Although, happiness indexes of examined countries seem to be close to each other and happiness values seem quite good for these countries, other factors affecting the result must also be considered.

Keywords: *Employment, technology, robots happiness.*

Performance of the Copper Based Grinding Wheels

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Abstract

The present study relates to design of grinding wheels in terms of improving their performance with respect to surface quality of glasses during grinding. The performance of the copper based grinding tools was investigated on the production line in a flat glass factory. Tools were manufactured under selected sintering temperature and pressure circumstances. The grinding wheel economic service life was determined and the surface roughnesses of the samples were assessed with experimental study. Ideal microstructure conditions and grinding parameters were figured out.

Keywords –Glass, Grinding, Grinding wheel life, Surface roughness

Özet

Bu çalışma taşlama esnasında düz camın yüzey kalitesine bağlı olarak, taşlama disklerinin performansını arttırmak için taşlama taşı dizaynı ile ilgilidir. Bakır esaslı taşlama diskinin performansı, cam fabrikasında üretim hatlarında yapılan çalışmalarda incelenmiştir. Kullanılan taşlama diskleri belirlenen sinterleme sıcaklığında ve basınç koşullarında üretildiler. Taşlama disklerinin ekonomik servis ömürleri deneysel olarak işlenen camların yüzey kalitesine göre belirlenmiştir. Elde edilen deneysel sonuçlar ile taşlama diskinin ideal mikro yapısı ile çalışma parametreleri belirlenmiştir.

Keywords –Cam, Taşlama, Taşlama diski ömrü, Yüzey pürüzlülüğü

Derin Öğrenme ile Arttırılmış Gerçeklik Uygulamaları

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Özet

Arttırılmış gerçeklik (AG), sanal gerçekliğin (SG) tümüyle yapay yapısından farklı olarak, kullanıcıya gerçek dünyayı izlerken gördüğü görüntünün üzerinde sanal objeler yerleştirerek çalışır. AG'nin ilk uygulamalarında bunu yapmak için önceden tanımlı bir desen kullanılır, bu desen üzerine obje yerleştirmekle yetinilirdi. Desenin kameradaki duruşu objeye de yön vermekteydi. Desenin eğitilmesi ve görüntü içerisinde yakalanması basit işlemlerdi. Daha sonraları yapay sinir ağları (YSA) ile eğitilen sistemlerde kullanılan özellik vektörleri sayesinde karmaşık desenler kullanılabilmiştir. Derin öğrenme yapay zekâ uygulamalarında devrim niteliğinde bir tekniktir. Yüksek hata oranlarıyla çalışan YSA'lara göre bu teknik insan beyninin tanıma özelliklerinin de üzerine çıkmaktadır. Derin öğrenme kullanan AG uygulamalarında desen yerine, üzerinde bilgi gösterilecek objenin eğitilmesi gerekmektedir. Örneğin kaynak nesne bir insan eli olduğunda herhangi bir insan eline ait farklı duruşların hepsinde tanıma gerçekleştirilebilir. Bu olanak sayesinde AG'nin geleceğinde derin öğrenme etkin olacağı açıktır.

Anahtar Kelimeler – Arttırılmış Gerçeklik, Sanal Gerçeklik, Derin Öğrenme, İşaretçiler

Abstract

Unlike the totally artificial structure of the virtual reality, the augmented reality (AR) works by placing virtual objects on user's vision while he/she watching the real world. In the first applications of AR, a pre-defined pattern is used to do this, which is sufficient to place objects on the pattern. The position of the pattern in the camera was also giving direction to the object. It was a simple process of training the pattern and capturing it in the image. Afterwards owing to feature vectors used in systems which are trained by artificial neural networks, complex patterns can be used. Deep learning is a revolutionary technique in artificial intelligence applications. According to neural networks which are working with high error rates, this technique exceeds the recognition properties of the human brain. Instead of using a pattern, augmented reality applications that are use deep learning need to be educated an object which an information shown on it. For example, when the source object is a human hand, recognition can be performed in all of the different positions of any human hand. It is clear that deep learning will be effective in the future of the augmented reality.

Keywords – Augmented Reality, Virtual Reality, Deep Learning, Markers

Laser Welding of Ti Alloys for Dental Applications: Microstructural Characterization

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Abstract

Titanium alloys have high mechanical and corrosion resistance, in pure state as well as they are flexible and biodegradable. Thanks to these features, it has wide application in the automotive and aircraft industry and in the health sector. It is necessary to apply welding to titanium and its alloys according to application places and types. Many types of welds are used for titanium and its alloys, but the laser welding process is difficult. In this study, we investigated the microstructure and strength of Nd: YAG lasers. Our aim is to see and improve the laser welding properties of titanium alloys and to obtain appropriate parameters for welding.

We researched of the Ti6Al4V alloy laser welding in studies were made. Differences between base metal, heat affected zone and weld zone were determined. It has been researched what kind of changes in microstructures are taken and how the laser source was made correctly. We examined how laser welding changes the hardness and what are the changes in the weld stitch and microstructure according to the different parameters applied.

We made a study and welded titanium alloys sheets with laser beam and examined the microstructure of welding zone. In the future study we will work on titanium rods welding and their hardness. If appropriate welding conditions are provide, the areas of use of titanium can be reproduced and improved. We can perform more convenient welding operations using laser welding.

Keywords: *titanium alloy, laser welding, dental applications*

Kesir Dereceli Kayan Kipli Kontrolcü ile Dört Rotorlu İnsansız Hava Aracının (İHA) Yörünge Kontrolü

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Özet

Bu çalışmada dört rotorlu İnsansız hava aracı (İHA) olarak adlandırılan bir quadrotorun yörünge takibi için kesir dereceli kayan kipli kontrolcü yapısı benzetim ortamında test edilmiştir.

İHA'lar doğrusal olmayan yapıya sahiptir ve bu tip sistemlerin kontrolü için yüksek performanslı kontrolcü tasarımı gerekmektedir. Dört rotorlu quadrotorun kontrolü için sistem dinamikleri, yapısal ve yapısal olmayan kısıtlarda göz önüne alındığında gürbüz kontrolörlere ihtiyaç duyulmaktadır. Bu amaçla Kesir Dereceli Kayan Kipli Kontrolcü (KDKKK) tasarımı ele alınmıştır. Doğrusal olmayan sistem iç döngü (duruş kontrolü) ve dış döngü (konum kontrolü) olarak kaskad yapıda bağlı iki doğrusal alt sistem olarak ele alınmıştır. Sistemi kaskad yapıda birleştirmek için ara kontrol işareti kullanılmıştır. Tasarlanan KDKKK'nün performansını kıyaslamak için parametreleri iyi ayarlanmış bir PI kontrolcü aynı yörüngeler için İHA'ya uygulanmıştır.

Benzetim sonuçları, KDKKK'nün PI denetleyiciyle karşılaştırıldığında hata giderme açısından tatmin edici performans gösterdiğini göstermektedir.

Anahtar Kelimeler: İHA, Quadrotor, Kesir dereceli kayan kipli kontrolcü.

Trajectory Tracking Control of a Four-Rotor Unmanned Aerial Vehicle (UAV) Using Fractional Order Sliding-Mode Control

Abstract

In this study, a fractional order sliding mode controller structure is presented for trajectory tracking control of a four rotor unmanned aerial vehicle (UAV) called the Quadrotor.

The UAVs have a nonlinear structure and a high performance controller design is required to control such systems. Robust controllers are needed when considering system dynamics and structural and non-structural constraints for four-rotor quadrotor control. For this purpose, the design of the Fractional Order Sliding Mode Controller (FOSMC) has been considered. The nonlinear system is considered as two linear subsystems connected in cascade as inner loop (position control) and outer loop (position control). A virtual control term is used to connect the system to the cascade structure. A well-tuned PI controller was applied to the UAV for the same trajectories to compare the performance of the designed FOSMC.

The simulation results show that the FOSMC is performing satisfactorily in terms of error elimination when compared to the PI controller.

Keywords: UAV, Quadrotor, Fractional Sliding Mode Controller.

Akıllı Şebekelerde Güvenli Haberleşme Tabanlı Güç Akışı Analizi

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Özet

Günümüzde güç sistemleri çalışma limitleri sınırlarında çalıştırılmaktadır. Şebekelere bağlanan, değişken karakteristik gösteren, lineer olmayan yükler ve bunu karşılamaya çalışan değişken karakteristik gösteren üretim santralleri arasında kararlılık limitleri dâhilinde üretim ve tüketim dengesi gözetilerek bir işletme yapılması oldukça zor bir mühendislik problemi. Bu durum elektrik güç sistemlerinin analizini her geçen gün daha da zorlaştırmaktadır. Elektrik güç sistem planlaması yapılırken sürekli yük akışı analizlerinin yapılması sistemin kararlı, güvenilir ve ekonomik olarak işletilmesinde önemli bir fonksiyona sahiptir. Güç sistemi yönetiminin gerçek zamanlı olarak yük ve üretim tarafında koordineli ve güvenilir olarak yapılması günümüzde akıllı şebeke çalışmaları kapsamında incelenmektedir. Akıllı şebeke çalışmaları kapsamında, bilgi sistemleri ile modernize edilen güç sistemleri dış tehditlere açık hale gelmektedir. Şebekenin siber saldırı olarak nitelenen bu tehditlere karşı dirençli olması stratejik öneme sahiptir. Akıllı şebeke çalışmaları içerisinde siber saldırılara açıklık konusu oldukça önemli bir çalışma alanına sahiptir. Bu çalışmada akıllı şebeke dinamik güç sistemi analiz ilkelerine uygun ve güvenli haberleşme tabanlı bir güç akışı yönetim sistemi geliştirilmiştir.

Tasarlanan güç akışı yönetim sistemi Java tabanlı olarak geliştirilmiş olup güç akışları Newton-Raphson, Gauss-Seidel ve Fast Decoupled gibi farklı sayısal yöntemler kullanılarak gerçekleştirilmiştir. Tasarlanan güç akışı yönetim sisteminin çalışma başarımı, gün içi değişken üretim ve tüketim değerlerine sahip IEEE 9 Bara, IEEE 14 Bara ve IEEE 30 Bara modelleri üzerinden RSA şifreleme yöntemi uygulanarak ortaya koyulmuştur. Bu çalışmada baraya bağlı olan elektriksel birimlerin anlık parametre paylaşımları, seçilen ağ topolojisine ve IEEE modeli parametre değerlerine uygun olarak talep alma, planlama ve devreye alma üzere üç aşama halinde RSA şifreli olarak yapılmıştır.

Güvenli haberleşme güç akışı yönetim sisteminde analizleri yapılan IEEE güç sistemleri modelleri için sistemin çalışma başarımı, kararlılık limitleri dâhilinde yapılan güç akışı sonuçları ve RSA haberleşme paket alışverişinin oluşturulan haberleşme paketlerini eksiksiz bir şekilde gerçekleştirilmiş olması ile ölçülmüştür. İncelenen güç sistemleri için yapılan güç akışı analizlerinin bara gerilimi ve güç değeri kararlılık marjlerinde olduğu gösterilmiştir. Aynı şekilde belirlenen ağ topolojisine uygun, RSA veri şifrelemeli paket alışverişlerinin tüm modeller için başarılı olarak uygulandığı ortaya koyulmuştur.

Anahtar Kelimeler: akıllı şebekeler, güvenli haberleşme, güç akışı analizi, Java

Secure Communication Based Power Flow Analysis in Smart Grids

Abstract

Nowadays power systems are operated within the working limits. Design of an operator is a very difficult engineering problem considering the production and consumption balance within the limits of stability between the variable characteristics of the network and the variable characteristics of the production plants which are trying to respond this load with non-linear loads. This situation makes the analysis of electric power systems more difficult every day. The continuous load flow analyzes have an important function in the stable, reliable and economical operation of the system when the electric power system is planned. The coordination and reliability of the power system management in real time on the load side and the production side is now being investigated within the context of smart grid operations. Within the context of smart grid operations, power systems modernized by information systems are becoming vulnerable to external threats. The fact that the grid is resistant to these threats, which are described as cyber attacks, has a strategic

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importance. The cyber attack openness concept has a very important working area in smart grid studies. In this study, a power flow management system based on smart grid dynamic power system analysis principles and a secure communication base has been developed.

The designed power flow management system is Java based and power flows have been realized by using different numerical methods such as Newton-Raphson, Gauss-Seidel and Fast Decoupled. The performance of the designed power flow management system is demonstrated by applying RSA encryption method over IEEE 9 busbar, IEEE 14 busbar and IEEE 30 busbar models with variable production and consumption values throughout the day. In this study, the instantaneous parameter sharing of the electrical units connected to the bar is done in RSA encrypted in three stages as request taking, planning and commissioning in accordance with the selected network topology and IEEE model parameter values.

For models of IEEE power systems analyzed in a secure communication power flow management system, the system's performance was scaled by the power flow results within the stability limits and the RSA communication packet exchanges fully accomplished the generated communication packets. It has been shown that the bar voltage and power rating of power flow analyzes performed for the power systems studied are in the stability margins. Likewise it has been demonstrated that packet exchange with RSA data encryption suited to the specified network topology has been applied successfully for all the models.

Keywords: *smart grid, secure communication, power flow analysis, Java*

Derin Öğrenme ile Hayvanların Sınıflandırılması

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Özet

Bu çalışmadaki amaç farklı derin öğrenme modelleri ile 14 farklı hayvanın sınıflandırılması gerçekleştirmektir.

Yapay zekânın bir alanı olan Derin Öğrenme son yıllarda geniş bir yelpazede kullanılmaktadır. Özellikle görüntü işleme, ses tanımlama ve doğal dil işleme alanlarında ileri düzeyde kullanılmaktadır. Görüntü analizinde geniş bir alanda kullanılmasının en önemli sebeplerinden biri görüntü için özellik çıkarma işlemi kendisinin yapması ve yüksek doğrulukta sonuç vermesidir. Her bir görüntü için farklı seviyelerde temsiller oluşturarak öğrenme işlemi gerçekleştirmektedir. Diğer makine öğrenmesi yöntemlerindeki gibi görüntüler üzerinde bir uzman yardımıyla özellik çıkarma işlemine ihtiyaç duymamaktadır. Görüntüler üzerinde özellik çıkarımını kendisi yapmaktadır. Derin öğrenme modellerinin temel mimarisi olan Convolution Neural Network (CNN) farklı katmanlardan oluşmaktadır. Bunlar; Convolution Layer, ReLu Layer, Pooling Layer ve Full Connected Layer. Derin öğrenme modelleri bu katmanları farklı sayıda kullanarak tasarlanmaktadır. Bu çalışma kapsamında AlexNet ve VggNet modelleri kullanılacaktır. AlexNet mimarisi toplam 21 katmandan oluşmaktadır. İlk convolution katmanında filtre boyutu 11x11 ve adım kaydırma sayısı ise 4'tür. VggNet ise toplam 41 katmandan oluşmaktadır. İlk convolution katmanında filtre boyutu 3x3 ve adım kaydırma sayısı ise 1'dir.

Bu çalışmada toplam 14 farklı hayvanın sınıflandırılması yapılmıştır. Bu hayvanlar sırasıyla; At, Deve, İnek, Keçi, Koyun, Kurt, Köpek, Kedi, Geyik, Domuz, Ayı, Leopar, Fil, Kanguru olarak belirlenmiştir. Hayvanların içerisinden çoğunlukla, karayollarında araç seyir halindeyken yola çıkabilecek olanlar seçilmiştir ve buna göre veri seti oluşturulmuştur. Çünkü iler ki çalışmalarda araç otonom sürüş için alt yapının bir kısmı bu ön çalışma ile gerçekleştirilmek istenmektedir. Hayvanlara ait görüntüler internet ortamında renkli (RGB) olarak toplanmıştır. Veri çeşitliliğinin artırılması için hazır veri setleri içerisinden de resimler alınmıştır. Her bir hayvan için 125 eğitim ve 25 test verisi olmak üzere toplamda 150 görüntü toplanmıştır. Veri setini oluşturacak 14 farklı hayvan için $14 \times 150 = 2100$ adet görüntü elde edilmiştir. Her bir görüntü 32x32, 64x64, 224x224 çözünürlükte olacak şekilde 3 farklı veri seti oluşturulmuştur. Deneysel çalışmalar için 3 farklı çözünürlükteki veri seti için toplamda $3 \times 1950 = 5850$ adet görüntü hazırlanmıştır.

Yapılan çalışma sonucunda hayvanların sınıflandırılması VggNet ile %91,2 doğrulukta ve AlexNet ile %67,65 doğrulukta gerçekleşmiştir. AlexNet'teki hata oranının yüksek olması ağıdaki katman sayısının az olması ve parametre değerlerinin yüksek seçilmesidir. Örneğin AlexNet mimarisindeki convolution katmanındaki filtre boyutu 11x11 ve adım kayma değeri 4 olması katmanlar arasındaki veri kaybına sebep olmaktadır. Buna karşı VggNet'te filtre boyutu 3x3 ve adım kayma sayısı 1 olduğu için bir sonraki katmana aktarımda veri kaybı yaşanmamaktadır.

Anahtar Kelimeler: AlexNet, CNN, Derin Öğrenme, Sınıflandırma, VggNet

Classification of Animals with Deep Learning

Abstract

The purpose of this study is that using different deep learning models for classification of 14 different animals.

Deep Learning, an area of artificial intelligence, has been used in a wide range of recent years. Especially, it using in advanced level of image processing, voice recognition and natural language processing fields. One of the most important reasons for using a large field in image analysis is that it performs the feature extraction itself on the image and gives high accuracy results. It performs learning by creating at different levels representations for each image. Unlike other machine learning methods, there is no need of an expert for feature extraction on the images. Convolution Neural

Network (CNN), which is the basic architecture of deep learning models, consists of different layers. These are Convolution Layer, ReLu Layer, Pooling Layer and Full Connected Layer. Deep learning models are designed using different numbers of these layers. AlexNet and VggNet models used in this study. AlexNet architecture consists of 21 layers. In the first convolution layer, the filter size is 11x11 and the number of stride is 4. VggNet consists of 41 layers. In the first convolution layer, the filter size is 3x3 and the number of stride is 1.

In this study, 14 different animals were classified. These animals are Horse, Camel, Cow, Goat, Sheep, Wolf, Dog, Cat, Deer, Pig, Bear, Leopard, Elephant and Kangaroo respectively. Animals that are most likely to encounter when during driving road were selected. Because thinking this work to be a preliminary work for the control of autonomous vehicle driving. The images of animals are collected in color (RGB) on the internet. In order to increase the data diversity, images were also taken from the ready data sets. A total of 150 images were collected with 125 training and 25 test data for each animal. For 14 different animals $14 * 150 = 2100$ images were obtained thus data set was created. Three different data sets have been created, with each image having a resolution of 32x32, 64x64, 224x224. For the experimental studies, $3 * 2100 = 6300$ images were prepared for 3 different resolution data sets.

As a result of the study, the classification of the animals was realized with 91.2% accuracy with VggNet and 67.65% with AlexNet. The high error rate in AlexNet is due to the small number of layers in the network and the high selection of parameter values. For example, the filter size in the convolution layer in AlexNet architecture is 11x11 and the number of stride is 4. This situation causes data loss in transferring the information to the next layer. In contrast, VggNet has a filter size of 3x3 and a number of steps of 1, there is no data loss in the transfer to the next layer.

Keywords: *Classification, Deep Learning, AlexNet, VggNet, CNN*

DI Bir Dizel Motorunda Optimum Buhar Püskürtme Oranı ve Yakıt Püskürtme Zamanının Taguchi Metodu ile Deneysel Olarak Belirlenmesi

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Özet

Dizel motorlarının çalışma prensibi gereği atmosfere saldığı NO_x ve PM emisyon değerleri oldukça yüksektir. NO_x emisyonlarının oluşumuna neden olan en büyük etken silindir içi yanma sonu ulaşılan yüksek sıcaklıklardır. NO_x emisyonlarını azaltmak için silindir içi sıcaklığın düşürülmesi gerekmektedir. Ancak, silindir içi sıcaklığın düşürülmesi, motor performansını ve diğer emisyonları olumsuz yönde etkilemektedir. Dolayısıyla NO_x emisyonlarını azaltırken performansın olumsuz etkilenmemesini sağlayan tekniklerin geliştirilmesi gerekmektedir. Bu tekniklerden biri buhar enjeksiyonu yöntemidir. Bu çalışmada, Taguchi deneysel tasarım yöntemi kullanılarak, tam yük şartlarında, farklı motor devirlerinde çalışan bir DI dizel motoruna farklı oranlarda buhar enjeksiyonu ve yakıt püskürtme avansı değerlerinde yakıt enjeksiyonu yapılmasının motor performans ve emisyon karakteristiklerine etkisi deneysel olarak araştırılmıştır. Her bir motor parametresi için optimum faktör seviyeleri Taguchi yöntemi ile belirlenmiştir. Motor performans ve NO_x emisyonları açısından optimum değerler S20, 32 KA_o (ÜÖN' dan önce) ve 1600 d/d olarak tespit edilmiştir. Bu şartlarda çalışan motorda standart motor verilerine göre performans parametrelerinde iyileşmeler, NO_x emisyonlarında dikkate değer oranlarda azalmaların meydana geldiği tespit edilmiştir.

Anahtar Kelimeler: Taguchi yöntemi, Buhar enjeksiyonu, Püskürtme avansı, Performans, Emisyonlar

Determination with Taguchi Method of Optimum Steam Injection Rate and Fuel Injection Timing in a DI Diesel Engine Experimentally

Abstract

Due to the operating principle of the diesel engines, release in to atmosphere NO_x and PM emissions is high. The greatest cause for the formation of NO_x emissions is the high temperature values reached at the end of the cylinder combustion. In order to reduce NO_x emissions, the temperature inside the cylinder must be reduced. However, the reduction in cylinder temperature affects engine performance and other emissions negatively. Techniques need to be developed to ensure that NO_x emissions are reduced while performance is not adversely affected. One of these techniques is steam injection. In this study, the effect of steam injection and fuel injection timing at different ratios on engine performance and emission characteristics for a DI diesel engine operating under full load conditions at different engine speeds was experimentally investigated using the Taguchi experimental design method. The optimum factor levels for each engine parameter are determined by the Taguchi method. In terms of engine performance and NO_x emissions, optimum values were determined as S20, 32 oCA (bTDC) and 1600 rpm. It has been found that the engine operating under these conditions improves performance parameters and reduces NO_x emissions considerably compared to standard engine data.

Keywords: Taguchi method, Steam injection, Fuel injection timing, Engine performance, Emissions

Cuckoo Search Algorithm for Optimal Choice of Free Knots in B-Spline Data Fitting

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Abstract

Fitting data points to curves commonly known as curve reconstruction a significant problem in computer aided design/manufacturing (CAD/CAM). This problem is frequently encountered in the field of reverse engineering where a free-form parametric curve (typically a B-spline) with a set of (usually a high-dimensional and noisy) data points, obtained by 3D laser scanning, has to be fitted. Although there are a number of methods to come up with this problem, until now there has not been a satisfactory general solution to the problem. The aim of this study is to solve the problem of curve fitting with the cuckoo search method (CSA).

In this study, the cuckoo search algorithm (CSA), one of the optimization methods inspired by a bird species named cuckoo that leave their eggs in the nest of other host birds, is used to solve the problem of curve fitting. Reverse engineering is used to obtain the curve from the data points. In addition, the knot positions and number of knot are free variables of the problem in the estimation of the curve, and these parameters are randomly selected in the search space by the CSA method. In this way, the curve estimate with the smallest error rate is aimed to obtain in this study. Five different functions frequently used in the literature for curve fitting are preferred in the experimental studies.

In the experimental results, the original curve and the predicted curve for each function are presented comparatively, and the results obtained show that for most functions, the curves predicted by the CSA method produce very similar results to the original curve.

Keywords: *B-Spline Curve Fitting, Cuckoo Search algorithm (CSA), Free knot placement, Optimization, Reverse Engineering*

Farklı Yaş Gruplarındaki İnsanların Derin Öğrenme ile Sınıflandırılması

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Amaç: Bu çalışmadaki amaç farklı yaş gruplarındaki insan görüntülerinin derin öğrenme modellerinden olan VggNet ile sınıflandırılmasının gerçekleştirilmesidir.

Materyel ve Metod: Yapay zeka, makine öğrenmesi ve Bilgisayarlı görme alanlarında son yıllarda çok ileri derecede çalışmalar gerçekleştirilmektedir. Kuşkusuz bu çalışmaların hızlıca ilerlemesinde Derin Öğrenmenin büyük katkısı olmaktadır. Derin öğrenme temeli geçmişe dayansa da 2012 yılında yapılan imageNet yarışmasıyla popüler hale gelmiştir. Çünkü görsel nesne tanımlamada %26 .1 olan hata oranı ilk defa o yıl Derin öğrenme ile keskin bir düşüşle %15.3'e inmiştir. Convolution Neural Network (CNN) derin öğrenme modellerinin temelini oluşturmaktadır. Temelde 4 katmandan oluşmaktadır. Bunlar; Convolution Layer, ReLu Layer, Pooling Layer ve Full Connected Layer. Derin öğrenme modelleri bu katmanları farklı sayıda kullanarak tasarlanmaktadır.

Bu çalışmada insanlar yaş gruplarına göre; erkek, bayan, yaşlı erkek, yaşlı bayan, erkek yüzü, bayan yüzü, erkek çocuk, kız çocuk, erkek çocuk yüzü, kız çocuk yüzü olacak şekilde 12 sınıfa ayrılmıştır. 12 farklı yaş kategorisindeki insanlar için öncelikle veri seti oluşturulmuştur. Her bir sınıftan 150 resim toplamda ise 1800 görüntü toplanmıştır. Bu görüntülerin %90'nı eğitim kalan %10'nu ise test için kullanılmıştır. Derin Öğrenme mimarilerinden olan VggNet oluşturulan bu veri seti ile eğitilmiştir. Eğitimi gerçekleştirilen model ile test yapılarak ilgili resimdeki insanın yaş grubu tahmin edilmektedir.

Sonuç: Yapılan çalışma sonucunda farklı yaş grubundaki insanların VggNet derin öğrenme modeli ile %78,5 doğrulukta tahmin edildiği görülmüştür. Derin öğrenme modellerinin doğası gereği büyük veri ile eğitilmesi gerekliliği düşünüldüğünde az veri ile de belli bir değerde eğitim başarısı sağlandığı görülmüştür.

Anahtar Kelimeler: CNN, Derin Öğrenme, Sınıflandırma, VggNet

Classification of Different Age Groups of People by Using Deep Learning

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Abstract

The purpose of this study is to classify human images of different age groups with VggNet which is one of the deep learning models.

Artificial intelligence, machine learning and computer vision have been carried out in recent years at very advanced level. Undoubtedly, it is a great contribution of Deep Learning in the rapid progress of these studies. Although Deep Learning foundational is based on past history, It has become popular in the imageNet competition held in 2012. This is because the error rate of 26.1% for visual object description has fallen to 15.3% for the first time with a sharp decline that year with Deep Learning. The Convolution Neural Network (CNN) basis of deep learning models. It is basically composed of 4 layers. These are Convolution Layer, ReLu Layer, Pooling Layer and Full Connected Layer. Deep learning models are designed using different numbers of these layers.

In this study, people are divided into 12 classes according to age groups. These classes are man, woman, man face, woman face, old man, old woman, old man face, old woman face, boy, girl, boy face, girl face respectively. A new data set was created for people in 12 different age categories. For Each class 150 and totally 1800 images were collected. 90% of these images were used for training and the remaining 10% were used for testing. VggNet which of the Deep Learning model, was trained with this data set. The age group of the person in the picture is estimated by testing with the training model.

As a result of the study, it was seen that people in different age groups were estimated with 78.5% accuracy with VggNet deep learning model. Deep learning models need to be trained with large data required. But it has been seen that training success has achieved a certain value with little data.

Keywords: Classification, Deep Learning, VggNet, CNN,

Salp Swarm Algorithm for Synthesis of Concentric Circular Antenna Arrays

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Abstract

Circular antenna array has a great popularity in communication field. This study is basically concerned with the synthesis of concentric circular antenna arrays (CCAAs) with the low sidelobe levels at a fixed beamwidth based on Salp Swarm Algorithm (SSA) methods. SSA is a relatively new population based evolutionary optimization algorithm. The main aim of this work is to simultaneous reduction in Side Lobe Level (SLL) and a fixed half power beam width (HPBW).

Concentric Circular Antenna Array (CCAA) has many important features that must be used in mobile and wireless communication. CCAA is capable of scanning electronically its main beam in the plane of the array without significant degradation of the array pattern as illustrated in Figure 1. CCAA also has a good flexibility in terms of array pattern synthesis both in narrowband and in broadband applications. In this study, a new and alternative algorithm SSA is used to synthesis of CCAA with the low sidelobe levels at a fixed beamwidth. In addition, examples with single, multiple, and broad nulls are given to demonstrate the flexibility and performance of the proposed algorithm.

The inspiration of SSA is the swarming behaviour of salps when navigating and foraging in oceans. Salps belong to the family of Salpidae and have transparent barrel-shaped body. Their tissues is almost the same as that of jelly fishes and move like them. The shape of a salp is shown in Figure 2 (a). In deep oceans, salps often form a swarm called salp chain. This chain is illustrated in Figure 2 (b). In the SSA swarm model, the salps that come back are follow the leading salp which move towards to the food source.

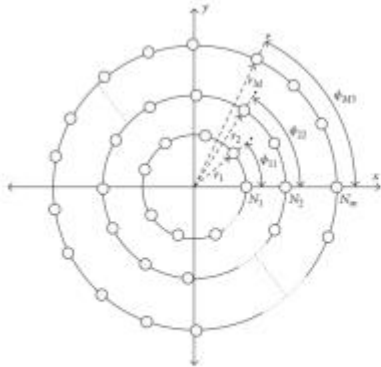


Figure 1. Geometry of a CCAA

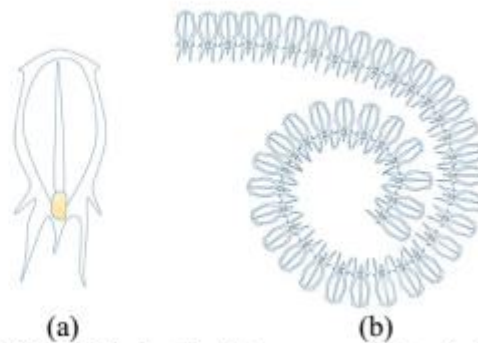


Figure 2. (a) Individual salp, (b) swarm of salps (salps chain).

In this study, a CCAA which has three rings is synthesized by using SSA for all examples. The number of innermost, middle, and outermost rings has 4, 6, and 8 array elements, respectively. In order to test the flexibility and performance of the algorithm, single, double, triple, and wide nulls on the sidelobe region of the pattern are also located by using SSA.

Keywords: concentric circular antenna, array synthesis, salp swarm algorithm, half power beam width

Polietilen Levhaların Sürtünme Karıştırma Nokta Kaynağında Takım Bekleme Süresinin Bağlantının Kopma Mukavemetine Etkileri

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Özet

Yüksek kimyasal dayanım, bakteri üretmeme, kolay temizlenebilme, yüksek aşınma dayanımı, düşük sürtünme katsayısı ve iyi kaynak kabiliyeti özelliklerinden dolayı yiyecek ve gıda endüstrisinde, kimya endüstrisinde, kâğıt sanayi ile kömür ve maden sanayisinde PE 300 polietilen plakalar yaygın kullanım alanı bulurlar. Bu çalışmada PE 300 polietilen plakaların sürtünme karıştırma nokta kaynağında takım bekleme süresinin kaynak mukavemetine etkisi araştırılmıştır. Bu amaçla kaynaklı parçaların; Çekme-makaslama deneyi ve makrayopı fotoğrafları alınmıştır. Çekme-makaslama deneyleri ile takım bekleme süresi değişiminin kaynak kopma kuvvetine etkisi; makro yapı fotoğrafları ile kaynak yapısının boyut tayini belirlenmiştir.

Anahtar Kelimeler: *Sürtünme Karıştırma Nokta Kaynağı, SKNK Parametreleri, Plastiklerin Sürtünme Karıştırma Nokta Kaynağı.*

Abstract

Because of its high chemical resistance, no bacteria, easy cleaning, high abrasion resistance, low coefficient of friction and good weldability, PE 300 polyethylene plates are widely used in the food industry, chemical industry, paper industry and coal and mining industry. In this study, the effect of welding duration of the tool on the friction stir welding point of PE 300 polyethylene plates was investigated. For this purpose, welded parts; Drawing-shear test and makeropi photos were taken. The effect of pull-shear tests and the change of tool waiting time on the weld breaking strength; the size specification of the weld structure was determined by macro structure photographs.

Key words: *Friction Mixing Point Welding, SKNK Parameters, Friction Mixing Point Welding of Plastics.*

Chemical characterization and biological activity evaluation of essential oils of *Achillea spikorensis*, an endemic plant from Turkey

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Abstract

In this work, it was aimed to investigate the *in-vitro* antioxidant, antimicrobial and cytotoxic activity of essential oil derived from *Achillea spikorensis*.

The essential oil was obtained from dried aerial parts of *A. spikorensis* by hydro- distillation method for about 3 hours with a Clevenger-type apparatus. The chemical composition of essential oil was characterized by gas chromatography (GC) and gas chromatography-mass spectrometry (GC-MS), respectively.

Obtained results Show that the essential oil of *A. spikorensis* exhibited good biological activity such as antioxidant, antimicrobial and cytotoxicity. The results of our study will provide research data for further utilization of *Achillea* species in preparing pharmaceutical preparations or in food industries as preservatives.

Keywords: *Achillea spikorensis*, GC/MS, antioxidant activity, antimicrobial activity, cytotoxicity

Modeling and Control of DC-DC Buck Converter using PEM Fuel Cell

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Abstract

This paper is focused on the comparison between PI and One-Cycle Control that is carried out in terms of design and performance for buck converter using PEM Fuel Cell. Buck converters can step-down the input voltage and give the load. These converters have been used various fields due to their properties of simply design and low cost especially high output-low input facilities. This paper aims at designing of a buck converter using PI Control and OCC Methods for constant voltage that is supplied by PEM Fuel Cell.

This paper focuses on the design and simulation results of buck converter between using of PI control method and One Cycle Control method for providing 5 V_{dc} constant output voltage for 40V DC input voltage via PEM full cell. The design has been implemented as changes of input voltage, reference voltage and load values.

The conventional PI control scheme has slow dynamic response to power source perturbation. Another modulation strategy known as One-Cycle Control overcomes this subsistent drawback of PI control and achieves good power source perturbation rejection and fast dynamic response. In this study, the system is designed for 40V to 5V DC-DC Buck Converter that is supplied by PEM Fuel Cell. Designed circuits are tested and simulated on MATLAB/Simulink program. Simulation results are provided to verify the conclusions.

Keywords: *Buck Converter, PI Control, OCC, PEM Full Cell*

Elliptical Antenna Array Synthesis Using Grasshopper Optimization Algorithm

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Abstract

The design of the elliptical antenna arrays is a relatively new research area in the antenna array community. Grasshopper Optimization Algorithm (GOA) is employed for the synthesis of elliptical antenna arrays having different number of array elements. GOA is a newly released optimization algorithm. For the aim of elliptical antenna array synthesis, GOA is used to calculate the optimum angular position and amplitude values of the array elements. In this paper, the problems are solved by using antenna array synthesis together with maximum sidelobe levels (MSL) and half-power beam width (HPBW) constraints. The proposed algorithm mathematically models and mimics the behaviour of grasshopper swarms in nature for solving optimization problems.

Antenna arrays may differ in their geometry. They are generally classified by considering these geometrical differences: Linear, planar, circular, concentric circular, and elliptical antenna arrays are the examples of these groups. Several method have been used in the synthesis of elliptical antenna arrays. An elliptical antenna array was examined in a detailed manner. This elliptical array has equally spaced elements and its main beam was toward to the array normal. Figure 1 shows the geometry of an elliptical antenna array with isotropic elements numbered by N and located on x-y plane.

The optimization algorithm we will use in this study is GOA. Grasshopper are insects. Grasshoppers moving in search space and they find possible solution for a problem. Figure 2 shows the life cycle of the Grasshoppers as the egg, nymph, and adult stages. The first term of GOA, the sum, considers the position of other grasshoppers and implements the interaction of grasshoppers in nature. The second term, simulates their tendency to move towards the source of food.

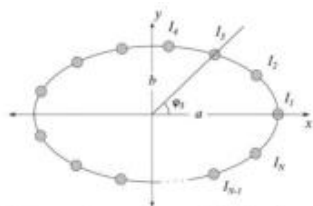


Figure 1. Geometry of an elliptical antenna array



Figure 2. (a) A real grasshopper. (b) Life cycle of grasshoppers

In this study, elliptical antenna arrays with 8, 12, and 20 isotropic elements are synthesized by using GOA. MSL and HPBW values were obtained by using new optimization algorithm GOA. In order to achieve the desired patterns, the angular position and amplitude values of the antenna array elements are optimally obtained by GOA. The results show that GOA is very successful optimization algorithm in the synthesis of elliptical antenna arrays.

Keywords: elliptical antenna, array synthesis, grasshopper optimization algorithm, maximum sidelobe levels

MgO-ZrO₂ Termal Bariyer Çemberli Bir Buji Ateşlemeli Motora Su Fumigasyonun Etkilerinin İncelenmesi

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Özet

Buji ateşlemeli motorlarda en önemli kirletici emisyonlardan biri kısmi eksik yanma ürünü olan HC emisyonlarıdır. Silindir içerisinde HC emisyonlarının oluşmasına neden olan birçok farklı kaynak olmakla birlikte silindir cidarına yakın soğuk bölgeler (alev sönme bölgeleri) ana kaynaklardır. Çalışmada alev sönme bölgelerinden kaynaklanan HC emisyonlarının azaltılması için piston başında ısı rezervi yüksek MgO-ZrO₂ seramik malzeme ile termal bariyer çember (TBÇ) oluşturulmuştur. TBÇ sonucunda silindir içerisinde sıcaklıklar arttığından vuruntu temayülü ve NO_x emisyonları olumsuz yönde etkilenmektedir. Bunun önlenmesi için çalışmada motor emme manifolduna su fumigasyonu tekniği uygulanmıştır. Deneysel çalışmalar sonucunda standart motor verilerine göre TBÇ' li motorda HC emisyonlarında önemli miktarda azalma, motor momenti, efektif gücü, özgül yakıt sarfiyatı ve efektif verimde iyileşmelerin olduğu, NO_x emisyonlarında ise artmaların olduğu gözlemlenmiştir. Motora yakıt tüketiminin farklı kütle oranlarında (%10, 20 ve 30) su fumigasyonu gerçekleştirildiğinde, standart motor verilerine göre, HC ve NO_x emisyonları ve motor performans parametrelerinde iyileşmelerin olduğu tespit edilmiştir.

Anahtar Kelimeler: Termal bariyer çember, HC, NO_x, Su enjeksiyonu, Motor performans

Investigation of the Effects of Water Fumigation on a SI Engine with MgO-ZrO₂ Thermal Barrier Layer

Abstract

One of the most important pollutant emissions in spark-ignition engines is partial incomplete combustion product HC emissions. Many different sources causing HC emissions in the cylinder, the cold zones (flame retarding zones) close to the cylinder wall are the main sources. In the study, a thermal barrier layer (TBL) with a high heat reserve MgO-ZrO₂ ceramic material was formed at the piston head to reduce the HC emissions from the flame extinction zones. As a result of the TBL, the knocking tendency and the NO_x emissions are affected negatively because the temperatures inside the cylinder increase. In the study attempting to prevent this, a water fumigation technique has been applied. As a result of experimental studies, it has been observed that significant reductions in engine emissions, engine torque, effective power, specific fuel consumption and improvements in effective efficiency and increase in NO_x emissions are observed in the HC emissions from standard engines compared to standard engine data. When water fumigation is performed at different mass ratios (10, 20, and 30%) of motor fuel consumption, HC and NO_x emissions and engine performance parameters are improved compared to standard engine data.

Keywords: Thermal barrier layer, HC, NO_x, Water injection, Engine performance

Akıllı Uzmanlaşma Stratejisi Çerçevesinde Fırat Teknokent Bilişim Kümelenme Örneği

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Özet

Bugün dünyanın küreselleşmesinin evrensel gelişme aracı, bilişim teknolojileridir. Dolayısıyla, gelişmiş ülkelerde bilişim araçlarını kullanma kapasitesi hızla artmaktadır. Günümüzde akıllı teknolojik araçlar büyük bir hızla yaşamımızın bir parçası olmuştur. İleri teknoloji denilince akla gelen ilk kavram yazılım - bilişim teknolojileri olmaktadır. Sanayi devriminden sonra bilişim çağına uyum sağlamaya çalışan dünyamızda akıllı sistemler ve bu sistemleri yöneten stratejiler gelişmekte olan endüstriler açısından büyük önem taşımaktadır. Endüstri 4.0 ve Avrupa Birliğinin Horizon 2020 fon kaynaklarının dağıtımı için en önemli yönetim aracı olarak gördüğü “Akıllı Uzmanlaşma Stratejisi” kalkınma politikalarının uygulanması açısından Türkiye gibi gelişmekte olan ülkeler için büyük önem arz etmektedir. Artık her alanda ülkelerin gelişmiş toplum olabilmesinde bilişimin önemi tartışılmaz durumdadır. Türkiye genç nüfusu ve yeni teknolojilere, girişimlere açık kültürüyle bilişime oldukça önem vermektedir. Gelişmiş dünyada olduğu gibi Türkiye’de de, bölgesel kalkınma ekosistemin en önemli oyuncularından teknoloji geliştirme bölgeleri/teknokentlerin girişimciliği ülkenin kalkınması için önemini çoktan kanıtlamıştır. Türkiye’deki teknokentlerin nicelik ve niteliğindeki artış da bilişim sektörünün büyümesine olumlu katkı sağlamaktadır. Teknokentler bulunduğu bölgede ileri teknoloji yaratıcı sektörlerin ortaya çıkması, bu sektörlerin mikro kümelerini oluşturmak, yetenek ve yatırımcıları çekmek, istihdam yaratmak ve yüksek vasıflı yetenek havuzlarına erişmek için iyi koşullara sahiptir. Çünkü küme dinamikleri, bir bölgenin veya ülkenin ekonomik, endüstriyel ve teknolojik uzmanlaşması için önemli bir güçtür. Avrupa Birliği tarafından desteklenen ve Akıllı Uzmanlaşma Stratejisine odaklanan yeni bölgesel yenilik stratejileri bağlamında, kümelenmeler bölgenin güçlü yönlerini ve yeni sektör potansiyellerini ortaya çıkarmada önemli bir araçtır.

Bu çalışmada, Türkiye’deki teknokentlerin küme oluşumundaki rolü, akıllı uzmanlaşma ile ilişkisi incelenecektir. Dünyada ve Türkiye’de bilişim kümesi oluşturan teknokentlerin bölgenin kalkınmasındaki potansiyeli, ve özellikle Fırat Teknokent’in son 5 yıllık bilişim kümesi oluşturma potansiyeli analiz edilerek, bilişim kümesinin durumu, istihdam kapasitesindeki artış, teknokent imkanlarını kullanımı ve büyüme potansiyeli rakamsal veriler kullanılarak analiz edilecektir.

Anahtar kelimeler: Teknokentler, Kümelenme, Akıllı Uzmanlaşma, Bilişim Kümesi.

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The Case of Fırat Technopark ICT Cluster in the framework of Smart Specialization Strategy

Abstract

Today, the universal development tool of the globalization in the world is ICT. Therefore, the capacity of using advanced tools of ICT in developed countries is increasing rapidly. Intelligent technological tools have become a part of our lives. Intelligent systems in our world that try to adapt to the era of information after the industrial revolution and the strategies governing these systems have a great importance in terms of emerging industries. Industry 4.0 and Smart Specialization Strategy, which is the most important management tool for the distribution of Horizon 2020 fund resources of the European Union, also have importance for developing countries like Turkey in terms of implementation of development policies.

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Now the awareness of the knowledge is unquestionable that every inhabitant countries can be developed society. Turkey attaches great importance to the youth population and new technologies and initiatives with open culture in ICT. Just as in the developed world, in Turkey, the entrepreneurship of technology development zones / technoparks as one of the most important players of the regional development ecosystem has already proved its importance for the development of the country. The increase in the quantity and quality of the technoparks in Turkey also contributes positively to the growth of the ICT sector. The emergence of high-tech creative industries in the region of technoparks have good conditions for creating micro-clusters of these sectors, attracting talent and investors, creating employment and accessing high-skilled talent pools. Because cluster dynamics are an important power for the economic, industrial and technological specialization of a region or country. In the context of new regional innovation strategies supported by the European Union and focused on the Smart Specialization Strategy, clusters are an important tool for discover the regional strengths and potentials of new emerging sector.

In this study, we will investigate the role of technoparks in Turkey, which forming cluster in relation to smart specialization. Also we will analyse the potential of ICT technoparks in the world and Turkey in the development of region, the potential of Fırat Teknokent to create a ICT cluster for the last 5 years, the state of the ICT cluster, the increase in employment capacity, the exploit of technoparks facilities and cluster growth capability.

Keywords: *Technoparks, Cluster, Smart Specialization, ICT Cluster.*

Ti6Al4V Alaşımının Korozyon Davranışı ve İslanabilirliği Üzerine İnce Film Kaplamaların Etkisi

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Özet

Günümüzde Ti6Al4V alaşımının kullanımı özellikle biyomedikal alanda hızla artmaktadır. Bu durum Ti6Al4V üzerine yapılan çalışmaların da artmasına neden olmuştur. Ti6Al4V alaşımı biyomedikal alanda vücut içerisinde yaygın olarak kullanılmaktadır. Korozyon direncinin yüksek oluşu ve yüksek dayanıma sahip olması Ti6Al4V alaşımının vücut içerisinde kullanılmasının en önemli sebeplerindendir. Vücut içerisinde kullanıldığında insan sağlığı açısından hayati öneme sahip olan Ti6Al4V alaşımının ömrünü uzatmaya yönelik olarak çalışmalar devam etmektedir. Bu alanda yüzey kaplamaları önemli bir yere sahiptir.

Bu çalışmada, TiAlN, TiN kaplamaların Ti6Al4V alaşımından hazırlanan numunelerin korozyon direncine etkisi araştırılmıştır. Bunun için ringer çözeltisi içerisinde potansiyodinamik korozyon testleri yapılmış, Tafel analizleri ile korozyon akımı, korozyon potansiyeli ve korozyon hızı hakkında bilgiler elde edilmiştir. Ayrıca yüzey kaplamalarının ıslanabilirlik üzerindeki etkisi araştırılmıştır.

PVD (Fiziksel buhar biriktirme) metodu ile elde edilen sert seramik kaplamalar biyomedikal alanlarda (protez, cerrahi aletler, dişçilik malzemeleri gibi) yüksek sertlikleri, aşınma dirençleri, korozyon dirençleri, biyo uyumlulukları sebebiyle kullanılmaktadır. Bu çalışmada reaktif magnetron sıçratma metodu ile TiAlN, TiN kaplanmış ve kaplanmamış Ti6Al4V alaşımının korozyon davranışı incelenmiştir. Kaplama sonrası numunelerin karakterizasyon çalışmaları kapsamında kaplama kalınlığı tespiti, pürüzlülük, nanosertlik ölçümleri, SEM, AFM, EDX, XRD analizleri yapılmıştır. Korozyon deneyleri İVIUYM potansiyostat cihazında gerçekleştirilmiştir. Numunelerin korozyon davranışları hakkında bilgi edinebilmek amacıyla her bir numune için testler ortam koşullarında tekrarlanarak elde edilen sonuçlar karşılaştırılmıştır. Karşılaştırmalar, Potansiyodinamik polarizasyon eğrileri kullanılarak yapılmıştır. Bunun için de, her bir deneyin sonuçları kullanılarak Tafel eğrileri çizdirilmiş, eğriler üzerinde korozyon potansiyeli ve korozyon akımı belirlenmiştir. Biyomedikal malzemelerin üretiminde gün geçtikçe daha da önemli bir yer edinen Grade 5 (Ti6Al4V) alaşımının korozyon davranışı ve kaplamaların korozyon davranışı vücut ortam şartları oluşturularak incelenmiştir. Vücut içinde implantların çalışabilmesi aynı zamanda hidrofilik özelliklerine de bağlıdır. Bunu belirlemek amacıyla ganyometre yardımıyla test numunelerinin yüzeylerinde kontak açıları tayin edilmiştir. Yüzey kaplamalarının ıslanabilirlik üzerindeki etkisi araştırılmıştır.

Kaplamaların Ti6Al4V alaşımının korozyon direnci ve ıslanabilirliğine etkisini inceleyen araştırma sonucuna göre kaplamasız Ti6Al4V alaşımına göre TiAlN ve TiN kaplamalı alaşımın korozyon direnci bakımından daha yüksek değere sahip olduğu belirlenmiştir. Kaplamaların kontak açıları incelendiğinde değerlerin 90⁰ den düşük çıktığı tespit edilmiştir. Vücut içi ortamında kaplamalı alaşımın hidrofilik özellik sayesinde iyi performans göstereceği tespit edilmiştir.

Keywords: *Ti6Al4V, korozyon, ıslanabilirlik, kaplama*

The Effect of Thin Film Coatings on Corrosion Behavior and Wettability of Ti6Al4V Alloy

Abstract

Today, the use of Ti6Al4V alloy is increasing rapidly, especially in the biomedical field. This situation has resulted in the increase of studies on Ti6Al4V. Ti6Al4V alloy is widely used in the biomedical field in the body. The high corrosion resistance and high strength of Ti6Al4V alloy having one of the most importance in the use of the body. When used

in the body in order to extend the life of the Ti6Al4V alloy is vital work continues. Surface coatings have an important place in this area.

In this study, the effect of TiAlN, TiN coatings on the corrosion resistance of samples prepared from Ti6Al4V alloy was investigated. For this, potentiostatic corrosion tests were performed in the ringer solution, and Tafel analysis was used to obtain information on corrosion current, corrosion potential and corrosion rate. In addition, the effect of surface coatings on wettability has been investigated.

PVD (Physical vapor deposition) hard ceramic coatings have been widely used in the field of biomedical applications - such as surgical tools, implants, and materials used in dentistry because of excellent properties such as high hardness, good wear, corrosion and oxidation resistance, chemical stability and good bio-conformity .

In this study, the corrosion behavior of TiAlN, TiN coated and uncoated Ti6Al4V alloy was investigated by reactive magnetron sputtering method. Coating thickness determination, roughness, nanosertlik measurements, SEM, AFM, EDX, XRD analyzes were carried out in the characterization studies of the samples after coating. Corrosion tests were performed on the IVIUYM potentiostat device. In order to obtain information on corrosion behavior of the samples, the results obtained by repeating the tests in the ambient conditions for each sample were compared. The comparisons were made using potentiodynamic polarization curves. For this, tafel curves were drawn using the results of each experiment, the corrosion potential on the curves and the corrosion current were determined. The corrosion behavior of the Grade 5 (Ti6Al4V) alloy and the corrosion behavior of the coatings, which have become increasingly important in the production of biomedical materials, have been investigated by establishing the body environmental conditions. The ability of the implants to work within the body also depends on their hydrophilic properties. To determine this, contact angles were determined on the surfaces of the test specimens using a goniometer. The effect of surface coatings on wettability has been investigated.

According to the results of investigations on the effect of coatings on corrosion resistance and wettability of Ti6Al4V alloy, it was determined that TiAlN and TiN coated alloy have higher values of corrosion resistance than uncoated Ti6Al4V alloy.

When the contact angle of the coatings was examined, it was determined that the values were lowered by 90⁰ deg. It has been determined that in the body environment the coating will perform well due to the hydrophilic nature of the alloy.

Keywords: *Ti6Al4V, corrosion, wettability, coating*

Kentsel Alan ve Gelişmişlik Arasındaki İlişkinin Gece Görüntüleri ve Sosyo-ekonomik Göstergeler Kullanılarak İncelenmesi

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Özet

Köyden kente göçün yoğun olarak yaşandığı ülkemizde şehir alanlarında gözle görülür bir artış olmuştur. Şehir alanlarında meydana gelen bu artışın kentin sosyal, kültürel ve ekonomik özellikleri üzerindeki etkileri kaçınılmazdır. Çalışmamızda Türkiye deki illerin 2010 yılına kentsel alanların ortaya çıkarılması ve bu kentsel alanın kentin Sosyo-ekonomik göstergelerle ilişkinin CBS teknolojileri kullanılarak irdelenmesi amaçlanmıştır.

Çalışmamızda kentsel alanların tespit edilmesinde 2010 yılına ait gece görüntüleri kullanılmıştır. Gece görüntüleri A.B.D. Hava Kuvvetleri Meteorolojik Uydu Programı tarafından oluşturulan görüntülerdir. Sosyo-ekonomik gelişmişlik sıralamasında kullanılan göstergeleri ise Türkiye İstatistik Kurumundan temin edilmiştir. Çalışma üç kısımdan oluşmaktadır. İlk kısımda 2010 yılına ait gece görüntüleri hücre tabanlı sınıflandırma yöntemine göre sınıflandırılarak kentsel alanlar ortaya çıkarılmıştır. İkinci kısımda Temel Bileşenler Analizine göre illere ait Sosyo-ekonomik göstergeler kullanılarak illerin gelişmişlik sıralaması elde edilmiştir. Son kısımda ise kentsel alanlar ile Sosyo-ekonomik gelişmişlik arasındaki ilişki istatistiksel analizler yapılarak ortaya çıkarılmıştır. Gelişmişlik ve kentsel alan arasındaki ilişkinin yönünü ve derecesini belirlemek için korelasyon analizi yapılmıştır. Bunun yanında Sosyo-ekonomik göstergelerin kentsel alanı açıklama oranını ve etkisini belirlemek için doğrusal regresyon analizi uygulanmıştır. Bu analizlerin yanı sıra alandaki değişkenlerin mekânsal dağılımını ve otokorelasyonunun tespiti için Moran I analizi yapılmıştır. Moran I analizi incelenen özelliğin mekânsal korelasyon içinde olup olmadığı hakkında bilgi veren ve yaygın olarak kullanılan bir yöntemdir.

Kentsel alan sonuçlarına göre en büyük kentsel alana sahip illerin ülkenin batı ve orta kısmında yer aldıkları görülmüştür. Benzer şekilde gelişmişlik sıralaması üst sıradaki iller ülkenin batı kesimine doğru yoğunlaşırken, az gelişmiş iller doğu ve güneydoğu bölgelerinde olduğu sonucu ortaya çıkmıştır. Sosyo-ekonomik göstergeler ve kentsel alan arasındaki doğrusal regresyon sonuçlarında kentsel alanı en yüksek açıklama oranına sahip gösterge grubunun demografik ve mali göstergeler olduğu ortaya çıkarılmıştır. Demografik göstergeler içerisinde en yüksek değere sahip gösterge 'şehirleşme oranı' olurken, mali göstergeler içerisinde 'sanayi üretiminin yurtiçi hasıladaki oranı' olmuştur. Moran I sonuçları incelendiğinde hem Sosyo-ekonomik gelişmişliğin hem de kentsel alanın mekânsal otokorelasyon içinde olduğu ortaya çıkmıştır.

Anahtar Kelimeler: Çoklu Doğrusal Regresyon, Gece Görüntüleri, Kentsel Alan, Moran I, Sosyo-Ekonomik Gelişmişlik

Analysis of the Relationship between Urban Area and Development by Using Night Images and Socio-Economic Indicators

Abstract

There is a visible increase in the urban areas in our country where the immigration from the village to the city is experienced intensely. This increase in the urban areas affects the social, cultural and economic characteristics of the city. In our study, it was aimed to reveal the urban areas in Turkey in 2010 and to investigate the relationship between this urban area and the socio-economic indicators of the city by using GIS technologies.

In our study, night time images of 2010 were used in determining the urban areas. Night time images are images created by the United States Air Force Meteorological Satellite Program. The indicators used in the socio-economic development order are obtained from the Turkish Statistical Institute. Our study consists of three parts. In the first part, night images of 2010 were classified according to the cell-based classification method and urban areas were obtained. In the second part, socio economic indicators were used to obtain the order of development of the provinces according

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to the Principal Component Analysis. In the last part, the relationship between urban areas and socio-economic development has been revealed by making statistical analyzes. A correlation analysis was conducted to determine the degree and extent of the relationship between development and urban area. In addition, multiple linear regression analysis was used to determine the impact of socio-economic indicators on the urban area. In addition to these analyzes, Moran's I analysis was used to determine the spatial distribution and autocorrelation of the variables in the area. Moran I analysis is a widely used method that provides information about whether the examined feature is in spatial correlation.

According to the results of the urban area, it is seen that the provinces having the largest urban area are located in the western and central part of the country. In the same way, developed provinces are concentrated towards the western part of the country, while the less developed provinces are located in eastern and southeastern regions. When the results of linear regression between socio-economic indicators and urban area are examined, it is seen that demographic and financial indicators explain urban area at high level. The highest value among the demographic indicators is the 'urbanization rate' and the highest value among the financial indicators is the 'domestic output ratio of industrial production'. When the results of Moran were examined, it was revealed that both socio-economic development and urban area showed spatial autocorrelation.

Keywords: *Multiple Linear Regression, Night Time Images, Urban Areas, Moran I, Socio-Economic Development*

The Effect of Cold Rolling on Mechanical Properties of Zircaloy-4

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Abstract

In this study, Zircaloy-4 rods are heat treated and cold rolled to different (15%, 30%, 45%, 60%, and 75%) reduction ratios to determine the effect of heat treatment and cold rolling on micro and nano scale mechanical properties of Zircaloy-4.

Micro scale mechanical properties are investigated by micro Vickers hardness tester and nano scale mechanical properties are studied by universal mechanical tester (UMT). Fracture surfaces of samples are illustrated by scanning electron microscope (SEM). Microstructure of samples are evaluated by optical microscope.

It is found that hardness increased with increasing cold rolling reduction ratio both in micro and nano scale. Nano scale measurements showed that the elastic modulus is increased with increasing reduction ratio. Increase in hardness and elastic modulus altered the fracture from ductile to brittle. Fracture mode for samples are determined as mixed mode.

Keywords: Zircaloy-4, UMT, cold rolling, mechanical properties

The Effect of Production Parameters on Secondary Dendrite Arm Spacing (SDAS) and Estimation of Cooling Rate by SDAS in Functionally Graded Al-Cu Eutectic Alloy

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Abstract

In this study, the effect of production parameters (G number, casting atmosphere, and cooling rate) on secondary dendrite arm spacing (SDAS) and estimation of cooling rate by SDAS in functionally graded Al-Cu eutectic alloy are investigated.

Functionally graded Al-Cu eutectic alloy is fabricated by centrifugal casting method. Different productions are carried out by changing cooling rate, G number and casting atmosphere. Cooling rate is controlled by a novel mold design and 0,09 K/s, 1,04 K/s, 1,96 K/s and 2,82 K/s cooling rates are obtained by using this mold. 10, 20 and 30 G numbers are obtained by changing the mold rotation speed. Air and 200 mBar vacuum atmospheres are preferred as casting atmospheres. SDASs are measured by Leica Application Suite V 4.6 image analysis software. Apparent interlamellar spacing is used in measurements.

It is found that cooling rate alteration has a significantly influence on SDAS. In addition to this, G number and casting atmosphere effected the SDAS by effecting the cooling rate. SDAS increased with the decreasing of cooling rate. Successful results are obtained in cooling rate estimation.

Keywords: *Aluminum alloys, FGM, SDAS, cooling rate*

Atıksu Arıtımında Kullanılan ve Atık Olarak Çıkan Sucul Bitkilerin Geri Kazanımının Değerlendirilmesi

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Özet

Bu çalışmada, atıksu arıtımında kullanılan ve atık olarak çıkan sucul bitkilerin geri kazanımının değerlendirilmesi tartışılmıştır.

Literatürde atıksuların arıtımında farklı arıtma metotları kullanılarak atıksulardan kirleticilerin uzaklaştırılması konusunda yapılan çalışmalar bulunmaktadır. Atıksu arıtımında biyolojik süreçler, kimyasal arıtma, membran sistemler vb. gibi birçok arıtma yöntemi kullanılmaktadır. Ancak, bu tür arıtma yöntemleri enerji maliyetleri ve işletme masraflarının yüksek olması, her türlü su kütlesine uygulanamamasından dolayı fazla tercih edilmemektedir.

Bu nedenle, fazla insan gücü gerektirmeyen, işletilme ve enerji maliyeti düşük olan ve hemen hemen her türlü su kütlesi için uygulanabilen doğal arıtma sistemleri kirleticilerin gideriminde kullanılabilir (Şekil 1). Doğal arıtma sistemlerinde yaygın olarak sucul bitkilerle arıtım kullanılmaktadır. Çünkü, sucul bitkilerle arıtma diğer ileri arıtma yöntemleri ile karşılaştırıldığında oldukça ekonomiktir. Hasatlanan bitkiler ise biyogaz üretiminde ve alternatif bir yakıt olarak biyoetanol üretiminde değerlendirilebilir. Ayrıca, hasatlanan sucul bitkiler piroliz işlemine tabi tutularak biyopetrol ve biyokömür üretiminde de kullanılabilir ve böylece çıkan atıkların geri kazanımı sağlanabilir.



Şekil 1. Atıksu arıtımında sucul bitkiler

Anahtar Kelimeler: Sucul bitki, arıtma, atık, geri kazanım

Evaluation of Recovery of Aquatic Plants Used in Wastewater Treatment and Discharged as Waste

Abstract

In this study, the evaluation of the recovery of aquatic plants used in wastewater treatment and and discharged as waste is discussed.

There are studies in the literature about the removal of pollutants from wastewaters by using different treatment methods in wastewater treatment. Many treatment methods are used in wastewater treatment as biological processes, chemical treatment, membrane systems and so on. However, such treatment methods are not preferred because of high energy costs and high operating costs, which can not be applied to all kinds of water bodies. Therefore, natural treatment systems, which do not require much human power, can be applied to almost any kind of water mass with low operating costs and energy costs, can be used for the disposal of pollutants (Fig 1). In natural treatment systems, treatment with aquatic plants is generally used. Because, treatment with aquatic plants are quite economical when compared with other advanced treatment methods. Harvested plants can be evaluated in biogas production and bioethanol production as an alternative fuel. In addition, harvested aquatic plants can be used in biopetrol and biochar production by subjecting to pyrolysis treatment, thus recovering of the discharged wastes can be ensured.

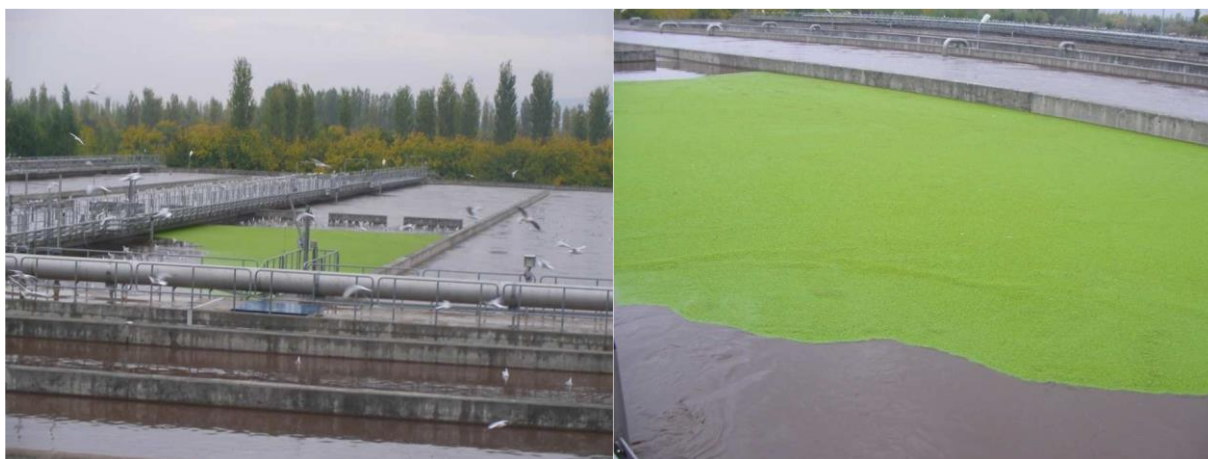


Fig1. Aquatic plants in wastewater treatment

Keywords: *Aquatic plant, treatment, waste, recovery*

Atık Alüminyumdan Elde Edilen Matrise Grafen Takviyesiyle Üretilen Kompozitlerin Özelliklerinin İncelenmesi

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Özet

Alüminyum ve alaşımları sahip olduğu üstün fiziksel ve mekanik özelliklerinden dolayı, inşaat, havacılık, uzay ve ulaştırma gibi birçok alanda kullanılmaktadır. Son yıllarda bu alanlarda kullanılan alüminyum atıklarının geri dönüşümü, hem doğal kaynakların hem de enerji kaynaklarının kullanımını azaltacağından çevrenin korunması açısından önemlidir. Gelişen teknoloji ile beraber malzemelerden daha yüksek mekanik özellikler gerektiğinden dolayı alüminyumun grafen takviyesi ile kompozit olarak üretimi önemli hale gelmiştir. İki boyutlu, karbon allotropu bir yapı olan grafen, hafifliği, yüksek mukavemet ve aşınma direnci gibi özellikleri nedeniyle kompozit üretiminde son yıllarda önemli bir takviye elemanı haline gelmiştir. Bu çalışmada, grafen takviyesinin atık alüminyumdan üretilen kompozitlerin sertlik ve mikro yapısına olan etkisinin ne olduğunun ortaya çıkarılması amaçlanmıştır.

Bu çalışmada, atık alüminyumdan elde edilen matrise ağırlıkça %0.1, %0.3 ve %0.5 oranlarında grafen ilave edilerek karıştırmalı döküm yöntemi ile üretilen kompozitlerin yoğunluk, sertlik ve mikroyapıları incelenmiştir. Kompozitlerin kristal yapıları X-ışını difraktometresiyle (XRD), mikro yapıları ise taramalı elektron mikroskopuyla (SEM) analiz edilmiştir.

Grafen yüzde ağırlık oranının artmasıyla sertlik, 70 HV'den 80,05 HV'ye yükselmiş ve en yüksek sertlik %0.1 takviye oranında elde edilmiştir. Bu oranın üzerindeki ilavelerde ise matrise göre sertlik değerleri daha fazla olmasına rağmen, artan grafen miktarıyla topaklanma eğiliminin artması sonucu sertliğin düştüğü belirlenmiştir. Yapılan mikroyapı analizlerinden grafen plakaların Al tane sınırlarına yerleştiği ve homojen dağıldığı görülmüştür.

Anahtar Kelimeler: Atık alüminyum içecek kutusu, grafen, alüminyum matrisli kompozit, karıştırmalı döküm, sertlik, mikroyapı

Investigation of Properties of Composites Produced by Reinforcement Graphene Matrix Obtained from Waste Aluminium

Abstract

Aluminum and its alloys are used in many areas such as construction, aviation, space and transportation because of its superior physical and mechanical properties. Recycling of aluminum waste used in these areas in recent years is important in terms of protection of the environment as both natural sources and energy sources reduce the use. Since higher mechanical properties are required from materials along with developing technology, production of composite with aluminum graphene reinforcement has become important. As a twodimensional, carbon allotropic structure graphene has become an important reinforcement element in composite production due to its lightness, high strength and abrasion resistance. In this study effect of the graphene amount on composite hardness and microstructure which fabricated from waste aluminum beverage cans.

In this study, the composites were produced by stir casting method with graphene addition from 0.1%, 0.3% and 0.5% by weight. The matrix was obtained from waste aluminum beverage cans. Density, hardness and microstructures of composite were evaluated. The crystal structures of the composites were analyzed by X-ray diffractometry (XRD) and the micro-structures were analyzed by scanning electron microscope (SEM).

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The hardness increased from 70 HV to 80.05 HV and the highest hardness was obtained at the rate of 0.1% reinforcement. In the additions above this ratio, although the hardness values were higher than the matrix, the hardness decreased with increasing graphene amount due to agglomeration tendency. From the microstructure analyzes, it was observed that the graphene plates were placed on the Al grain boundaries and were homogeneously distributed in matrix.

Keywords: *Waste aluminium beverage can, graphene, aluminum matrix composite, stir casting, hardness, microstructur*

Patlatma Kaynaklı Yer Hareketi İçin Bilgisayar Yazılımının Geliştirilmesi

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Özet

Bu çalışmada, patlatma kaynaklı oluşan yer hareketlerinin (hava etkili ve direkt etkili) yapılar üzerindeki dinamik etkilerini incelemek için, hesaplarda kullanılacak olan yer hareketi ivme değerleri rastgele yöntem ile tahmini olarak elde edilmektedir. Patlatma etkili yer hareketinin modellenmesinde, patlatma kaynağına olan uzaklığa ve patlatma şarj ağırlığına bağlı olarak elde edilen pik ivme değerinden ve patlatma basıncının zaman zarf eğrisinden yararlanılmaktadır. Patlatma kaynaklı yer hareketi modelinin oluşturulması için stasyonier olmayan rastgele işlem yeterli bir yöntem olarak sunulmaktadır. Patlatma kaynaklı yer hareketini temsilen, yer hareketi ivme değerlerinin tahmin edilebilmesi için BlastGM (Artificial Generation of Blast Induced Ground Motion) adlı bir yazılım geliştirilmiştir. Bu yazılım sayesinde patlatmanın kaynağına olan uzaklığa ve patlatma gücüne bağlı olarak yapay ivme değerleri oluşturulabilmektedir. Ayrıca bu yazılımda, patlatma kaynaklı yer hareketine ait, hız-zaman, yerdeğiştirme-zaman, patlama basıncı-zaman grafikleri elde edilmektedir. Yapıların yakınında meydana gelen patlatmaların, çok etkili ani yer hareketlerine neden olduğu üretilen ivme değerlerinin incelenmesi ile görülmektedir.

Anahtar sözcükler: Patlatma, Patlatma Etkili Yer Hareketi, Rastgele İşlem, Zarf Fonksiyonu, Pik İvme

Developing Computer Software for Blast-Induced Ground Motion

Abstract

This study intended to obtain ground motion acceleration values due to blast-induced ground motions (air-induced and direct-induced) estimated by a random method. In order to model blast-induced ground motion, firstly, peak acceleration of ground motion acceleration and the time envelope curve function for the blast pressure were obtained from distance of the explosion center and the explosion charge weight and then blast-induced acceleration time history were established by using these factors. Non-stationary random process is presented as an appropriate method to be created blast induced ground motion model. As a representative of blast induced ground motion, the software named BlastGM (Artificial Generation of Blast induced Ground Motion) was developed by authors to predict ground motion acceleration values. Artificial acceleration values generated from the software depend on the charge weight and distance from the source of the explosion. Moreover, velocity-time, displacement-time and airblast pressure-time graphics of blast-induced ground motion are artificially obtained. According to the examination of synthetically generated acceleration values, it can be concluded that the explosions cause significant effective ground movements.

Key Words: Blast, Blast Induced Ground Motion, Random Process, Envelope Function, Peak Acceleration

Genetik Algoritma Kullanılarak Ağırlıklandırılmış Myriad Filtrelerin Optimizasyonu

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Özet

Bu çalışmada, doğrusal olmayan filtre yapılarından olan ağırlıklandırılmış Myriad filtre parametreleri Genetik algoritma yardımıyla belirlenmiş ve optimize edilmiştir. Bununla birlikte Genetik algoritmanın başarımı türeve dayalı klasik bir algoritma ile karşılaştırılmıştır.

Myriad filtre yapısı son yıllarda, dürtü gürültülü ortamlar (özellikle α -bağımlı gürültü) için güçlü bir doğrusal olmayan filtre yapısı olarak kullanılmaktadır. Bu filtre yapısı haberleşme, işaret ve görüntü işleme alanlarına başarıyla uygulanmıştır. α -bağımlı gürültü α 'nın $0 < \alpha \leq 2$ şeklindeki değişimine bağlıdır. Burada $\alpha=1$ durumunda oluşan gürültü Cauchy dağılımlı, $\alpha=2$ durumunda oluşan gürültü ise Gaussian dağılımlıdır. Evrimsel algoritmalar öğrenme, genelleme yapma, kolaylıkla farklı problemlere uygulanabilme ve gürültüye karşı toleranslarından dolayı farklı problemlerin çözümünde sıklıkla kullanılmaktadır. Bu çalışmada ağırlıklandırılmış Myriad filtrelerin evrimsel algoritmalarından olan Genetik Algoritma ile optimizasyonu ele alınmış ve bu algoritmanın performansı farklı karakteristikteki α -bağımlı gürültü durumlar için test edilmiştir.

Yapılan çalışmalar sonucunda, α -bağımlı gürültülü durumlar için Genetik algoritma kullanılarak düşük optimizasyon hatası ile Myriad filtre parametrelerinin tespit edilebileceği gözlenmiştir. Genel olarak değerlendirildiğinde Genetik algoritmanın Myriad filtrelerin optimizasyonunda başarılı oldukları tespit edilmiştir.

Anahtar kelimeler: Ağırlıklandırılmış Myriad filtre, α -bağımlı gürültü, Genetik algoritma,

Optimization of Weighted Myriad Filters using Genetic Algorithm

Abstract

In this study, the Weighted Myriad Filter parameters from nonlinear filter structures are determined and optimized with the aid of Genetic Algorithm. Also performance of Genetic Algorithm is compared with a derivative based classical algorithm.

Myriad filter structure has been used in recent years as a powerful nonlinear filter structure for impulsive noisy environments (especially α -stable noise). This filter structure has been successfully applied to the fields of communication, signal and image processing. The α -stable noise depends on the change of α in the form $0 < \alpha \leq 2$. In this case, the noise that occurs in case of $\alpha = 1$ is Cauchy and the noise that occurs in case of $\alpha = 2$ is Gaussian distributed. Evolutionary algorithms are frequently used to solve different problems due to learning, generalization, application of different problems easily and noise tolerance. In this study, Optimization of myriad filters by genetic algorithm from evolutionary algorithms are studied and this performance is tested for α -stable noise situations in different characteristics.

As a result of the studies made, for the α -stable noise cases, it has been observed that Myriad filter parameters can be detected with low optimization error by using Genetic algorithms. When evaluated generally, Genetic algorithm has been found to be successful in optimizing myriad filters.

Keywords: Weighted Myriad Filter, α -stable noise, Genetic Algorithm

Ekolojik Malzemeler Kullanarak Üretilen Isı Yalıtım Levhalarının Özelliklerinin İncelenmesi

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Özet

Günümüzde binalardaki enerji tasarrufunun en önemli bölümü ısı enerjisi tasarrufu oluşturmaktadır. Yapılarda ısı yalıtımı ancak doğru uygulanmış bir ısı yalıtımı ile sağlanabilmekte ve çatılarda da yapının sağlığını korumak amacıyla yalıtım işlemleri uygulanmaktadır. Yalıtım binanın ilk yalıtım maliyetini arttırmasıyla birlikte, işletme tasarrufu göz önüne alındığında birey ve ülke ekonomisine katkı sağlamaktadır. Ülkemizde önemli miktarlarda tarım ürünü üretilmekte ve bunların milyon ton bazında atıkları oluşmaktadır. Bu çalışma ile fındık kabuğu, tekstil atıkları, ayçekirdeği kabukları ve ağaç lifleri gibi atık olan ürünleri değerlendirerek standartlara da uygun olan yalıtım malzemesi üretilenmektedir.

Fındık kabuğu, tekstil atıkları, ayçekirdeği kabukları ve ağaç lifleri gibi atık olan ürünler ve bağlayıcı olarak ta epoksi reçine kullanılacaktır. Levha haline getirebilmek için tahtadan kalıplar, karışımın preslenip levha haline getirilebilmesi için universal test cihazı, ısı katsayısının tayini için termocupl Cihazı kullanılacaktır.

Ekolojik malzemelerle bağlayıcı olarak kullanılması planlanan epoksi reçine karıştırılarak kalıba alınacak ve oluşturulan karışım universal test cihazı yardımıyla preslenerek levha haline getirilecektir. Üretilen levhanın termokupl yöntemiyle ısı katsayısı tayin edilerek bulunan ısı katsayısının, standartlara uygunluğu kontrol edilecektir. Expanded polistren (eps), Extrude polistren (xps) gibi kullanılmakta olan ısı yalıtım levhalarının özellikleriyle karşılaştırılacaktır.

Türkiye’de harcanan enerjinin yaklaşık % 40’ı konutlarda tüketilmektedir. Bu enerjinin%80’i de ısınma amaçlıdır. Türkiye’de tüketilen enerjinin %65’inden fazlası ithal edilmektedir. Bu yüzden üretilen malzemeler yapılarda önemli oranda ısı tasarrufuna katkı sağlayacaktır. Üretilmesi planlanan ısı yalıtım levhaları ısı yalıtımı olarak kullanılan ve ithal olan emsalleri Expanded polistren (eps), Extrude polistren (xps) ye göre, ekonomik değeri az veya olmayan atık ürünlerden elde edilecektir.

Keywords: ekolojik malzeme, ısı yalıtımı

Investigation of Properties of Heat Insulation Plates Produced Using Ecological Materials

Abstract

Today, the most important part of the energy saving in the buildings is the heat energy saving. Thermal insulation of constructions can only be achieved by properly applied thermal insulation, and insulation should be assigned to protect the integrity of the insulation. Insulation contributes to the individual and the country's economy when it comes to operating savings, with the initial insulation cost increasing. Agricultural products are produced in significant quantities in our country and their waste amounts to some million tonnes. This study will evaluate the waste products such as hazelnut shells, textile wastes, sunflower husks and wood fibers and produce insulation material which is suitable to the standards.

Materials; waste products such as hazelnut shells, textile wastes, sunflower husks and wood fibers, epoxy resin intended to be used as binders, casting molds for making plates, universal tester for pressing the mixture into plates, thermocouple device for determination of heat coefficient.

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The epoxy resin is mixed with the eco-materials and the mold is taken. The formed mixture is pressed with the aid of universal tester and made into sheets. The heat coefficient is determined by the thermocouple method of the manufactured plate. The compliance of the obtained heat coefficient to the standards is checked. Expanded polystyrene (eps), Extrude polystyrene (xps), such as the use of heat insulation plates can be replaced

Approximately 40% of the energy consumed in Turkey is consumed in the houses. 80% of the energy is also used for heating. More than 65% of the energy consumed in Turkey is imported. This means that the materials produced will contribute to saving the heat considerably. heat insulation plates will be obtained from waste products that are used as heat insulation and imported from hundreds of local, economically valuable or non-economic items according to Expanded polystyrene (eps), Extruded polystyrene (xps).

Keywords: *ecological material, heat insulation*

Fosfojips ve Perlit Katkılı Sıvaların Su Emme Miktarlarının 2⁴ Deneysel Tasarım Yöntemiyle Belirlenmesi

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Özet

Dünya nüfusunun artmasına bağlı olarak, ekilebilir tarım alanlarının sınırlı oluşundan dolayı, daha fazla ürün elde etme yoluna gidilmiştir. Bu nedenle fosfatlı gübrelerin kullanımı artmıştır. Fosfat kayasının değerlendirilmesi ve fosforik asit üretimi sonrası fosfojips atık ürün olarak ortaya çıkmakta olup; önemli depolama problemleri yanında çevre kirliliğine de sebep olmaktadır. Perlit ısıyla genleşme özelliği olan, geliştirildiğinde çok hafif ve gözenekli hale geçen bir kayadır. Ham perlit kimyasal bileşimi itibarıyla silisli ve alüminyumlu bileşikler içerdiğinden kalsiyum esaslı bağlayıcılar ile kimyasal tepkimeye girerek hidrolik aktivite gösterir. Bu özelliği nedeniyle yapı sektöründe geniş çapta kullanılmaktadır. Bu çalışmada; sıva içerisine gübre fabrikası atığı olan fosfojips ve doğal bir mineral olan perlit katılarak oluşturulan malzemenin su emme kapasitesi incelenmiştir. Böylece hem yeni bir malzeme geliştirilmesi hemde çevre kirliliğinin azaltılması amaçlanmıştır.

Farklı oranlarda fosfojips ve perlit sıva içerisine katkı maddesi olarak eklenmiştir. 2⁴ tam faktöriyel tasarım kullanılarak optimizasyon yapılmıştır. ANOVA analizi yapılarak hangi faktörlerin etkili olduğu araştırılmıştır. Bu faktörlerin oluşturulan katkılı sıvanın su geçirgenliği üzerinde anlamlı bir etkisinin olup olmadığı incelenmiş ve optimum değerler tespit edilmiştir. Aynı zamanda Pareto çizelgesi de oluşturularak ana ve ikili etkileşimlerinin hesaplanan Pareto değerine göre anlamlılığı test edilmiştir. Deneysel çalışmalar sonucunda optimum katkı miktarları tespit edilmiştir.

Bu çalışmada perlit ve fosfojips katkılarının sıva harçlarının taze ve sertleşmiş haldeki özellikleri üzerindeki etkileri ve bu katıklar ile ısı yalıtım özelliğine sahip bir sıvanın yapılabirliği araştırılmıştır. Standartlara uygun karışım ve karışım sonrası fiziksel ve mekanik özellikler sağlanmıştır. Hazırlanan bu karışımların deney sonuçları karşılaştırılmış ve en iyi değerlere sahip sıva karışımı elde edilmiştir.

Anahtar Kelimeler: Sıva, perlit, fosfojips, deneysel tasarım

Determination of the Water Absorption Quantities of Plaster Containing Phosphogypsum and Perlite Using 2⁴ Full Factorial Design

Abstract

Due to the limited population of arable land due to the increase in world population, more crops have been acquired. For this reason, the use of phosphate fertilizers has increased. Phosphogypsum emerges as waste product after evaluation of phosphate rock and production of phosphoric acid; it causes environmental pollution as well as important storage problems. Perlite is a thermally expandable rock that becomes very light and porous when expanded. Since crude perlite contains chemical compounds of silicic and aluminum according to its chemical composition, it shows chemical activity by entering chemical reaction with calcium-based binders. Because of this feature, it is widely used in building sector. In this study; the water absorption capacity of the material formed by adding phosphite and perlite which is a mineral fertilizer plant in plaster was investigated. Thus, both new material development and environmental pollution reduction are aimed.

In this study, the water absorption capacity of the material formed by adding its industry waste phosphogypsum and natural mineral perlite to the plaster was investigated. Phosphogypsum and perlite added different rates. Optimized using 2⁴ full factorial design. ANOVA analysis was conducted to determine which factors were effective. The effect of these factors on the water permeability of the added plaster was investigated and optimum values were determined. At the

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same time, by creating a Pareto table, primary and binary interactions were tested for significance according to the calculated Pareto value. As a result of the experimental studies optimum amounts of additives have been determined.

This study examines the effects of perlite and fosfojips additives on the fresh and hardened properties of plaster putty and also the feasibility of a plaster which has these additives and heat insulation properties. Mixture and physical and mechanical properties after mixture conforming to standards have been provided. The test results of these mixtures have been compared and the plaster mixture with best values has been obtained.

Keywords: *Plaster, perlite, fosfojips, experimental design*

Siber Saldırı Yöntemleri ve Türkiye'nin Siber Güvenlik Mevcut Durum Analizi

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Özet

Bilişim teknolojilerinin hızlı gelişimi sayesinde artan bilgisayar ve İnternet kullanımı hayatın vazgeçilmez bir unsuru haline gelmiştir. Bilişim ve İnternetin dünyada bir anda yaygınlaşması kullanıcılara bir yandan kolaylık ve özgürlük tanırken, öte yandan oluşan güvenlik açıkları sebebiyle sistemlerin kötüye kullanılmasına sebep olmaktadır. Sistemlerden kaynaklanan bu güvenlik açıkları kişileri etkilerken kimi zaman da kişisel ölçekte alınmayan tedbirlerden dolayı sistemler de tehdit altında kalmaktadır. Nesnelerin İnternet'i (İnternet of Things, IoT) kavramı ile İnternete bağlanan cihaz sayısının da çok daha artması ve bu cihazların insanların hayatına dâhil olmasıyla güvenlik ihlallerine maruz kalma riskinin de aynı doğrultuda artacağı düşünülmektedir. Birbiriyle bağlantılı donanım, yazılım, sistem ve insanların İletişim ve/veya etkileşimde buldukları soyut veya somut alanı tarif eden siber uzay içerisinde alınan güvenlik tedbirlerinden özellikle son kullanıcının da haberinin olması ve bu konuda farkındalığının sağlanması giderek önem kazanmaktadır. Günümüzde çok çeşitli siber saldırı yöntemleri bulunmakta olup çalışmada bu siber saldırı yöntemleri incelenerek, Türkiye'de siber güvenlik durum analizi yapılmaktadır.

Anahtar Kelimeler – *Siber Güvenlik, Siber Saldırı Yöntemleri, Siber Uzay, Bilişim Sistemleri, Güvenlik*

Abstract

Computer and internet use that has increased by means of the rapid development of information technologies has become an essential component of life. Sudden spreading of information and internet across the world provides convenience and freedom to users on one hand, but leads to the misuse of systems due to security flaws on the other. These security flaws that are caused by systems not only affect individuals, but also threaten systems due to the failure of taking precautions on an individual scale from time to time. It is thought that as a result of the increase of the number of devices connected to internet thanks to the concept of Internet of Things (IoT) and involvement of these devices in people's lives; the risk of being exposed to security violations will increase in the same direction. The fact that security precautions taken within the cyber space that describes intangible or tangible areas where interconnected hardwares, softwares, systems and individuals communicate and/or interact are also known especially by end-users and an awareness is provided on this issue becomes more and more important. Today, there are various methods of cyber attacks and in this study these methods of cyber attacks are examined and situation analysis of cyber security in Turkey is carried out.

Keywords – *Cyber Security, Cyber Attack Methods, Cyber Space, Cyber Force, Information Systems, Security*

Meslek Yüksekokullarının Müfredat Programlarının Güncellenerek Endüstri 4.0'a Entegrasyonunun Sağlanması

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Özet

Endüstri son yıllarda sektörel gereksinimlerini hızlı, güvenilir ve yenilikçi bir anlayış ile karşılamaya çalışmaktadır. Bu nedenle sanayileşme çalışmaları, yüksek teknoloji stratejisine yönelik başlatılmış, siber-fiziksel sistemler ve dinamik veri işleme ile değer zincirlerinin uçtan uca bağlandığı, yeni bir sanayi reformu olan Endüstri 4.0 dönemine girmiştir. Türkiye'nin nitelikli işgücü yetiştiren, ürettiği değerleri ihraç eden ve hem bölgede hem uluslararası alanda söz sahibi bir ülke haline gelmesi için ilk adımın eğitim alanında atılması gerekmektedir. Ülkemizdeki işsizlik oranlarının büyük bir kısmını, yüksekokul mezunlarının oluşturduğu görülmektedir. Bu da gelişen teknolojiye uygun programların ve müfredatların güncellenmesi gerekliliğini ortaya koymaktadır. Özellikle sanayide düşük maliyet, yüksek kalite ve hızlı üretim odaklı yaklaşımların gündemde olması ileri teknolojileri kullanma zorunluluğunu ortaya çıkarmaktadır. Dolayısıyla MYO laboratuvarlarının Endüstri 4.0 felsefesine entegre edilecek şekilde müfredatların yenilenmesi gerekmektedir. Böylelikle Endüstri 4.0 müfredatına uygun programlardan mezun olanların, oluşturulan akıllı fabrikalarda kendi alanlarındaki branşlarda istihdam edilebilmeleri mümkün olabilecektir. Bu çalışma; Endüstri 4.0 reformlarına uyum sağlayabilecek elemanların yetiştirilmesi için yüksek öğretim programlarının güncellenmesinin gerekliliğine dikkat çekmek amacıyla yapılmıştır.

Her türlü bilimsel bilgi ve beceri düzeyine sahip, teknolojiyi kullanabilen, çağdaş, nitelikli, takım çalışması yapabilen, etik değerlere sahip, reel sektörün ihtiyaçlarına cevap verebilecek güvenilir ara elemanları yetiştirme hedefi olan Meslek Yüksekokulları (MYO)'nın öğretim programlarının, son yıllarda çok çabuk değişen endüstri koşullarına ayak uydurabilmesi için, yeniden gözden geçirilmesi gerekmektedir. MYO-Sanayi işbirliği kapsamında laboratuvarların geliştirilmesi için her ne kadar protokoller yapılmış olsa da beklenen düzeyde verim alınamamıştır. Dolayısıyla Endüstri 4.0'a adapte olmuş sektörlerde, mevcut programlardan mezun olanların istihdam edilmeleri mümkün görülmemektedir. Bu kapsamda özellikle veri analizi, yazılım, siber güvenlik, robotik uygulamalar, mekatronik, dijital iş süreçleri gibi alanlarda donanımlı eleman ihtiyacı olacaktır. Teknik okulların; Mekatronik, Elektrik, Elektronik, Otomotiv, Makine, Bilgisayar Programcılığı, Lojistik gibi programların müfredatlarının Endüstri 4.0'a uyumlu hale getirilmesi öngörülmektedir.

Bu çalışmada, dördüncü sanayi devrimi mantığı çerçevesinde hazırlanacak olan yeni müfredat programlarının uygulanmasıyla birlikte Endüstri 4.0 kavramını bilen ve dünyayı daha entegre bir yer haline getirmeyi hedefleyen, mühendis ve teknisyen arasında görev yapacak olan, tekniker unvanına sahip, donanımlı eleman ihtiyacının karşılanmasının ülkemiz için elzem olduğu görülmektedir. Teknik ve mesleki alanda yapılan literatür taramaları, teknik okulların her yıl öğrencilerine yaptırdığı endüstriye dayalı eğitim uygulamaları, yüksekokul mezunlarıyla ve sektörün önde gelen temsilcileriyle yapılan mülakatlar neticesinde Endüstri 4.0 dönüşümünün gerçekleşebilmesi için akıllı cihaz ve sistemler kadar, yetişmiş insan kaynağının da çok önemli olduğunu düşünülmektedir.

Anahtar Kelimeler: Endüstri 4.0, Meslek Yüksekokulları, Öğretim Programı

Providing the Integration of Vocational Colleges to Industry 4.0 by Updating the Curriculum Programs

Abstract

In recent years, the industry has been trying to meet its sectorial needs with a fast, reliable and innovative understanding. For this reason, industrialization studies have entered into a new industry reform, Industry 4.0, in which the value chains are ultimately linked to cyber-physical systems and dynamic data processing, initiated towards high-tech strategy.

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Looking at the unemployment rates in our country, it is seen that the college graduates constitute a high rate. This work; It was done in order to draw attention to the necessity of updating the higher education programs in order to train the personnel who can adapt to the industrial 4.0 reforms.

The curriculum programs of Vocational Colleges, which have all kinds of scientific knowledge and skill level, can use technology, are modern, qualified, able to work in teams, have ethical values and can respond to real sector needs, it needs to be re-audited so that it can keep up with industry conditions. Although protocols have been made for the development of laboratories within the scope of university- industry cooperation, the expected yield has not been obtained. Especially in the industry, low cost, high quality and fast production oriented approaches are on the agenda, necessitating the use of advanced technologies. Therefore, curriculum updates must be made so that it can be integrated into the philosophy of industry 4.0 of the Vocational Colleges laboratories. In this way, students graduated from these schools will be able to be employed in the factories in their own fields in the smart factories that are created.

In this study, it seems that it is essential for our country to meet the need for qualified staff with the title of technician who will work with the engineer and technician who knows the concept of industry 4.0 and aims to make the world a more integrated place with the implementation of new curriculum programs to be prepared in the framework of the fourth industrial revolution.

Keywords: *Industry 4.0, Vocational Colleges, Curriculum Programs*

Hava Kalitesinin Bulanık Mantık Algoritması ile Modellenmesi ve Değerlendirilmesi-Ankara Örneği

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Özet

Hava, bütün canlılar için en önemli hayat kaynaklarından biridir. Temiz havanın bileşiminde bulunan ve bulunmayan gazlarla partiküller atmosferde kirletici olarak bulunurlar. Kirleticilerin, belirli bir konsantrasyon değerinin üzerine çıkması halinde hava kirliliği meydana gelmektedir. Hava Kirliliği başta insan sağlığı olmak üzere bütün canlılara zarar vermektedir.

Hava kirliliği modellemesi ile kirletici konsantrasyonların doğru bir şekilde tahmininin yapılması kirliliğin olumsuz etkilerinin azaltılmasında ve gerekli önlemlerin alınmasında önemli bir etkiye sahiptir. Hava kirliliği tahmini ve modellenmesinde yaygın olarak geleneksel istatistik modellerden yararlanılmaktadır.

Bu çalışmanın amacı; uygulama olanakları giderek artan ve başarılı sonuçlar veren Bulanık Mantık algoritması ile hava kalitesinin modellenmesi ve bu modele dayalı olarak hava kirliliğini tahmin etmektir. Araştırmanın örnekleme, Ankara ili verileridir.

Bu çalışmada, Ankara ili örneklem verileri Çevre ve Şehircilik Bakanlığı web sitesinden edinilmiştir. Veriler, Ankara Cebeci bölgesinden izlenmiş 2010-2016 Ocak-Aralık aylarına ait veri setidir. Veri Setine ilişkin Kirleticiler; kükürt dioksit (SO₂), azot dioksit (NO₂), karbon monoksit (CO), ozon (O₃) ve partikül maddelerdir (PM10).

Bulanık mantık modelinin ilk ve önemli adımı, sistemin giriş ve çıkış değişkenlerinin tanımlanmasıdır. Çalışmada SO₂, NO₂, CO, O₃ ve PM₁₀ giriş değişkenleri olarak, "Hava Kalitesi İndeksi-HKİ" ise çıkış değişkeni olarak belirlenmiştir. Bulanıklaştırma aşamasında sistemde "düşük", "orta", "yüksek" olmak üzere üç bulanık küme kullanılmıştır. Çalışmada hem yamuk hem üçgen üyelik fonksiyonu kullanılmıştır. Bulanık kümelerin aralıkları belirlenirken normalde Çevre ve Şehircilik Bakanlığı'nın iyi kabul ettiği değerler "düşük", orta ve hassas kabul ettiği değerler "orta" bulanık kümelerinde gösterilmiştir. Sağlıksız, kötü ve tehlikeli kabul edilen değerler ise "yüksek" bulanık kümesinin sınırlarına dahil edilmiştir. Sistemde "HKİ" olarak adlandırılan çıkış değişkeni "iyi", "orta", "hassas", "sağlıksız", "kötü" ve "tehlikeli" olmak üzere altı sözel değerden oluşmaktadır. Bir sonraki adımda, giriş değişkenleri ve çıkış değişkeni arasındaki ilişkiler IF-THEN kuralları formunda tanımlanmıştır. Kural tabanı, sistemde 3 bulanık küme ve 5 giriş değişkeni bulunduğu için toplamda 243 farklı kuraldan oluşmaktadır. Bulanık kurallar oluşturulurken, Çevre ve Şehircilik Bakanlığı'nın mevcut sisteminde de kullanılan en kötü aralığa giren kirletici değerleri hava kalitesi indeksinin belirlenmesinde etkili olmuştur. Durulaştırma aşamasında ise centroid durulaştırma yöntemi kullanılmıştır.

Bulanık mantık kullanılarak hesaplanan sonuçlar ile Çevre ve Şehircilik Bakanlığı'nın kullandığı mevcut yöntemin sonuçları karşılaştırıldığında oluşturulan sistemin yakın sonuçlar verdiği görülmüştür. Bulanık mantık sisteminin sonuçları genel olarak incelendiğinde yamuk üyelik fonksiyonuna ait sonuçlar, mevcut sisteme daha yakın sonuçlar çıkarmıştır. Yamuk üyelik fonksiyonu kullanıldığında "iyi" aralığına giren yüzde değeri mevcut sistemle aynı yüzdesel oranı göstermektedir. "Orta" ve "hassas" değerlerinde yüzdesel farklılık oluşmasının nedeni, mevcut sistemde "orta" ve "hassas" değerlerin üyelik fonksiyonunda "orta" olarak gösterilmesi olarak yorumlanmıştır.

Aynı şekilde mevcut sistemde "sağlıksız", "kötü" ve "tehlikeli" olarak nitelendirilen değerler bulanık mantık sisteminde "yüksek" olarak belirlenmiştir. Bu nedenle mevcut sistemde bulunan sonuçlar ile küçük yüzdesel farklar görülmüştür.

Anahtar Kelimeler: Hava Kalitesi, Hava kirliliği, Bulanık Mantık, Kirletici konsantrasyonları.

MODELING AND EVALUATING AIR QUALITY WITH FUZZY LOGIC ALGORITHM-ANKARA SAMPLE

Abstract

Air is one of the most important life sources for all living things. Gases that are present and absent in the composition of clean air also considered as pollutants in the atmosphere. If the pollutants rise above a certain concentration level, air pollution occurs. Air Pollution damages all living things, especially human health.

Accurate estimation of pollutant concentrations through air pollution modeling has an important effect in reducing the adverse effects of pollution and taking necessary precautions. Conventional statistical models are widely used in air pollution forecasting and modeling.

The purpose of this study is modeling the air quality and estimating the air pollution using Fuzzy Logic algorithm which has increasing application possibilities and successful results, The sample of the study is Ankara wheather monitoring data.

In this study, Ankara provincial sample data was obtained from the website of the Ministry of Environment and Urbanization. These sample data are the data set for January-December 2010-2016 from Ankara Cebeci region. Polluters for the Data Set; sulfur dioxide (SO₂), nitrogen dioxide (NO₂), carbon monoxide (CO), ozone (O₃) and particulate matters.

The first and most important step of the fuzzy logic model is to define the input and output variables of the system. In the study, SO₂, NO₂, CO, O₃ and PM₁₀ are defined as input variables and "Air Quality Index-AQI" as output variable. During the fuzzification phase, three fuzzy sets were used in the system: "low", "medium", "high". Both trapezoidal and triangular membership functions are used in the study. When the ranges of fuzzy clusters are determined, the values accepted by the Ministry of Environment and Urban Planning are accepted as "low" and the values accepted as medium and sensitive are shown in "medium" fuzzy clusters. The values considered unhealthy, bad and dangerous are included in the limits of the "high" fuzzy set. In the system, the output variable called "AQI" is composed of six verbal values: "good", "medium", "sensitive", "unhealthy", "bad" and "dangerous". In the next step, the relationships between input variables and output variables are defined in the IF-THEN rules form. The rule base consists of 243 different rules as there are 3 fuzzy sets and 5 input variables in the system. While generating fuzzy rules, the pollutant values that entered the worst range used in the current system of the Ministry of Environment and Urbanization were effective in determining the air quality index. Centroid method was used in the defuzzification phase.

It has been seen that the system that using fuzzy logic and the current method used by the Ministry of Environment and Urbanization gave close results. When the results of the fuzzy logic system are examined, the results of the trapezoidal membership function are closer to the current system. When using the trapezoidal membership function, the percentage value entering the "good" range indicates the same percentage as the current system.

In the current system, the values "medium" and "sensitive" values are defined as "medium" in the membership function. Likewise, the values "unhealthy", "bad" and "dangerous" are defined as "high" in the fuzzy logic system. For this reason, small percentage differences are seen with the results in the existing system.

Keywords: *Air Quality, Air pollution, Fuzzy Logic, Pollutant concentrations.*
