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INTERNATIONAL CONGRESS OF ENGINEERING AND NATURAL SCIENCES STUDIES

**ABSTRACTS
BOOKLET**





**International
Congress of Engineering and Natural Sciences Studies
Abstracts Booklet**

07-09 May 2021

Ankara/Turkey

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ISBN: 978-605-06728-5-5

1st Edition

2021

International Congress of Engineering and Natural Sciences Studies

Abstracts Booklet

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Certificate No: 46367

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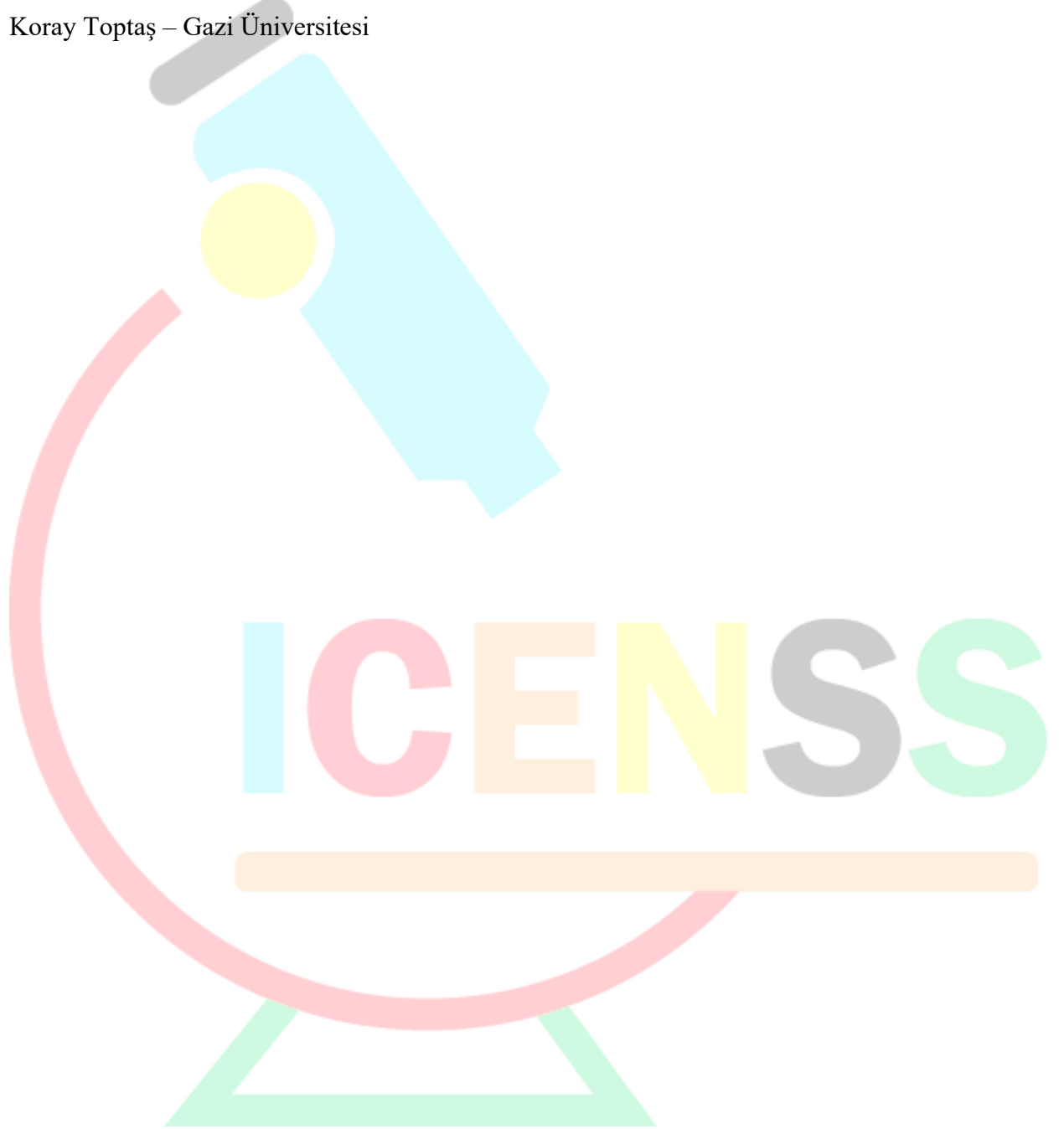
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Virtual Reality and Augmented Reality Integration into AEC Industry

Abstract

Virtual Reality (VR) and Augmented Reality (AR) technologies are considered to be one of the most influential technologies anticipated soon to transform the architecture, engineering, and construction (AEC) industry through benefits in scheduling and project progress tracking, quality and defect management, time and cost management, employee and safety training. The goal of the study was to assess both technologies in terms of their reported advantages and shortcomings and identify and map hardware and software needs to aid institutions planning to implement such technology by providing a practical framework from which to initiate. Hardware abstraction, locally distributed applications, distributed environments, rapid prototyping and run time flexibility need attention and careful evaluation. Implementation of VR applications can be affected by development tools, interfaces and languages. In terms of interface, some offer a very high-level view where applications can be built using custom scripting languages and graphical software, and the framework itself assumes most responsibility for calculations, geometry, and interaction. There are numerous software commercially available for VR. Platform, hardware support, limitations and strengths can play a decisive role in which software to choose. High cost of initiation and program development is still one of the most important limitations for both technologies.

Keywords: Construction Project Tracking; Mixed Reality; Wearable Computing; Immersive Environment; Design Technology; Spatial Perception



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CONGRESS OF ENGINEERING AND NATURAL SCIENCES STUDIES

ULUSLARARASI MÜHENDİSLİK VE DOĞA BİLİMLERİ ÇALIŞMALARI KONGRESİ

ISBN: 978-605-06728-5-5

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Budget and Time Constarint Tourist Routing Problem: A Genetic Algorithm Approach

Abstract

At the moment there is a decrease in the number of domestic and foreign tourists in our country as a result of different domestic and foreign situations. The contribution of tourists to the country's economy is quite large. In order to improve the economy, it is necessary to provide convenience to tourists. As a result of the surveys it is seen that there is no route application for tourists. As a result, the contribution to the number of tourists and economic of the country, which finds the shortest way, which has the highest level of satisfaction and does not exceed the budget, will be inevitable. As a result, with the use of the application it is possible to create a route where a tourist can best go with his budget. In our project, we will get help from the Traveling Salesman Problem technique. The Traveling Salesman Problem, which has a wide range of applications in many sectors including; distribution, planning and logistics, is a difficult problem that has been worked on for many years by researchers and academicians in the area of optimization. In this study, a solution to the traveling vendor problem was sought with the help of a genetic algorithm which is a meta-intuitive method and the developed application will be done by the Ministry of Culture and Tourism.

Keywords: Team orienteering problem, tourist travel program, genetic algorithm



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ISBN: 978-605-06728-5-5

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Readability Formulas for Texts in Azerbaijani Based on Word Frequencies

Abstract

The article is concerned with the effect of less used (passive) words on the readability of text. Two readability formulas for the texts in Azerbaijani are presented – the New Dale-Chall Readability Formula and the Spache Readability Formula for English texts are adapted for the texts in Azerbaijani. Information is provided about lists of 1000 and 3000 “simple” words, first prepared for the Azerbaijani language with the aim of applying these formulas. At the same time, the importance of preparing a new frequency dictionary of the Azerbaijani language is emphasized.

Keywords: active and passive words, New Dale-Chall Readability Formula, Spache index, frequency dictionaries.

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ISBN: 978-605-06728-5-5

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Publishing Large Volume Spatial Data as Map Layer with Open-Source Software

Abstract

Today, the system that performs the functions of collecting, storing, processing, managing, spatial analysis, querying and presenting geographical data in location-based decision-making processes for the solution of many problems is called Geographic Information System (GIS). In the GIS system, the data are kept in the database system or file form in the format defined in the map projection system. These data, which can consist of data types such as point, line and polygon in the GIS system, are called spatial data. Infrastructure systems such as Natural Gas, Electricity, Water, Telephone and Internet can perform fast transactions in digital environment by examining their subscribers on the map by using GIS systems in address structure. Since the data in the GIS system constitute a map address layer of the systems that work in integration with the GIS system, it is important to present this data as the map layer. In this study, it is proposed to present the map layer using open source software in the GIS system with large volumes of spatial data. In the proposed system, spatial datasets belonging to Kayseri Metropolitan Municipality were used. In the proposed system, GeoServer software, which is an open-source software written in Java programming language and enables the sharing, processing and updating of spatial data, is used. TileCache system, which has BSD license, was used to increase the performance of GeoServer software. In the proposed study, the performances of GeoServer and GeoServer-TileCache systems were compared on real data. Experimental results showed that the proposed GeoServer-TileCache based system responded faster than the GeoServer based system.

Keywords: Geographic Information Systems, Spatial Data, GeoServer, TileCache, Map Layer



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ISBN: 978-605-06728-5-5

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Neuro-Evolution of Augmenting Topologies for Food Quality Assessment Using Artificial Neural Network

Abstract

Abstract-With their ability to handle and recognize complex patterns that relate each input with the required output, Artificial Neural Networks (ANNs) are being widely used in different applications. Although the use of these networks for food quality assessment is relatively new, compared to the use of other Machine Learning (ML) techniques, this application has shown promising results. However, with the complex computations being conducted in these networks to compute the outputs and the need for rapid predictions, several of the recent researches have focused on optimizing the structure of these networks, to minimize the complexity of the models. In this study, we propose a new food quality assessment using ANNs, by employing the Neuro-Evolution of Augmenting Topologies (NEAT) to recognize the optimal structure of the neural network, so that, the least-complex neural network that has the ability to achieve the highest accuracy is used. This reduction in complexity and improvement in the accuracy can significantly improve the performance of the food assessment systems, by consuming less resources, which reduces the cost of the required hardware, and provide faster predictions, which increases the number of samples that the system can handle in a certain interval.

Keywords: Artificial Neural Networks, Food Quality, Machine learning



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ISBN: 978-605-06728-5-5

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An approach to Detecting Cyber Security Vulnerabilities of Web Applications with OWASP Top 10 Principles

Abstract

Nowadays, the internet is used effectively in all areas of our lives. It seems that this usage rate will increase day by day. With the widespread use of the Internet, the use of web services and mobile applications has increased at the same level. In addition to the positive aspects of internet services such as fast access to information and time saving, there are also some weaknesses in terms of security. Security levels of web applications that process and store sensitive information of users such as banking and e-commerce are of vital importance. This data should not be made available to unauthorized users, shared and kept safe from attacks. People can easily do many operations using these applications. The use of these applications is stored in a huge amount of information. Therefore, databases contain large amounts of data. The fact that information reaches such large dimensions reveals the necessity of the reliability and protection of the information. Also, the purpose of malicious people may not be just to obtain information. It may be making the system or application inaccessible. For this purpose, all kinds of load, stress and functional tests must be carried out in a complete and safe manner from the development process of such applications to the production environment. In this study, structural recommendations will be made to the processes and procedures required to be implemented by corporate companies, especially those that make financial transactions, to guarantee the security of web applications they open to the outside world. For this purpose, the OWAPS (Open Web Application Security Project) approach, which is accepted all over the world and applied in e-commerce systems worldwide, has been discussed in detail. Each of the 10 most important items of the OWAPS approach is explained with examples and the actions to be taken are also specified. This study can be seen as a reference resource in web application designs.

Keywords: Internet Communication, OWAPS, Cyber Security, Web Application, Software Security



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ISBN: 978-605-06728-5-5

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A Comparative Analysis on the Usage of MQTT Protocol in IoT Devices

Abstract

Nowadays, the number of smart devices has reached an uncountable volume. These smart devices are found in homes, hospitals, factories and any environment where IoT devices are used. It is predicted that this number will increase with the increase of internet usage. With the increasing number of devices, the amount of data made up of the context of these devices is also increasing. Especially in recent years, the concept of the Internet of Things, which has been in our lives a lot, is seeking new solutions to get instant information from these huge data heaps. The Internet of Things (IoT) concept is a new concept that has increased in popularity thanks to the development of modern wireless communication technologies. The basic formation of this concept is the development of applications that facilitate human life by enabling the objects in the world to communicate with each other. In this study, the process approaches and methods followed at the point of processing data obtained from IoT devices and obtaining information are discussed and especially the MQTT protocol used for asynchronous processing of data is taken with all layers. The MQTT protocol was not only evaluated from a performance perspective, but also its security structure was considered structurally. The aspects that distinguish the MQTT protocol from other protocols such as AMQP and HTTP protocol are also addressed.

Keywords: AMQP, Asynchronous Messaging, Big Data, Communication Protocols, HTTP, MQTT, Internet of Things



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ISBN: 978-605-06728-5-5

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Classification of Agricultural Crops using Deep Learning Methods

Abstract

Agricultural crop classification based on remote sensing data is vital to support sustainable agriculture management at national and global scale. In this study, a public data set obtained by RapidEye satellites and Unmanned Aerial Vehicle Synthetic Aperture Radar (UAVSAR) system was used to classify agricultural crops. There are 174 features of 7 different crop type images including corn, peas, canola, soybeans, oats, wheat and broadleaf, in the dataset. These features are the combination of 98 features extracted from the radar images obtained by the UAVSAR system on two different dates on the same region and 76 features extracted from the images obtained via RapidEye satellites. In the study, a deep learning model based on convolutional neural networks was proposed. In order to determine the performance of the proposed model, the training and testing stages were carried out using the 5-fold cross validation method. As a result of the experimental tests, the classification accuracy of the proposed model was measured as 99.62%. This result obtained in the study showed that the proposed deep learning model can be used effectively in the classification of agricultural crops.

Keywords: Deep learning, Convolutional Neural Networks, Classification, Agricultural crops, Satellite images



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ISBN: 978-605-06728-5-5

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IBSS Data Analysis Platform

Abstract

Business intelligence applications are developing rapidly today. Although programming languages have used along with product development, they haven't useful for users. The operations can be done quickly and easily by using various tools for users. Data analysis platforms scope an important part of business intelligence applications. Firms develop data analysis platforms suitable for their customer masses. In this study; A data analysis platform has been designed for our customers. Our platform has designed using open source technologies. Analysis of numerical and textual data within the platform is presented to users by using various tools we have developed. By connecting to various databases, data can be uploaded to the platform. In addition, the data is easily processed using the drag and drop method. By using features such as missing value, frequency, the histogram on the features, users are enabled to recognize their data quickly. It is important to find similar records when a firm's databases are changed or updated. By learning similar records, firms learn the wrong or missing records. Similar records are presented to the users with similarity analysis using the desired similarity rates in textual data analysis on our platform.

Keywords: Data Analysis, Similar Records, Feature Analysis



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ISBN: 978-605-06728-5-5

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A Multi-Layered Object Model for Relational Database Systems

Abstract

In most of the software systems that are developed today object oriented approaches or tools are used. Thus many programming languages either are completely designed with the object oriented paradigm or at least support it. On the other hand, databases, which are an indispensable part of software systems, are designed using relational databases or use relational databases. The use of such databases in developing new software systems with the object oriented approach may cause some problems in the development phase. In this study, we investigate the development of a multi-layered object model that can be used directly with the database system. This is achieved by using a basic relational database table consisting of three layers (Type-Class-Object). The first layer, which is the “Type” layer contains objects, object property types and object access constraints, which are required in the second “Class” layer. The second “Class” layer is used for abstraction, encapsulation and inheritance of the object oriented approach. The third “Object” layer is used as a supplemental table for attribute values.

Keywords: Relational Database, Layered, Object Oriented, Inheritance, Object



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ISBN: 978-605-06728-5-5

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Experiencing Cultural Heritage through Extended Reality Technologies

Abstract

The transfer of cultural heritage assets to the audience through different experiences is seen as a current requirement. Via extended reality Technologies (XR) the audience can have knowledge about the cultural heritage assets and reach to an immersive experience without the need to be physically there. The limitation of physical visits and activities during the pandemic has led to an increase in studies based on extended reality technologies and led to industrial development of the sector in this field. Within the scope of this study, the methods of extended reality technologies used to experience cultural heritage assets are examined. These studies are discussed through examples. Various techniques used among these methods, photogrammetry, 3D modeling studies, software tools and programs were examined, and studies were evaluated within the scope of augmented reality and virtual reality technologies under the umbrella of extended reality. With the ease of access to augmented reality applications and the widespread use of devices using this technology (phones, tablets etc.) and the other hand the decrease in the costs of virtual reality devices, the increasing availability of virtual reality applications and with diversified virtual reality applications (museum, games, education etc.) the effect of the growing market share it is seen that the usage area has increased. In this study, literature review and content analysis (visual) were adopted as methods.

Keywords: Cultural Heritage, Pandemic, Extended reality technologies, Augmented reality, Virtual Reality, Immersive experience



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ULUSLARARASI MÜHENDİSLİK VE DOĞA BİLİMLERİ ÇALIŞMALARI KONGRESİ

ISBN: 978-605-06728-5-5

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Preventing Hotel Name Duplication Using Approximate String Matching (ASM) Based Algorithms

Abstract

The World Wide Web (WWW) has drastically increased the amount of electronically exchanged information. These changes brought new forms to the supply-demand model in the tourism industry. Consequently, travelers have shown a tendency to plan holiday activities such as booking hotel rooms, buying flight tickets, renting a car through online travel agencies (OTAs). An OTA typically retrieves data about accommodation alternatives from Global Distribution System (GDS) databases. GDS is a computerized network that facilitates automated transactions between travel agents and OTAs. It enables agents to visualize the accommodation alternatives, compare prices, and make purchases from multiple service providers in real-time.

There can be one or more countries/regions/cities dominated by each GDS. As the number of GDS used increases, data retrieved from them may vary for the same hotel. The non-uniqueness of service offerings such as hotel names, hotel descriptions, hotel images causes a serious heterogeneity problem to be handled. Overall, there is a need to perform efficient methods to prevent excessive records keeping in the databases (duplicate records) and extra matches in the search results.

In this study, a system was designed to detect exact and approximate duplicates using Approximate String Matching (ASM) algorithms to get a better quality of information. ASM algorithms were used to compare texts that cannot be matched exactly due to some differences in their spelling, although they express the same reference entity. Text matching criteria compare two expressions in various ways and calculate the similarity ratio between them. Levenshtein, Monge-Elkan and N-gram are some of the most used ASM algorithms. The Levenshtein distance obtained by measuring the difference between two strings. Informally, the Levenshtein distance between two words is the minimum number of single-character edits (i.e., insertions, deletions, or substitutions) required to transform String 1 into String 2. The fewer changes required imply the higher similarity between the two expressions. The Monge-Elkan method is an effective string comparison method using a combination of internal character and word level similarity measures. Given two texts A, B, the Monge-Elkan measure is determined by calculating the average of the similarity values between pairs of more similar tokens within texts A and B. First, String 1 and String 2 are divided into words. (For example: A = "hotel bursa termal"; A1 = "hotel"; A2 = "bursa"; A3 = "termal" and B = "bursa hotel thermal"; B1 = "bursa"; B2 = "hotel"; B3 = "thermal"). In comparisons involving more than



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one word, each word is matrixed and inserted into the Levenshtein algorithm. The average of the maximum values for each term is calculated vertically and horizontally, and the maximum value of these two scores is obtained in the comparisons. The N-gram measures the similarity between two strings by finding the length of the longest common subsequence.

In this study, Monge-Elkan based ASM model was designed and tested on approximately 3.000 hotels retrieved using APIs of 2 different GDSs. The matching threshold value of 0.7 was determined using a grid search approach. The model successfully determined that 8, 40, 30, 8, and 14 hotels in Montenegro (ME), Italy (IT), Greece (GR), Portugal (PT), and Spain (ES) are deduplicated, respectively. These results were also manually controlled and approved by the domain experts. Overall, it is concluded that the performed method achieves expected performance to deal with the repeated of the hotel records.

Keywords: Online Travel Agency, Global Distribution System, Heterogeneity Problem, Approximate String Matching, Monge-Elkan Method

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ISBN: 978-605-06728-5-5

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Comparison of Machine Learning Methods on Network Based Intrusion Detection Systems

Abstract

In recent years, the internet has started to touch the indispensable points of our life. The internet, which has entered human life significantly, has brought many developments with it. The area where the Internet will be most effective from now on is the Internet of Things (IoT) devices that increase its diversity day by day. IoT devices are taking their place in our lives more and more every day, and the size of the data processed here is increasing day by day. Since the behavior of IoT systems is not like a traditional network, new algorithms are designed to secure communication and data, especially due to low processor and battery power. It has increased the importance of Intrusion Detection Systems (IDS), which are used to detect and prevent attacks on IoT systems, to keep sessions between devices secure. Recently, it has been clearly understood that the performance of an IDS using machine learning methods is better than traditional IDSs. In this study, machine learning methods such as Artificial Neural Networks(ANN), K-Nearest Neighbor (KNN) and Decision Trees were used with the capabilities of the MATLAB software by researching on STSs made or proposed using machine learning methods. We used the Kitsune data set focusing on attacks on IoT devices, it was determined which of the machine learning methods gave us the best results by comparing the results we obtained with these three different algorithms.

Keywords: Internet of Things, Intrusion Detection Systems, Machine Learning

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A Deep Learning-based Product Classifier Using Images

Abstract

In e-commerce platforms, it is a common practice to organize the product catalogue. This enables the buyer to locate the item they are looking for and explore various items available under a category. However, the organization and categorization of data in the product catalog can be time-consuming and costly due to the large volume of product data. In this direction, more researchers have recently focused on the categorization of products using different approaches. Data to be analyzed can vary from numeric, textual, matrices, images, etc.

Considering current studies, it is observed that although most of them concentrate on analyzing textual descriptions, researches to extract features from product images has become popular recently. This study aims to determine properties from the visuals of products offered for sale on e-commerce applications. Visual data set to be analyzed consists of product images on boyner.com.tr e-commerce platform, which mainly provides textile products to the customers.

The proposed model framework includes three main modules such as image preparation, object identification, specification of product properties (see Figure 1).

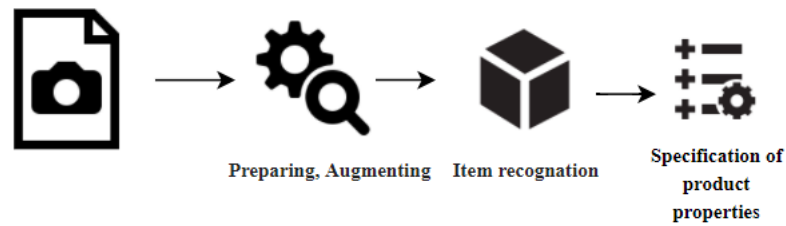


Figure 1 General framework of the proposed model.

First, the following pre-processing steps were carried out on 6400 images of 8 different categories (jacket, shirt, t-shirt, coat, shoe, bag, shorts, dress).

- All images are hashed. Then images with the same hash code were deleted to prevent repeating data in data set.
- The images were optimized using RGB scaling color correction method.

- The images were resized as 224X224.

After the pre-processing was completed, following DL methods were applied.

1. Ssd Mobilnet v1 coco
2. Ssd Mobilnet v1 0.73 depth coco
3. Faster rcnn resnet 101 coco
4. Faster rcnn resnet 101 lowproposals
5. Faster rcnn inception resnet v2 atrous coco
6. Faster rcnn inception resnet v2 atrous lowproposal coco

According to experimental results, the best performing model was “Faster R-CNN inception ResNet v2 atrous coco” with an F1 score of 97%. The last part of the proposed model aims to classify the color and pattern qualities of textile products. Accordingly, Resnet, Imagenet inception v1, Imagenet inception v3, and Mobilnet v2 models) were performed on two different datasets. The first dataset, including 2000 images of 8 different categories (white, black, blue, navy blue, green, red, yellow, and brown), was used to determine the color of products. The second dataset 3200 images of 5 different categories (flat, flowering, striped, spotty, and printed) to determine the pattern of textile products. Considering the performance results, it is realized that Resnet v2 achieved the most accurate results (99% F-score). Figure 2 shows how the categorization model processes test data. Considering the results, it can be concluded that this study appears promising for future studies on product categorization systems.

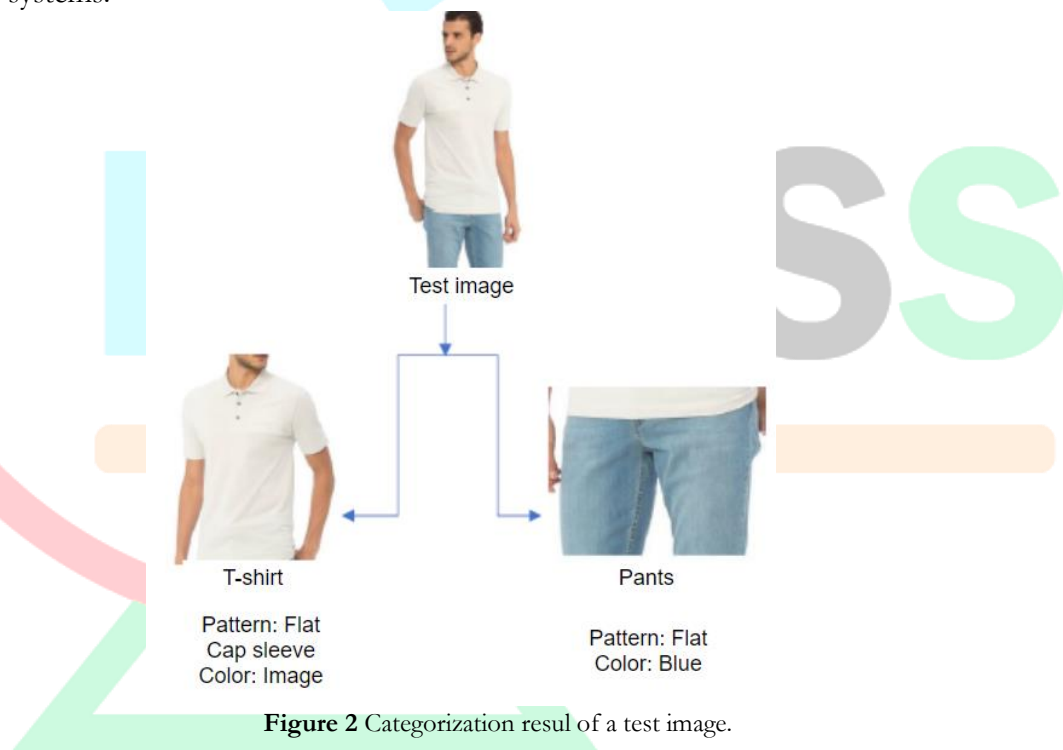


Figure 2 Categorization result of a test image.

Keywords: Deep Learning, Object Detection, Product Categorization, Catalog Organization



INTERNATIONAL

CONGRESS OF ENGINEERING AND NATURAL SCIENCES

ULUSLARARASI M hendislik ve Doęa Bilimleri  alışmaları Kongresi

ISBN: 978-605-06728-5-5

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Improvement Suggestions for Industrial IoT Security Issues

Abstract

Industrial IoT (IIoT) devices rely on a variety of technology arrays that receive and analyze data from connected entities, locations, and people to take insights-based action at the industrial edge. While IIoT provides several benefits, such as automating and optimizing work, eliminating manual processes, and increasing overall efficiencies, security remains an issue that industrial organizations fall short of managing. The entry of IoT devices has opened new entry points into corporate networks that cybercriminals can take advantage of. Whether it's in a new connection or an extension of an older architecture, security should be at the heart of the IIoT application. Many industrial organizations still do not have the skills required to protect IIoT security architectures. In this article, a proactive set of security recommendations is presented to improve the security situation in IIoT applications.

Keywords: Industrial IoT, Security, Industry 4.0

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ISBN: 978-605-06728-5-5

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FaceRecog-Net: Development of Real Time Manufacturing Employee Tracking System with Face Recognition Feature Based on Deep Learning Algorithms for Android Mobile Systems

Abstract

One of the most important researches conducted in the area of biometrics is face recognition. One of the main reasons is the continuous evolutionary research on computer vision. Computer vision is used in areas including education, health and security. In addition, the object and face detection applications are also used in versatile technological areas. There are some sort of important applications in the form of attendance checking of students at universities and electronic scheduling of staff working hours in the workplaces with the face recognition system. In this study, the real time employee tracking system in conjunction to face recognition feature has been developed to use in workplaces. For this reason, four different state-of-the-art convolutional neural networks (CNN) architecture designs have been proposed. FaceRecog-Net has achieved the highest predictive performance with accuracy of 95.27% and F1-score of 95.08% in six classes. The results obtained with FaceRecog-Net have been transferred to Android based mobile application via Firebase Real Time Database. As a result, an employee tracking system supported by face recognition feature based on artificial intelligence algorithms has been created for Android mobile users.

Keywords: FaceRecog-Net, Face recognition, Personnel control, Personnel tracking, Deep learning, Convolutional neural networks, Android



INTERNATIONAL

CONGRESS OF ENGINEERING AND NATURAL SCIENCES

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ISBN: 978-605-06728-5-5

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Investigation of Collagenase and Elastase Inhibitory Potential of the Novel Coordination Compound

Abstract

Extracellular matrix (ECM) consist of laminin, collagen, elastin, fibroblasts, and glycosaminoglycans. Its main role maintain the integrity and strength of organs as well as acts as a primary barrier to prevent the spread of the tumor cells because is a major component of the cellular microenvironment. The degradation of ECM involves different types of matrix metalloproteases (MMPs) such as collagenase and elastase. MMPs play a central role in major stages of tumor progression so novel potential inhibitors should be developed to prevent their protease activities. Coordination complexes have been used in medicine for their therapeutic properties. In the present study, we aim to investigate in vitro inhibitory effect of $[\text{Ni}(\text{edbea})\text{Ag}_3(\text{CN})_5]$ against to collagenase and elastase activities by spectrophotometrically. Inhibition constant (K_i) of these enzymes was obtained from drawn Lineweaver Burk graphs. The complex containing silver exhibited effectively inhibitory effects on collagenase and elastase. K_i constants against to collagenase and elastase was found as $16.73 \pm 1.07 \mu\text{M}$ and $42.81 \pm 9.62 \mu\text{M}$, respectively. The IC_{50} value of the novel compound against to these enzymes was $10.66 \mu\text{M}$ and $49.5 \mu\text{M}$, respectively. Inhibition type of the compound was noncompetitive against to collagenase and elastase activity. In conclusion, it has been indicated that novel dicyanidoglylene compound have in vitro inhibitory effect on collagenase and elastase. In the future, the inhibitory effect of the molecule on ECM-degrading enzymes can be investigated in cell cultures and animal experiments for beneficial effects and the result may lead to designing potent new inhibitors.

Keywords: Collagenase, Cyanido Complexes, Elastase, Enzyme İnhibition, Matrix Metalloproteinases



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Anti-Urease And Antibacterial Effect of Newly Synthesized Dicyanidosilver Complexes Associated with Gastric Ulcer

Abstract

Helicobacter pylori is one of the most common microorganism that cause bacterial infection in humans. It gives rise to chronic and infectious diseases and is only pathogenic for humans. *H. pylori*, a gram-negative bacterium, is the most important pathogenic factor in the formation of gastric ulcer and maintains its life cycle in the gastric mucosa by secreting urease enzyme. *H. pylori* infection is common problem in the world and Turkey. The high rate of *H. pylori* infection in family members of infected people is an indicator of human-to-human transmission. Metal-containing coordination compounds exhibit a variety of biological properties such as antitumor, antimicrobial, antifungal, analgesic and anti-inflammatory. Therefore, it has gained great importance to investigate the medicinal and pharmacological properties of metal complexes in the context of bacterial-associated gastric ulcer. In this study, the inhibition effect of dicyanidoglycine (DSG) complexes ($[[Ni(hydeten)_2Ag(CN)_2] [Ag(CN)_2] (DSG-1)$ and $[Ni(bishydeten)_2Ag(CN)_2] [Ag(CN)_2] \cdot H_2O (DSG-2)$ on the urease enzyme and antimicrobial effects against *H. pylori* were studied for the first time. It was determined that DSG complexes showed inhibitory properties on urease compared to the control group. The IC_{50} values of the dicyanidoglycine complexes against the urease enzyme were calculated as 26.65 μM and 12.37 μM , respectively. In the disk diffusion study, it was determined that DSG compounds formed different zones at different concentrations. For hydeten and bishydeten molecules, the zones were measured as 14 mm and 10 mm, respectively. In the MIC experiment, it was observed that the bactericidal effect of DSG complexes was higher compared to the minimal bactericidal concentration (MBC). As a conclusion, it was determined that newly synthesized coordination molecules have anti-bacterial properties against *H. pylori* and inhibitory properties for urease enzyme secreted by it. Thus, it has been revealed that these novel synthesized complexes have pharmacological importance. In the future, biological and therapeutic effects of these compounds can be investigated in cell culture and animal experiments with new studies. These results may lead to the design of potential new inhibitors.

Keywords: Antibacterial, Enzyme Inhibition, *H. pylori*, Metal complexes, Urease

This study was supported by TÜBİTAK 2209-A - Research Project Support Programme for Undergraduate Students (Project no: 1919B011902147).



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ISBN: 978-605-06728-5-5

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Up-to-Date Evaluation of The Priority Plant Taxa and Habitats of Kırşehir Province

Abstract

In this study, the target habitats rich with endemic species in the eyes of vascular plant diversity of Kırşehir Province (TURKEY), endangered target taxa, the ecosystem and habitat diversities of the study area, the featured plant communities and indicator taxa, the monitoring plans at species, habitat, ecosystem and regional level, threats to biodiversity of research area and solutions are offered.

When the data from the field studies are included on the literature scans, the number of plant taxa detected within Kırşehir Province reached 1,300. According to the IUCN's the most critical threat categories, 6 of the plant species within Kırşehir Province are in "CR", 5 of them are in "EN" and 13 of them are in "VU" category. None of these species are included in Appendix-I of Bern Convention, while 26 species are included in Annex-II of CITES Convention. In addition, 209 of the plant species distributed in Kırşehir Province are endemic.

As a result, this study has the feature of being the most up-to-date flora research for Kırşehir province and provides a long-term roadmap for the protection of the plant diversity of the region under the sustainability principle.

Keywords: Biodiversity, Flora, Endemic, Threatened, Conservation.



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Convergence vs. Phylogeny: Micro-Structures on Lizard Scales

Abstract

Imbricate scales cover reptile integument. Epidermis consists of a live germinative layer and dead α - and β -keratin rows on top. The outermost Oberhautchen layer carries micro-structures. In lizards these hexagonal micro-structures resemble honeycomb. They can cover the scale as a whole or just partially (on the tip/at the center). It's been argued that, since all rain-harvesting lizards that distribute in arid habitats have micro-structures, then they must have adapted together with this specific behavior. Because they widen the surface area and catalyze water uptake. But this assumption was reconsidered since honeycomb shaped micro-structures were found in lizards that distribute in humid habitats. One of the two hypothesis concerning entity, position, morphology and morphometry points out convergent evolution: Micro-structures must have adapted similarly in species exposed to similar environmental conditions. Rain-harvesting lizards distribute in America, Asia and Australia support this view. Second hypothesis which points out phylogeny says that, closely related species must have micro-structures with similar features. E.g., micro-structures in all rain-harvesting and non-rain-harvesting *Phrynosoma* species that distribute in America support second hypothesis. Since only members of Phrynosomatidae and Agamidae families have rain-harvesting behavior, the argument obliges the expansion of these two contrary hypotheses using ecology-based studies and advanced technologies.

Keywords: Reptile, Lizard, Scale, Micro-structure, Convergent evolution, Phylogeny



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The Proliferative and Antioxidant Effects of Aqueous Extracts from the Edible Mushroom *Pleurotus Ostreatus* on Healthy Cells

Abstract

Mushrooms could be used as potential therapeutic agents for producing natural antioxidants and functional foods. *Pleurotus ostreatus* is the commercially important edible mushroom acknowledged as the oyster mushroom. To acquire fungal biomass in submerged culture is a rapid and easy method. For this purpose, the bio-mass of *P. ostreatus* grown on liquid media was used to prepare hot water extracts. This study aims to determine the antioxidant and proliferative effects of mycelium extracts on human blood in vitro. Primarily, extracts were used to evaluate the total phenolic and flavonoid contents per gram extract using a colorimetric method. Subsequently, extracts were administered at 40, 80, 160, 240, and 320 mg/L doses for 2 hours to whole blood and 24 and 48 hours to lymphocyte cultures. At the end of the incubation periods, total oxidant status (TOS) and total antioxidant capacity (TAC) analyses were used to measure serum oxidative damage. Besides, the proliferative effects on lymphocytes were evaluated using WST-1 assay in vitro. As a result of the analysis, total phenolic and flavonoid contents were 7.8 ± 0.22 mg gallic acid equivalent (GAE)/g extract and 1.75 ± 0.1 mg quercetin (QE)/g extract, respectively. Besides, three doses (80, 160, and 240 mg/L) of tested extracts had effective antioxidant activity and high proliferative potency on cells relative to other doses (40 and 320 mg/L). Eventually, this mushroom used as a daily nutrient could be a source for new drug developments, increase body resistance, and guide studies in this area.

Keywords: Antioxidant, human health, lymphocytes, *Pleurotus ostreatus*, proliferation



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ISBN: 978-605-06728-5-5

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Serpentine Flora of Bursa Province (Northwest Anatolia, Turkey)

Abstract

Serpentine soils are derived from ultramafic rocks and they poor in some nutrients such as Calcium, Potassium and Phosphorus while they contain large amounts of Magnesium as well as heavy metals such as Nickel, Chrome, Cobalt and Iron. These heavy metals have been affected on the plant growth as negative while some plants are shown good development in extreme conditions due to their genetic adaptation. Serpentine soils have been used as model system for many studies on plant adaptation, plant speciation, plant diversity and climatic change, due to their unique chemistry and their high levels of plant endemism.

The aim of this study to investigated serpentine flora of Bursa and to support related studies that will be done after. At the end of our study that carried out between 2011 and 2018 years, 172 plant taxa identified belong to 104 genera and 36 families from 20 different serpentine sides in Bursa province. 35 of these are endemic, endemism ratio is 20 %. These taxa are listed according to their locations, life forms, serpentine affinities (serpentinophyte or serpentinovag), IUCN categories and phytogeographical regions. The most abundant families and their including taxa are Asteraceae (36), Brassicaceae (15), Caryophyllaceae and Poaceae (13).

Keywords: Serpentine flora, Ultramafic rocks, Endemism, Bursa province, Turkey



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ISBN: 978-605-06728-5-5

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Investigation of Enzyme (β -Glucosidase) Inhibitor Obtained from Marine Biofilm Bacteria

Abstract

Recently, drug explorations have focused on the structure of products derived from marine natural sources. Glucosidase (enzyme) inhibitors are also among the current research areas in the pharmaceutical industry. The potential uses of marine natural products as sources of chemical compounds for various glucosidase inhibitors are being investigated. Bacteria, in aquatic environments, play a role in various biogeochemical cycles and have important functions in nutrient/energy transport. Biofilm bacteria are an important group, which researched in marine ecosystems. Our study focused on the determination of enzyme (β -glucosidase) inhibitor production by marine biofilm bacteria and the identification of the chemical profile of the obtained extract. For this purpose, the enzyme-agar plate method was used to investigate eight biofilm bacteria (*Exiguobacterium homiense* FJ200652, *Vibrio lentus* FJ200648, *Alteromonas genovienensis* FJ200641, *Pseudoalteromonas agarivorans* FJ040187, *Pseudoalteromonas haloplanktis* FJ040185, *Pseudoalteromonas elyakovii* FJ200649, *Pseudoalteromonas porphyrae* FJ200650, *Pseudoalteromonas marina* FJ200653) and the inhibition tests of the methanol extracts were performed. As a result of the research, we found that the biofilm bacteria have the potential to produce β -glucosidase inhibitors. It was determined that the extracts of five bacteria contain inhibitors. In addition, according to chemical profiling analyzes, it was revealed that *Pseudoalteromonas elyakovii* FJ200649 has total flavonoid (17.081%), alkaloid (3.379%), phenolic (8.187%), and terpenoid (0.457%) contents. As a result, advanced structural analysis of this enzyme inhibitor will be performed to investigate its active pharmaceutical use potential.

Keywords: β -glucosidase inhibitors, Biofilm bacteria, Terpenoid, Alkaloid, Phenolic, Flavonoid



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ISBN: 978-605-06728-5-5

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The Ethnobotanical Characteristics of Some Plants in Çeltikçi District (Burdur)

Abstract

Ethnobotanical is defined as the study of human plant relationships. The geographical structure of Çeltikçi district, where the study is conducted, is 867m above sea level and its surface area is 247 km. Because the district is in the south west of our country, it has a typical transition climate since it is under the influence of both Mediterranean and continental climate. The climate is typical Mediterranean one; hot and dry in summers and warm and rainy in winters. In this thesis, it is aimed to determine the ethnobotanical characteristics of some natural plant taxa that show natural distribution in Çeltikçi district. For this purpose, questionnaires with 17 questions were prepared and surveys were conducted with the local people in 6 villages in the district. As a result of the interviews, 29 taxa belonging to 15 families used were determined in the region. Of these taxa, 15 are used for food, 14 for medical, 2 for animal feed, 2 for ornamental plant and 1 for some beliefs.

Keywords: Burdur, Çeltikçi, Ethnobotany, Folkloric plants, Medicinal plants

*This study was derived from the corresponding author's unpublished master's thesis (TEVENT, A. 2020. *Ethnobotanical characteristics of some natural plant taxa that spread in Çeltikçi (Burdur) district*. Burdur Mehmet Akif Ersoy University, Graduate School of Natural and Applied Sciences, Burdur).



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ISBN: 978-605-06728-5-5

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Population Change of *Frankliniella occidentalis* (Pergande) (Thysanoptera: Thripidae) in Different Ornamental plants.

Abstract

In this study, a survey was conducted to determine the population change of flower thrips pests found in different cut flower species in İzmir province districts. Thrips were collected by shaking the plants onto the white tray.

in the district of Balçova in the province of İzmir, gypsophila, cloves, starlice and gypsum-in the district of Guzelbahce, cloves, chrysanthemums and roses-rose, in the town of Menderes, rose, gladiolus, carnation, statice, tagetes and lilyantus-rose, in the district of Narlıdere, gerbera, chrysanthemum and lilyum in the district of Seferihisar, gerbera, freesia, carnation and chrysanthemum-Urla district, including gerbera, carnation, chrysanthemum and lilyum, 13 different types of cut flowers *Frankliniella occidentalis* (Thripidae; Thysanoptera) harms the nature, as a natural enemy Hemiptera, Thysanoptera, Neuroptera, Araneae and Coleoptera.

In addition, in the districts of Balçova, Güzelbahçe, Menderes, Narlıdere, Seferihisar and Urla, a total of 184 greenhouses surveyed were found to be contaminated with *F. occidentalis*.

The densest *F. occidentalis* population was detected in rose and chrysanthemum plants.

Keywords: *Frankliniella occidentalis*, ornamental plants, population change, İzmir.



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ISBN: 978-605-06728-5-5

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Smart Grid Managment and Load Prediction Using Genetic Algorithm and Fuzzy Logic

Abstract

The main study of this project focuses on the planning methodology for the expansion of the primary and secondary electrical distribution networks for the short, medium and long term, in accordance with the objectives and goals of smart grids. For this, it is necessary to consider the incorporation of distributed generation, response to demand, electric vehicles, induction cookers and the influence of the communications network. In short, it will take into account, apart from the system itself for the distribution of electricity to all consumers, the distribution automation system and information technologies in order to improve reliability, quality of service, operational efficiency, have a lower environmental impact and an active participation of the clients.

Keywords: AI. Machine learning. GA. Fuzzy logic

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ISBN: 978-605-06728-5-5

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Optimizing Resource and Energy Allocation in Cloud Computing Using Aco Algorithm and Fog Nodes

Abstract

The proposal of this paper is that the provision of computational resources is the responsibility of the cloud administrator, yet the path taken by the information from user to the cloud and back is the responsibility of the user, and yet they are available as services. In this context we propose the use of swarm intelligence and fog nodes in order to achieve the optimal path to the cloud and back, the provision of resources needs to be seen in several layers, where each layer represents a specific genre of resources that can be provided in different ways.

Keywords: ACO. Swarm intelligence. Fog nodes. Cloud computing.

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ISBN: 978-605-06728-5-5

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Efficient Routing in Vanet Networks Using Epso Optimization and Maodv Protocol

Abstract

The main objective of this paper focuses on the planning methodology for the expansion of the primary and secondary Design a V2V and V2I communication model based on the IEEE 802.11p AODV and several other protocols, using "machine learning optimization", in order to optimize the transmission and reliability of shared messages in a VANET network. It is intended to compare this proposal against the normal behavior of a VANET network and against other optimization mechanisms

Keywords: EPSO. Vanet. V2V. AODV. Machine learning



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ISBN: 978-605-06728-5-5

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Managment of Distributed Control Systems Using Fuzzy Logic

Abstract

The objective of this project is to implement an automatic system in one of the stations of a real production line of oil, in the building of the Higher Technical Oil refineries. Likewise, the objective is also to implement a SCADA type control system to control and monitor the operating parameters of the station using fuzzy logic, and to carry out a statistical control of the quality of the parts processed by the system, showing a series of statistical tools in time. real that allow to verify the correct operation of the process within the established quality parameters. The station to be automated is Station 1, and the SCADA system will work on a Computer connected to the same network.

Keywords: SCADA. DCS. Fuzzy Logic.

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ISBN: 978-605-06728-5-5

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Energy Management in Hybrid Smart Grid Using Anfis

Abstract

This paper shows the theoretical framework of the ANFIS based energy management system EMS, where the elements and control methods object of the research such as PV arrays and fuel cells are exposed. Similarly, explaining in depth the variables and methods implemented to give rise to the results, which are displayed in the next section. The objective of this research is to show the benefits of the use of fuzzy logic for the control of voltage in steady state in a smart grid.

Keywords: EMS. ANFIS. Fuzzy. Smart grid.

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The Voltage Regulator in a Smart Grid Depends on Variables Compensator Based Management Energy System with Renewable Energy**Abstract**

The latest results from power distribution systems are a more accurate answer to a query. It also offers greater reliability or error correction. The Static Var Compensator was developed for smartgrid distribution by changing the existing methodology to detect and identify any type of error. The use of static var compensators for the rehabilitation process is the most important contribution to this study. The decision to optimally reconfigure the model is based on the power signals associated with each transformer to restore performance in the faulty areas of the switchgear. In this paper we model a 400 kW high-voltage network that can be supplied with a short-circuit power of approximately 12 MVA. This high demand for reactive power can only be met by a high-voltage network since it should be limited to approx. 200 MVAar. The AC-to-AC systems of conversion are equally divided into separate 66 kW and 22 kW distribution of power systems, referred to as pulsed power networks, provided by three identical transformers that reduce curvature. The largest power sources (basically, AC / AC transformers with a nominal output of > 20 MVA and Heating systems in energy sources are connected to 66 kW buses. The installed total power of the AC/DC adapters is fixed and compensated for the interactive power system (TCR + matched filters) is approximately 500 MVA and 250 MVA_r, respectively, Therefore, It is important that you have the ability to predict inappropriate emergency conditions and the ability to prevent them through the analytical model.

Keywords: SVC, ANN , PV, Smart grid. active power. Harmonics.TCR

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Investigation of the Impact of Electric Vehicles on Stability Delay Margin of Single-Area LFC System with Fractional-Order Controller

Abstract

This paper investigates the impact of Electric Vehicles (EVs) aggregator on the stability delay margin of single-area load frequency control (LFC) system with fractional order proportional–integral (FOPI). Using time-domain simulations, stability delay margins are determined for wide range of PI controller gains, the order of integral controller and the power sharing factors between the conventional power plant and EVs aggregator. Results reveal the fact that the fractional order of the integral controller should be lower than one to increase stability delay margin. Additionally, it is observed that stability delay margins increase as the participation of EVs aggregator into the frequency regulation increases via the participation factor, and thus, the integration of EVs into LFC system improves the stability. It is concluded that both EVs and FOPI controller are important tools that will improve the dynamic performance of LFC system with communication time delays.

Keywords: Time delay, Delay-dependent stability, Electric vehicles, Fractional order controllers, Delay margin.



INTERNATIONAL

CONGRESS OF ENGINEERING AND NATURAL SCIENCES

ULUSLARARASI MÜHENDİSLİK VE DOĞA BİLİMLERİ ÇALIŞMALARI KONGRESİ

ISBN: 978-605-06728-5-5

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Monitored on Mobile Application Pulse Oximeter Device

Abstract

Many physiological parameters such as pulse, blood pressure, temperature, oxygen amount in the blood can be measured from the human body. These parameters can be made and recorded by devices in hospital environments. However, due to the high level of measurement mechanisms, there are outward reasons. Various device applications are carried out today, where the development of health technologies and early diagnosis and diagnosis are important. The oxygen library in the blood is important for pregnant women and other critically ill patients. Pulse oximeter is a non-invasive medical measuring device used to detect oxygen saturation (SpO₂) of the blood. At this stage, as a pulse oximeter device that can be monitored from low mobile devices to measure blood oxygen saturation. In this context, a probe connected to the fingertip emits infrared and red light. The amount of oxygen in the blood has different absorption at these light wavelengths. This transmitted is detected by a photodiode on the opposite side. By connecting to Arduino microcontroller, analog data is converted to digital. In this way, the SpO₂ value is together on the LCD screen. Bluetooth connection is made to Arduino for monitoring from mobile devices, which is the main purpose of the study, and it is transferred to mobile devices by means of software that can be measured.

Keywords: Pulse Oximeter, Microcontroler, Arduino, Android, Bluetooth



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ISBN: 978-605-06728-5-5

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Analysis and Assessment of Driving Behavior of Public Transportation Drivers Using Machine Learning

Abstract

Drivers cause many problems and dangers in life. According to the statistics, 89% of the cause of accidents and traffic problems are drivers. Every year, over one million people die on the roads. Especially, risky driving behavior of public transport drivers are very important factor for the deaths. Doing this as a job rather than a short trip causes them to make mistake during driving. It is significant point that analysis and assessment of driving behavior of the drivers to prevent the deaths. However, it is difficult to define correct driving behavior. Because these behaviors vary according to driver mood, road surface condition, traffic situation etc. But some variables give significant information about the driving behavior. In this article, the variables that affect the driving behavior are analyzed and evaluated according to the severity of the accidents they cause. Because these variables are implicit, it is difficult to describe them with a mathematical model. Machine learning model uses in this article because of the this. The purpose of the article is to develop an approach that will prevent possible accidents by both evaluating the driving behavior of public transportation drivers and warning the drivers while driving.

Keywords: Driving Behavior, Public Transportation Drivers, Machine Learning Method, Early Warning Systems, Accidents



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ISBN: 978-605-06728-5-5

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3D Yazıcı Teknolojisi ile Üretilmiş Robotik Bio-El

Abstract

Bio-Inspired Robot Hand (BIRH) is a bio-mechatronic system and has become one of the technological subtitles that have become popular with the acceleration of technology today. Since the 1980s, many studies have been carried out in the country and abroad on the robot arm, robot hand. There are over 100 robotic hand designs in the literature. Bio-Simulation Robot Hands (BIRH) has come to the fore in the industry, universities, defense industry, and daily life, especially because of the precision of robotic systems in object gripping, pick and place applications, and because they have security elements on them. As a result of this study, the finger movements of the user operator were detected by the sensors and the robot was controlled wirelessly, which was transferred to the bio-inspired robot hand. The system software work has been completed by programming on the computer with open source controller platforms (Arduino, XCTU).

Keywords:

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CONGRESS OF ENGINEERING AND NATURAL SCIENCES

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ISBN: 978-605-06728-5-5

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Precise Estimation of Eddy Current Losses in Distribution Transformer Windings Using FEM

Abstract

Distribution transformers are one of the most decisive elements that define the stability and reliability of any electric power system. Although their efficiency is between 98 to 99%, they are the second-largest loss-making component in the electric power grid. Neglecting the transformer stray losses during the design stage may result in temperature rise and a short life span. Precise estimation of the transformer stray losses is crucial to enhance the transformer performance and its life span. Eddy current losses that initiate in the transformer windings account for a large portion of the transformer load losses. This paper deals with the eddy current losses in small-rating distribution transformer windings. 2D and 3D finite element models of the transformer were established to study the leakage flux distribution and winding eddy-current losses were precisely estimated using analytical and numerical methods. The graphical curves introduced in this work provide a deep understanding of the leakage flux distribution for a widely used small-rating distribution transformer. The results obtained allow manufacturers and design engineers to precisely predict windings' local hotspots and electromagnetic forces.

Keywords: Eddy current, Finite Element Method, Transformer losses



INTERNATIONAL

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ISBN: 978-605-06728-5-5

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H-Shaped Microstrip Antenna Design for RF Energy Harvesting Applications

Abstract

In the study, H-shaped microstrip patch antenna design is performed on a square substrate geometry to be used in RF energy harvesting applications in the 2.45 GHz ISM frequency region. Substrate and ground plane dimensions are taken equal to each other and the antenna design is started with traditional rectangular microstrip patch antenna formulas and design, then the final H-shaped antenna design is obtained with appropriate geometric arrangements. The designed antenna is fed with a coaxial line and is designed using the FR-4 substrate, a 1.6 mm thickness and easily available material. In order to improve the performance of the antenna, techniques that shorting pin addition to the antenna and rectangular shaped slot etching on the ground plane have also been applied. In order to achieve the optimum design, the physical dimensions of the antenna, the feeding position, the substrate dimensions, the dimensions of the slot on the ground plane and the shorting pin positions are analyzed in parametric analysis. Antennas are simulated using ANSYS Electromagnetics Suite 2019, HFSS (High Frequency Electromagnetic Field Simulation). Manufacturing and measurements of the optimum antenna design obtained as results of the simulations are carried out. The return loss, axial ratio, radiation pattern and antenna impedance results show that this design can be used in energy harvesting applications.

Keywords: RF energy harvesting, H shape antenna, HFSS, FR-4, ISM.



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ISBN: 978-605-06728-5-5

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Developing a Warning Sign According to Earthquake Intensity Through Intelligent Earthquake Information System

Abstract

It is known that earthquake early warning systems are used to determine the occurrence intensity of earthquakes in studies on earthquakes at international level. However, these earthquake early warning systems are located at certain points in earthquake-prone areas. The data obtained from here can be seen from earthquake information centers, and the earthquake intensity can be determined in this way. With the determination of these earthquake intensities, certain critical facilities (rail systems, electricity generation, transmission facilities, etc.) can be warned and thus their systems can be protected. However, no earthquake early warning system is currently used to ensure that people living in multi-storey buildings, which are most affected by earthquakes, are warned against the severity of the earthquake by early warning systems and at least reach a sheltered point. Therefore, the present study aims to develop an earthquake early warning system that can be used effectively at more local points within international and national earthquake early warning systems. In this system study, the signs that will create an earthquake early warning in response to 5 different earthquake occurrence signs which previously occurred in earthquake simulation centers in AFAD (Disaster and Emergency Management) units and whose earthquake intensities are known are determined by accelerometer and the software included in the system. Accordingly, it can be ensured that people will be immediately warned against earthquakes and they will behave accordingly by creating single warning (sound or light flashing) signals when the earthquake intensity range is determined to be between 0 and 4 magnitude values and by creating multiple warning (both sound and light flashing) signals when it is determined to be between 4 and 8 magnitude values.

Keywords: arduino, accelerometer, intelligent earthquake information system, earthquake early warning system



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ISBN: 978-605-06728-5-5

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Aisi 304 Kalite Paslanmaz Çeliğin, Soğuk Deformasyon Oranı, Faz Miktarı ve Isıl İşlem Proseslerine Bağlı Mekanik Özelliklerinin İncelenmesi

Özet

Paslanmaz çelikler yüksek korozyon dayanımları ve yüksek şekillendirilebilirlik kabiliyetleri ile endüstride oldukça geniş bir kullanım alanına sahiptirler. Paslanmaz çelik yassı malzemeler, dökümden sonra sıcak haddeme, tavlama ve soğuk haddeme ile üretilir ve ardından tavlama yüzey pasivasyonu sağlanarak servis hatları için hazırlanır. Bu çalışmada 304 kalite paslanmaz çeliklerin farklı deformasyon oranlarında haddelendikten sonra çözelti tavlama öncesi ve çözelti tavlama sonrasında farklı kalınlıklardaki malzemelerin çekme testleri yapıldıktan sonra mühendislik akma ve çekme mukavemetleri baz alınarak gerçek akma ve çekme mukavemetleri hesaplanmıştır. Hesaplanan bu değerler yardımıyla haddede soğuk işleme maruz kalmış malzemelerin dayanım sabiti ve deformasyon sertleşmesi üssü değerleri teorik olarak hesaplanmaya çalışılmış, bu değerlerin malzemenin mekanik özellikleri ve malzemeyi oluşturan alaşım elementlerinin oluşturduğu sertleşme kabiliyeti ile bu sabitler arasındaki ilişki incelenmiştir.

Keywords: Stainless Steel, AISI 304, Cold Deformation, Sendzimir, Strain Hardening, Strength Coefficient, Yield Strength, Tensile Strength, Cold Deformation



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ISBN: 978-605-06728-5-5

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Electric Motor Types for Electric Vehicles: Advantages and Disadvantages

Abstract

Nowadays, electric motors are widely used in the automotive industry as well as in all areas of life. In conventional vehicles, it is used as a starter motor that provides the initial starting of internal combustion engines or as an alternator to charge the battery while the vehicle is running. In addition, it can be used for side functions such as power window regulator or wiper motor. Especially with the entry of electric vehicles into the market, electric motors have become an important part of vehicle drive systems. In electric vehicles, electric motors provide movement energy by using the energy that taken from battery group. Movement energy is changed according to many different factors such as the state of the road, driving characteristics of the driver, starting and braking situations. It is seen that the use of different types of electric motors in electric vehicles comes to the fore in order to minimize the negative effects of such parameters and to achieve the desired performance. In this study, the subject of electric motor types used in electric vehicles, which is one of the current research topics, is discussed. Electric motors have been examined from different perspectives such as power density, efficiency, controllability and price, and comparison analyzes have been made. As a result, it was concluded that permanent magnet synchronous motors in terms of power density and efficiency, DC motors in terms of controllability and induction motors in terms of cost provide more advantages for electric vehicles.

Keywords: Electric Vehicles, Electric Motor Types for Electric Vehicles, DC Motor, Permanent Magnet Synchronous Motor, Switched Reluctance Motor, Induction Motor

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An Excel application in simulating the Hodgkin-Huxley model of the neuron
Abstract

As we know that, there is a famous term in artificial intelligence. It is neural networks and we wanted to get more detail on it. Then, we figure it out with modeling of single neuron and understanding that its working principle. These models are mathematical and electrical model. There is a model that named as Hodking-Huxley Neuron Model exist and this case earned nobel price. In our case, we used the equations and parameters that used in this model and we got action potential graphs as real neuron's graphs with just using excel and we just did not use excel, we also achieved same results with using matlab and python.



Figure - 1

Keywords: Neuron, Simulation, Excel, Python, Network



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ISBN: 978-605-06728-5-5

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An Artificial Neural Network Model in Prediction of Electric Car Sales in Turkey

Abstract

In the period from the invention of automobiles to the present, vehicles have led to a large-scale change in the world. This change also plays a incentive role in developing the global economy. On the other hand, these positive changes in the global economy have brought together issues such as energy consumption, use of fossil fuels, harmful emissions, the effects of greenhouse gases on the environment and traffic safety. For this purpose , ARGE activities have been initiated for the production of electric car during the recent years in Turkey that is dependent on foreign sources of oil in all and is provided trade by highway. In this study have been purposed to prediction sales electrical vehicles that will be launched the market in 2023. Neural Network Algorithm is designed for monthly electric car sales forecast in Turkey. The data between the years 2023-2030 obtained from the Automotive Distributors Association reports were first adjusted for serial seasonal effects using the Moving Averages Method. A Feed-Forward Artificial Neurol Network Model has been applied to the series trained with the Propagation Algorithm. Then the performance of the Artificial Neural Network Model has been verified with Multiple Regression Analysis.

Keywords: Artificial Neural Network, Electrical Vehicles, Moving Averages Method, Multiple Regression Analysis, Demand Forecasting



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ISBN: 978-605-06728-5-5

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A Multi-Objective Multi-Period Mathematical Model for the Location Problem of Temporary Emergency Treatment Facilities: A Case Study from Bakirkoy, Istanbul

Abstract

Izmir (2020) and Elazig (2020) earthquakes, where 118 and 41 deaths and thousands of affected people were recorded in Turkey, have been important reminders for the expected earthquake in Istanbul, Turkey. In Marmara Earthquake (1999), one of the most devastating disasters recorded in the last century in Turkey, the intensive influx of casualties was a significant problem encountered at healthcare facilities. After a large-scale disaster, the sudden increase in demand at healthcare facilities can lead to increase in the number of losses. In this study, we suggest opening temporary emergency treatment facilities in order to enhance the rapidness and effectiveness of emergency response operations for the first 72 hours aftermath of a disaster. Furthermore, the utilization of existing hospitals and the impact of injury level of victims on the service capacity are investigated in the presented model. A multi-objective, multi-period, mix-integer mathematical model is developed to minimize the total distance travelled by casualties and the cost of opening temporary emergency facilities. We conducted a real-case study for a district in Istanbul, Bakirkoy to demonstrate how the proposed model can be applied in practice. By weighted-sum method, results provide various choices related to the number and location of temporary emergency units by considering trade-off between two conflicting objective functions. This work was supported by Yıldız Technical University Scientific Research Projects Coordination Unit. Project Number: FBA-2020-3942.

Keywords: Humanitarian Logistics, Facility Location and Allocation Model, Optimization



INTERNATIONAL

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ISBN: 978-605-06728-5-5

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A Decision Support System for Determining Covid-19 Personal Risk Index with Fuzzy Logic

Abstract

COVID-19 disease is an outbreak that seriously affected the whole world, occurred about a year ago, and thus was declared a global epidemic by WHO (World Health Organization). To reduce the impact of the epidemic on humans, it is important to detect the symptoms of the disease in a timely and accurate manner. Recently, several new variants of COVID-19 have been identified in the United Kingdom (UK), South Africa and Brazil, and preliminary findings have been suggested that these mutations increase the transmissibility of the virus. Therefore, this paper presents a decision support system consisting of three different sub-Mamdani type fuzzy inference systems corresponding Common and Serious symptoms, Rare Symptoms and Personal Information, respectively. Finally, we obtain personal risk index of individual by combining these fuzzy inference systems in a final system.

Keywords: COVID-19, Personal Risk Index, Fuzzy Inference System (FIS), Common and Serious Symptoms, Rare Symptoms



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ISBN: 978-605-06728-5-5

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Demand and Capacity Sharing Decisions in Medical Waste Disposal Facilities during the COVID-19 Pandemic Period

Abstract

The amount of medical waste increases after the Covid-19 virus, which was first detected in Wuhan, China in December 2019 and has spread worldwide, is declared as a pandemic by the World Health Organization. To manage the increasing amount of medical waste, an effective capacity and demand planning necessity is emerged in medical waste disposal facilities (WDF). In cases where the capacity could not meet the demand, undisposed medical wastes cause various infectious diseases and chemical and physical damages to the environment. This study proposes a collaborative network of medical waste disposal facilities (CNF) to eliminate the increasing amount of medical waste. CNF aims to provide an effective collaboration model to reduce the risk of undisposed waste when WDF could not meet their demands. Coordination of demand and capacity sharing decisions in CNF is managed by Distributed Decision-Making (DDM) structure in which each WDF is a self-employed, independent organization, and cooperates with each other to achieve mutual benefit. Therefore, CNF optimizes the sharing decisions by analyzing simultaneously the amount of capacity and demand of CNF. Experimental results imply that the total amount of disposed medical waste, capacity utilization, and demand fulfillment rates of each WDF are increased by applying CNF.

Keywords: Covid-19, Medical Waste, Distributed Decision Making, Collaborated Network, Waste Management



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ISBN: 978-605-06728-5-5

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Modelling of Photon Interactions in Solids by Monte Carlo Method

Abstract

Theoretical calculations are planned to determine the photon interactions in solid materials. Firstly, photon interaction cross sections including photoelectric absorption, coherent (Rayleigh) and incoherent (Compton) scattering will be calculated. The molecular photoelectric absorption cross section values will be calculated from the atomic cross section data. Molecular coherent and incoherent scattering cross sections will be calculated using the relativistic modified form factor and incoherent scattering function approaches, respectively. The molecular form factor obtained by taking into account the molecular interference effects and incoherent scattering function valuables will be calculated separately. Energy distribution and scattering possibility distribution of solid matter will be obtained by incorporating the photon interaction coefficients into the Monte Carlo simulation program. The results will be compared with the data in the literature.

Keywords: Monte Carlo, Solid material, Photon interaction.

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ISBN: 978-605-06728-5-5

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Studying the Structure of Massive Stars

Abstract

Theoretically calculated internal structure coefficients (η_j , Δ_j and k_j for $j=2, 3, 4, 5, 6, 7$) for different masses (between 50 and 100 M_{\odot}), and for different six initial metallicities (between $Z=0.0001$ and $Z=0.03$) are presented. We conclude that fifth order or higher terms in the coefficients can be neglected. The decrease of $\log k_2$ is more severe at larger metal values ($Z=0.02$ and $Z=0.03$). We have used ZAMS models for our presented tabulation of data and TAMS models to compare our results with observational and other theoretical results. For observational check we used results for HD 152248 and HD 152218 binary stars. We can conclude that the apsidal motion constant k_2 can be used for determine the ages of the stars. In this context, we can say that : The EZ Web model program and the Fortran Program which integrate the RADAU differential equation give good results for the structure coefficients of the evolved stars (non- ZAMS), in line with literature.

Keywords: Stellar models, internal structure coefficients, density

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ISBN: 978-605-06728-5-5

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Determination of ²¹⁰Po Concentrations using by Radiochemical Methods in Tekirdağ (The Sea of Marmara) Marine Biota

Abstract

The alpha-emitting radionuclide polonium-210 in the natural uranium series is transported to the marine environment by physical, chemical and biological processes and is found in marine biota species. ²¹⁰Po activity concentrations were investigated in some marine organisms obtained from Tekirdağ coasts from the North of Marmara Sea. The crab samples used in the study were obtained with using trammel net and diving method, while the sole were obtained from fishermen in the region while the mussels and macroalgae samples were manually collected.

The radioactive nuclide Polonium in the samples was deposited on silver discs using by radiochemical methods. The ²¹⁰Po activity concentrations were measured by alpha spectrometry in the Environmental Radioactivity Measurement and Research Laboratory in the Nuclear Physics Department. The results obtained will be presented in detail.

In the continuation of this study, ²¹⁰Po, which is present in these marine biota species, will be deposited on stainless steel and aluminum discs using by radiochemical processes. The ²¹⁰Po activity concentration values will be determined by alpha spectrometer. Accordingly, the accumulation efficiency of the discs will be evaluated. The data obtained from this study will be a pioneer for the samples in Tekirdağ region's marine biota and will make an important contribution to the database.

Keywords: Polonium 210, Alpha Spectrometry, Marine Radioactivity.



INTERNATIONAL

CONGRESS OF ENGINEERING AND NATURAL SCIENCES

ULUSLARARASI MÜHENDİSLİK VE DOĞA BİLİMLERİ ÇALIŞMALARI KONGRESİ

ISBN: 978-605-06728-5-5

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Non-Inertial Effect on a non-Relativistic Electron Confined by the Inversely Quadratic Hellmann potential in the Presence of a Topological Defect

Abstract

In this paper, we study topological and noninertial effects on the motion of a non-relativistic electron restricted in a quantum dot under the influence of an uniform magnetic field and confined by the inversely quadratic Hellman potential. The Schrödinger equation that describes the model is derived. The exact analytical solutions of the eigenvectors and energy levels through the biconfluent Heun function are obtained. Absorption threshold frequency is calculated as a function of topological charge, field strength and rotation frequency. The influence of the disclination and the rotation on the absorption threshold frequency is also studied.

Keywords: Quantum Dots, Disclination, Absorption Treshold Frequency

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CONGRESS OF ENGINEERING AND NATURAL SCIENCES

ULUSLARARASI MİHENDİSLİK VE DOĞA BİLİMLERİ ÇALIŞMALARI KONGRESİ

ISBN: 978-605-06728-5-5

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Evaluation in the Scope of Landscape Urbanism: The Case of Bolu City Center **Abstract**

After industrial and technological developments, population growth, unplanned construction, anthropogenic effects and various natural disasters, the form of cities has changed, central features have disappeared, widespread and scattered cities have become widespread, abandoned in these cities, areas that need to be improved have started to emerge. The landscape is undoubtedly a binding factor, for metropolises where the urban fabric is about to disappear. Projects focused on the design of regions with ecosystem sensitivity, especially in idle industrial areas; It is a precondition of for these areas to be recycled to the city again and in the most efficient way. Landscape urbanism, instead of the classical structuralist understanding of urbanism, is a theory that paves the way for cities to embrace nature again. Landscape urbanism is a multidisciplinary concept in terms of meaning. Its basic claim; the guidance of the existing landscape with urbanization and city organization, and the landscape of the existing area in the relationship between building and environment is the determining layer. The keywords are; uncertainty, open-ended, flexibility and complex systems. Water, water utilization, storage and filtration, water improvement, urban infrastructure, consideration of water supply, wastewater and stormwater, supporting services and transportation systems are constitute a large part of the urban infrastructure, which are the most important issue of landscape urbanism. The main objective is to integrate these functions within a usable open space. In this context, this study aims to examine the water permeability, erosion risk status, vegetation cover analysis (NDVI) and transportation status of Bolu city center in terms of landscape urbanism from a top-down holistic perspective. Maps related to these investigations were created by using the ArcGIS program, and the result map was obtained by interpreting these maps together. The resulting map was associated with the development plan showing the development of the city, and suggestions were made about what should be within the scope of landscape urbanism for the city center of Bolu.

Keywords: Landscape, Landscape Urbanism, Bolu



INTERNATIONAL

CONGRESS OF ENGINEERING AND NATURAL SCIENCES

ULUSLARARASI M hendislik ve Doęa Bilimleri  alışmaları Kongresi

ISBN: 978-605-06728-5-5

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Evaluation of the Role of Functions of  znik Lake Wetland in Marmara Basin Management

Abstract

The aim of this study is to examine the functions of Iznik Lake Wetland on the basis of basin management. Wetlands are hydrologically complex ecosystems, from an ecological point of view, wetlands are heterogeneous, unique ecosystems that can develop naturally or can be formed as a result of human activities. Common features are aquatic soil structure, microorganisms that adapt to biological and chemical environment conditions due to constant or variable water movements, hydrophilic and humid environment-loving vegetation and fauna. Wetlands have many functions due to their structure. Like; flood control, groundwater feeding, coastal stabilization and storm protection, sediment, nutrient storage and transport, water treatment, biodiversity reservoir, wetland products, cultural value, recreation and tourism, reducing and adapting to climate change. In this study, it is aimed to contribute to the determination of the functions of Iznik Lake wetland and determining its place within the River Basin Management. The fact that river basin management plans have not yet been completed in Turkey may provide an advantage in terms of the integration of wetlands into the river basin. Before the Marmara basin management plan is completed, the current status of the wetlands can be determined with the wetland inventory, function and status determination.

Keywords:  znik Lake, Wetland, Wetland Functions, Entegration of River Basin Management, Marmara Basin Management.



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ISBN: 978-605-06728-5-5

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Trends in the Deployment of Drones in the Construction Industry

Abstract

Drones are an emerging technology with many potential applications in the civil engineering field spanning planning, design, construction, as well as maintenance phases for both horizontal and vertical construction projects. The goal of this study was to assess the state of drone use in the construction industry by surveying data from industry. The study also aimed to identify factors that are correlated with drone use across multiple countries, and to pinpoint specific characteristics that result in some countries adopting drones more or earlier. Ultimately, the study aims to assess the state of the Turkish construction industry in terms of drones' adoption and compare to its peers. A clear effect of economic parameters of a country on construction drone usage was lacking. The number of companies operating in the construction industry of a country was not related to the prevalence of drone usage either. The positive correlations found are the existence of a general market for drones in the country as an established industry is easier to sprawl to other related industries, and countries that focus on infrastructure and maintenance seem to be benefiting the most from drones. Turkey fits well into the category of countries where drones in construction can be employed. With growing emphasis placed on large infrastructure projects and components, it is expected for the construction industry to be more inclusive of this technology in the future.

Keywords: Construction Trends; Construction Industry; Drones; Unmanned Air Vehicles; Construction Management



INTERNATIONAL

CONGRESS OF ENGINEERING AND NATURAL SCIENCES

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ISBN: 978-605-06728-5-5

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Detection and Quantitative Analysis of Sesamin in Various Selected Cultivated Turkish Sesames

Abstract

The seeds of the sesame plant are used extensively in the food field, and the sesame oil obtained from the seeds has an importance in the field of medicine with its stable oil and rich active compound content.

Sesame oil shows many activities such as antioxidant, antimicrobial, antihypertensive, antihyperlipidemic, antipyretic, anti-inflammatory, anticancer activity. Lignan derivatives are responsible for some of the effects of sesame oil.

In this study, the contents of sesame lignans species being grown in Turkey were investigated. Cumhuriyet 99, Tanas, Osmanlı 99, Orhan Gazi 99, Tan 99, Sarısu, Kepsut sesames from the Aegean region, Batem-Aksu, Baydar 2001, Muğanlı 57, Gölarmara and Batem-Uzun sesams from the western Mediterranean region were selected for analysis.

Sesame oil was obtained from selected sesame species with Soxhlet device. As a result of the YPSK analysis, it was determined that sesamin was found in sesame oils. Since the presence of the substance in each sesame variety changes, a quantitative analysis was performed to determine which sesame variety contained the highest level of sesamin.

The results obtained will be a guide in the cultivation of high-yielding species with high active compound content for medicinal use of sesame varieties grown in our country.

Keywords: Sesamin, Quantitative Analysis, Natural Product, Sesame Oil, Bioactivity



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ISBN: 978-605-06728-5-5

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Remediation of Chlorpyrifos Contaminated Soil by Coupling Soil Washing with Tween 85, Oxidation Using the US/Fenton Process and Recycling of the Surfactant

Abstract

Surfactant-enhanced soil washing was applied to Chlorpyrifos contaminated soil, followed by a hydroxyl radical based advanced oxidation process. In this study, soil washing experiments were conducted with the nonionic surfactant Tween 85 (TW 85) and the influence of washing temperature, TW 85 concentration and liquid to soil ratio on the removal of Chlorpyrifos was investigated. The parameters of liquid/solid ratio, surfactant concentration, operation time, mixing speed and temperature were examined in the removal. It is seen when the optimal conditions are examined that, while for 1g/L Tween 85 concentration with a 20/1 (liquid/solid) ratio, 360 minutes operation time and 60 rpm washing speed in room temperature, the removal efficiency was 95.44%. Furthermore, the US/Fenton process was used for the selective oxidation of Chlorpyrifos from the effluent and the recovery of TW 85. The regenerated effluent was re-employed in the soil washing process and the results showed that the removal efficiency was almost the same as with fresh surfactant solution. Overall, the result indicates that soil washing with TW 85 and the subsequent selective US/Fenton process may provide a potential option for the remediation of soil contaminated with pesticides.

Keywords: Chlorpyrifos, Surfactant, Tween 85, US/Fenton



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CONGRESS OF ENGINEERING AND NATURAL SCIENCES

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ISBN: 978-605-06728-5-5

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Foaming Properties of Casein-Based Aqueous Systems

Abstract

Three different casein-including systems were investigated in the presence of salt (NaCl) in terms of their foamability and foam stability. Sodium caseinate (NaCas) particle dispersions, native NaCas solutions, and casein micelle dispersions were prepared almost at the same protein concentration. NaCas particles were prepared via a two-step emulsification method, which included the gelation of NaCas through acidification. Foaming properties of different systems were compared mainly by visual observations and by considering the viscosity of the liquid phase. The presence of salt ions affected the foaming behaviour of all systems differently, as the salt ions changed the electrostatic interactions between the proteins. The foam of NaCas particle dispersions survived the longest (~3h) when there was no salt present; whereas when there was salt addition, native NaCas solutions showed the highest foam stability (~2h). Salt ions should have induced falling apart of NaCas particles, and the small fragments of particles could behave like low molecular weight surfactants. Alternatively, salt ions should have induced the aggregation of native NaCas and these aggregates behaved like nm-sized particles. The particles at the air-water interface acted as Pickering stabilizers, which were better in increasing the foaming properties of systems than the native proteins.

Keywords: Casein micelle, Electrostatic interaction, Foam stability, Protein particle, Sodium caseinate



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Gas Chromatography and Method Development in Food Analysis

Abstract

Gas chromatography (GC) is widely used in food analysis. With GC, it is possible to make fast, reliable and cheap analyzes in qualitative and quantitative food analysis. GC is commonly used to determine food composition and to detect food contaminants in general. In addition to these, it also gives results to investigate the toxins, taste and aroma components in the food.

The aim of the study is to transfer the methods of developing methods with GC in line with personal experiences and literature studies. In food analysis, the method should be developed depending on the structure of the food matrix and the limit values that can be determined. For this purpose, the detector (thermal conductivity (TCD), flame ionization (FID), nitrogen phosphorus (NPD), etc.), appropriate column selection for the sought substance are of great importance at the first stage. Afterwards, the most appropriate method should be obtained by arranging sections such as column, furnace, injection, gas flow. In the method development phase, it should be aimed to obtain the best possible peaks, to separate the peaks from each other and to complete the analysis as soon as possible. Following these steps, the method developed needs to be validated.

As a result, GC, where a wide variety of analyzes can be made, has an important place in food science, technology and R&D studies. In this respect, it is of great importance to develop and validate methods with GC. While developing the method, obtaining the most accurate method with improvements at every step increases the validity and reliability of the analysis.

Keywords: Gas chromatography, Food analysis, Method, Validation



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Chromatographic Analysis in Food Traceability

Abstract

In the axis of the changing technology and the conscious consumer, every day the consumer demands a healthy and safe food product whose characteristics, source and story are known. The number of applications that provide this is increasing with technology support. In this respect, traceability systems, which include all food location, ingredients, critical control points and possible risk information, are very important tools in ensuring food safety. It is also known that traceability systems will provide "from field to fork" food quality by preventing foodborne diseases.

In food traceability, support is obtained from different chromatographic methods, especially in order to determine the content and origin of the food. Among these, MS (Mass Spectrometry) based methods (ICP-MS - Inductively Coupled Plasma Mass Spectrometer, GC-MS - Gas Chromatography Mass Spectrometer) serve as traceability tools with different methods. At the same time, residues such as antimicrobials, antibiotics, pesticides in food are detected by MS-based methods. These chromatographic methods are also important in detecting elements in food content and volatile and semi-volatile structures, aromas and pesticides. HPLC (High Performance Liquid Chromatography) is used to measure different contents such as carbohydrate, fat, protein, vitamin, mycotoxin, phenolic substance, organic acids, amino acid.

It is impossible to talk about the safety of a food without content information and traceability. In short, chromatographic analyzes play a role in determining the food content in the most precise form and are of great importance as indispensable tools for traceability systems.

Keywords: Food traceability, Food safety, ICP-MS, GC-MS, HPLC



INTERNATIONAL

CONGRESS OF ENGINEERING AND NATURAL SCIENCES

ULUSLARARASI M hendislik ve Doęa Bilimleri  alışmaları Kongresi

ISBN: 978-605-06728-5-5

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Health Benefits and Risks of Polyphenols: An Overview

Abstract

Plant-derived functional foods are gaining considerable attention due to their safety and therapeutic potentials. Research on plant-based functional foods presents several challenges ranges from hypercholesterolemia to cancer prevention. These molecules consist of over 500 plant metabolites that come from numerous food sources including various fruits, vegetables, grains, and beverages such as coffee, tea, and wine. The quantity of polyphenols in food vary greatly, as does their bioavailability for use in the body after consumption. In this context, more human studies are needed to provide clear evidence of their health protective effects and to better evaluate the risks possibly resulting from polyphenol consumption. In the present review, we focus on structural differences of polyphenols, dietary sources of each class, the factors influencing the bioavailability of the polyphenols and some general allied health benefits and risks supported by current research.

Keywords:

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CONGRESS OF ENGINEERING AND NATURAL SCIENCES

ULUSLARARASI MÜHENDİSLİK VE DOĞA BİLİMLERİ ÇALIŞMALARI KONGRESİ

ISBN: 978-605-06728-5-5

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Lisinoalanine Content in Heat Treated Milk and Dairy Products

Abstract

Heat treatment applied to milk Maillard reaction in milk occurs by denaturation of serum Proteins and complex formation between serum proteins and casein, and isopeptides such as lysinoalanine (LAL) are formed by hydrolysis of these proteins. LAL formation in the protein decreases the digestibility of proteins as well as the availability of the amino acids lysine and cysteine in the body. It has been determined that LAL causes various problems in living things by decreasing the enzyme activity. It is also thought that LAL has toxic effects and causes nephrocytomegaly and inhibition of maetaloenzymes in mice. For these reasons, it is of great importance to determine LAL in heat-treated foods with alkaline pH. Studies have shown that the amount of LAL increases with the increase of heat treatment temperature applied to milk. Lysinoalanine is accepted as an indicator of heat treatment load in UHT products, cheese and baby food. It has been found that there are much higher levels of LAL due to the absence of reducing sugar (lactose), especially in commercially produced caseinates. In addition, it was determined that milk powder produced by the roller method has a higher level of LAL compared to the spraying method. It has been found that situations such as reprocessing dairy products, using poor quality raw milk and not paying attention to hygiene conditions also increase LAL. Studies are ongoing to prevent the formation of LAL and to eliminate the LAL that is formed, because it reduces the nutritional value of food and creates a toxic effect.

Keywords: Lysinoalanin, Maillard reaction, Heat damage, UHT milk



INTERNATIONAL

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ISBN: 978-605-06728-5-5

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Preserving Colour of Spinach (*Spinacia oleracea* L.) Juice with Zinc Sulphate and Enzyme Treatment

Abstract

Colour preservation of fresh fruit juices is an ongoing challenge for food industry especially for green vegetables. Spinach has higher colour quality than thermally processed ones due to the chlorophyll degradation. There are some factors affecting the stability of chlorophyll such as temperature, pH, enzyme, and minerals. Aim of this experiment is to stabilize the colour of spinach juice by addition of enzyme and zinc during aseptic processing and determine the most effective way to preserve the green colour. Four different methods were applied during cold press spinach juice process. First method is addition of zinc sulphate and cold filling, second one is the same procedure with aseptically filling. In the third experiment, both zinc sulphate and enzyme (Novozymes) are added at 50°C for 60 minutes blanching and then cold filling. The fourth experiment is the same procedure with aseptically filling. According to the results, the most effective way is achieved by applying third experiment. Colour quality is measured by using L*, a*, b* values. Fresh spinach a* value is found as -5,5 and for third experiment the result is -4,3. It indicates that the addition of both enzyme and zinc sulphate contributes to the preservation of colour, while aseptically filling affects the colour negatively.

Keywords: Spinach juice, Chlorophyll, Enzyme, Zinc, Aseptic filling



INTERNATIONAL

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ISBN: 978-605-06728-5-5

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The Investigation of Incidence of *Staphylococcus Aureus* in Catering Industry

Abstract

Foodborne diseases are an important health problem that can show individuals of all ages in the society. Foodborne infections can be seen as sporadic cases, as well as contaminated food, poisoning that affects human beings. The aim of the study is to investigate the kitchen, food and personal hygiene importance for the samples that were obtained from the surfaces and tools / equipment of *Staphylococcus aureus* (*S. aureus*) in the industrial food production enterprises in Istanbul in food safety and public health poisoning. 130 food, 24 surface, 26 tools / equipment samples were taken from corporate company that can write collective meals, catering, pizza business and restaurant serving the private sector in the province of Istanbul. According to the microbiological analysis methods, food samples were cultured on Baird Parker Agar and Mannitol Salt Agar, respectively. Chemically, catalase and DNase tests have been applied for suspect ones. As a result; 130 foods (pastry = 14, raw meatballs = 22, grilled meatballs = 18, salad = 30, creamy chicken = 20, pizza = 26), 24 pieces surface (counter = 12, cutting board = 12), 26 pieces of tools / equipment were analysed and in total of 33 (18.3%) positive *S. aureus* strains were detected in the samples. Presence in *S. aureus* foods is closely related to business operation hygiene. It is concluded that the personnel, food and business hygiene in the mass food production enterprises are vital for public health, and Hazard Analysis of Critical Control Points (HACCP) applications regarding the use of appropriate disinfectants, and the hygiene training of the food personnel should be considered.

Keywords: *S. aureus*, food poisoning, industrial food hygiene



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ISBN: 978-605-06728-5-5

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Novel Lactic Acid Bacteria Strains as a Representative of Bioprotective Culture Abstract

Since the importance of microbiota on human health was understood, studies on these organisms and their effects on health have continued to increase day by day. It is known that most of the microorganisms in the human body colonized in the colon part. It can be reported as providing a healthy microbiota, or more precisely, a balanced microbiota, in the colon, also has effects on the protection of general health status. In this context, consumption of foods produced especially by microbial processes contributes to a positive contribution in the balance. In addition to its effects on the human body, it is necessary to include dominant and competitive microorganisms in the production processes in order to ensure safe food production process and to eliminate pathogen. Following the characterization of the fermented meat isolates 71, 91 and 223, which are found to be included in the lactic acid bacteria group, their antagonistic effects were determined on various Gram-negative and Gram-positive pathogens (*Escherichia coli*, *Salmonella enteritidis*, *Listeria monocytogenes*, *Staphylococcus aureus*, *Staphylococcus mutans*, *Bacillus subtilis*) at a minimum of 14 mm and a maximum of 25.5 mm zone diameter. It has been demonstrated that these strains can exhibit bacteriocin / bacteriocin-like compound-based bioprotective properties on *Listeria monocytogenes* as well as various metabolite-derived antimicrobial effects. As a result of the identification study of the strains by the 16S rDNA sequencing; 71 and 91 isolates were found to be respectively 96.8% and 96.3% similar to *Lactobacillus sakei* reference strain NR_113821.1, It was determined that the isolate numbered 223 was 96.2% similar to *Lactobacillus curvatus* with accession number NR_113334.1. As a result of phylogenetic analysis including 110 reference strains and 3 isolates through the MEGAX program; it was observed that strain 71 and 91 were phylogenetically closely related, while the isolate 223 was only related to these strains at genus level.

Keywords: Lactic acid bacteria, *Lactobacillus*, bacterial characterization, 16S rDNA, antimicrobial activity.

“This work was supported by Scientific and Technological Research Council of Turkey (TÜBİTAK-project# 1190343.”



INTERNATIONAL

CONGRESS OF ENGINEERING AND NATURAL SCIENCES

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ISBN: 978-605-06728-5-5

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Probing Molecular Gas, Dust and Far-ultraviolet Emission Across the Disc of the Spiral Galaxy NGC 7331

Abstract

Molecular clouds (MCs) are the places for stars to be born and die. It is necessary to obtain multiple emission lines to study the physics and kinematics of the MCs better. Carbon monoxide (CO), the second most abundant molecule in the interstellar medium, is widely used to probe the star-forming gas clouds. In this study, we probe the physics of the gas and dust across the disc of the nearby spiral galaxy NGC 7331. Using the literature CO data, we selected 14 regions over the galaxy. $^{12}\text{CO}(1-0)$ intensities, far-ultraviolet (FUV) and $24\mu\text{m}$ flux density were obtained for all the regions. CO intensities, gas mass, gas surface density, $24\mu\text{m}$ -to-FUV flux ratio (i.e. the extinction) increase up to about $40''$ (≈ 3 kpc) from the centre and then start to decrease. There is a positive correlation between many parameters studied, such as between the molecular gas mass and the extinction. Our results indicate that the regions on the eastern side of the disc show some differences in the physical parameters compared to the regions on the western side. This indicates that the star formation history and physical properties of the interstellar medium could be different on either side of the disc.

Keywords: Galaxies, Spiral galaxies, Molecular gas, Dust, Far-ultraviolet emission



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ISBN: 978-605-06728-5-5

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Augmented Reality and Drone Usage in Construction Industry

Abstract

Technologies expected to have an impact on the construction industry include those that increase simulation capabilities and possess mobile interfaces, such as augmented reality, 3-D scanning, and unmanned aerial vehicles or drones, among others. The aim of the paper is to exhibit possible usages of technologies within the construction sector to increase productivity by using augmented reality and drones, applied to construction projects in general and construction sites in particular. The study seeks to identify potential benefits of each, the interaction between the two technologies, as well as carry out a case study to demonstrate the applicability and practicality of discussed techniques. An example application carried out as part of the study sought to demonstrate benefits of related technology towards visualization, planning, and quick estimates, and the amount of training required for technical personnel for their use. Main contributions of analyzed technologies are work safety, cost-effectiveness, pre-planning, reporting to customers, defect management, progress tracking, identifying potential problems and associated delays, and environmental impact reductions. Application via the software did not prove to be challenging, did not require prior training except fundamental knowledge of tools in undergraduate civil engineering curriculum, and took a few minutes to complete basic calculations. This study will benefit construction managers in raising awareness of the use of augmented reality and drone usage at construction projects while saving resources such as cost and labor, and reducing required time.

Keywords: Augmented Reality, Drone, Advanced Construction Technology, Construction Simulation, Defect Management



INTERNATIONAL

CONGRESS OF ENGINEERING AND NATURAL SCIENCES

ULUSLARARASI MÜHENDİSLİK VE DOĞA BİLİMLERİ ÇALIŞMALARI KONGRESİ

ISBN: 978-605-06728-5-5

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Quantifying Benefits of BIM for Quantity Takeoff: A Comparative Study

Abstract

With growing global competition and as the complexity of construction projects increases, there is ever growing emphasis on using resources efficiently and effectively. Building Information Modeling (BIM) has numerous benefits, from improved communication and coordination to minimizing errors and costly waste during a construction project. The current study aims to compare and quantify potential benefits of BIM for quantity takeoff purposes. Model of a 2-room cabin with basic features and construction was developed and analyzed in the study. Some of the technical benefits of employing BIM were quantified and demonstrated in results. Times were recorded to compare alternative software and methods to quantify materials in the developed model. Results indicate that BIM software provided the results in the shortest time with the added benefit of enabling native 3-D visualization from developed models. Time savings may translate into economic savings either by utilizing technical staff more efficiently, or via the need to keep fewer employees to carry out the same task.

Keywords: BIM, Quantity Takeoff, Construction Management, Construction Project



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ISBN: 978-605-06728-5-5

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Car Ownership Analysis and Affecting Factors

Abstract

This purpose is to identify and analyze the factors that affect car ownership. Data taken as an example for the ownership of the automobile tones belonging to the provinces in the study. The variable variable in the study is in the category of cars per 1000 people. Independent variables are the number of automobiles per 1000 inhabitants belonging to the provinces, gross domestic product, consumption expenditures transportation percentage, village population, age dependency ratio, city population, household size, divided road length in annual population, vehicle-km, tons. -km, passenger-km, the number of illiterate people, the number of high school graduates, the number of university graduates, the number of literate women and the number of literate men decrease. And as a result, where there are the largest positive variables for gross domestic product and the number of literate auto cars.

Keywords: Car ownership, Regression analysis, Transportation.

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ISBN: 978-605-06728-5-5

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Investigation of Physical and Mechanical Properties of Slaked Lime Based Geopolymer

Abstract

In this study, the effects of silica fume additive and activator ratio on physical and mechanical properties of geopolymer mortars produced using slaked lime were investigated. The binder formed by adding 5%, 10%, 15% silica fume into the slaked lime was activated with sodium hydroxide (NaOH). The concentration of activator is determined between 10 moles and 15 moles. Water/binder ratio was chosen as 0.55% and binder/sand ratio as 1/3. Basalt origin aggregate was used in the mixtures, mortar samples mixed in the mixer were placed in 40×40×160 mm molds. It was then exposed to the activation temperature of 105 °C for 24 hours. The samples taken out of the oven were kept at room temperature (22±2) °C for up to 28 days. Unit weight, ultrasound pulse velocity, porosity, water absorption ratio, flexural and compressive strength tests were carried out on all samples. As a result of the experiments, a strength of 24.80 MPa was obtained in geopolymer samples produced entirely with slaked lime. In the samples containing 85% slaked lime and 15% silica fume, a compressive strength value of 36.46 MPa was determined. Compared to conventional lime mortar samples produced as control samples, it was observed that the compressive strength of geopolymer mortars increased approximately 5.9 times.

Keywords: Slaked lime, silica fume, flexural strength, compressive strength, geopolymer

Acknowledgement

This study was supported by the Yozgat Bozok University Project Coordination Application and Research Center as a Scientific Research Project no 6602a-MÜH/20-400.



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CONGRESS OF ENGINEERING AND NATURAL SCIENCES

ULUSLARARASI MÜHENDİSLİK VE DOĞA BİLİMLERİ ÇALIŞMALARI KONGRESİ

ISBN: 978-605-06728-5-5

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X-ray Radiation Shielding Features of Cement Based Composites Produced with Different Aggregates

Abstract

In this study, the usability of cement-based composite materials produced with different aggregates as an alternative wall coating material to lead mine was investigated. For this purpose, barite, hematite, magnetite, limonite, vermiculite, silica fume and iron powder were selected as aggregate and coating materials with cement binder were produced. A total of 21 mortars with dimensions of 4x4x16 cm were produced to investigate the physical and mechanical properties, and a total of 14 mortars with dimensions of 10x10x10 cm for the X-ray retention test. After the produced covering samples were applied to standard curing for 28 days, unit weight, water absorption and porosity values were determined to the physical properties. Pressure and bending tests were carried out to determine the mechanical strength of the samples. In addition, the linear and mass reduction coefficients of the samples were determined by performing radiation experiments on the produced composite coating samples with an X-ray source with 150 keV photon energy. Measurements were carried out using X-ray detection system including PM1402M model detector and GM detector. The experimentally obtained linear and mass reduction coefficients were compared with the theoretical linear and mass reduction coefficients determined by the NISTXCOM program. And equivalent lead thicknesses have been calculated for each coating sample. For the examination of the internal structures of the samples, the image was taken with scanning electron microscopy (SEM).

Keywords: X rays, Radiation, Absorption coefficient, Aggregate, Composite



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Effect of Removing Brick Walls on Vertical Irregularity in Buildings

Abstract

In some of the buildings available in our building stock, brick walls were removed in order to use large space on the ground floors. It is believed that the damage rate increases in buildings where these elements are removed, structural earthquake performance is negatively affected and can cause vertical irregularities. Finally, it has been commented that one of the buildings destroyed in the 6.6 magnitude İzmir Seferihisar earthquake on October 30, 2020 occurred especially due to the removal of the brick walls. A detailed study of this current issue and observing the impact of brick walls on the structure is also critical for many structures in a similar situation.

In this study, the perspective of vertical irregularities of the Turkish building earthquake regulation (TBDY) published in 2018 was investigated. If these are not met, the restrictions or obstacles that they bring have been discussed. In addition, it was examined how the situation of having flexible joints or connections between the frame elements of brick walls affects the calculations. In order to evaluate how the removal of non-bearing brick walls affects earthquake performance and can be evaluated within the scope of vertical irregularities B1 (Weak Floor) and B2 (Soft Floor), earthquake tests were carried out in a group of buildings with wall interactive earthquake analyzes and the results were examined.

As a result, it was determined what size the contribution of brick walls to the rigidity of the building and the negative effects of its removal may be, and suggestions were made about what can be done to eliminate these effects. In addition, information about future studies on this issue has been provided.

Keywords: Wall Effect in Structure, Earthquake Performance, Vertical Irregularities, Weak Floor, Soft Floor.



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CONGRESS OF ENGINEERING AND NATURAL SCIENCES

ULUSLARARASI MÜHENDİSLİK VE DOĞA BİLİMLERİ ÇALIŞMALARI KONGRESİ

ISBN: 978-605-06728-5-5

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The Evaluation of the Design Results of the Reinforced Concrete Structures with Different Floor Numbers According to the Non-Linear Static Pushover Analysis in the Scope of Tbdy 2019

Abstract

The main purpose in performance-based design is to predetermine which damage zone, stipulated by the regulations, the structure will remain after a seismic load is registered on the same structure. The element to consider in this design philosophy depends on projecting the damage that the structure may sustain in an earthquake scenario. As a matter of fact, Turkish Structure Earthquake Code (TSEC) 2019 specifies the limits of the performance targets in new structures according to the importance of the structure and the levels of earthquakes. This research evaluates the non-linear pushover analysis results for structures with three, six and nine-story reinforced concrete frame system within the scope of TSEC 2019. Due to many reasons such as manufacturing defects, engineering service errors, damages that occur in the buildings after the earthquakes, especially after the recent ones such as Erzincan earthquake (1992) [1], Adana earthquake (1998) [2], Kocaeli earthquake (1999) [3], Van earthquake (2011) [4], Elazığ earthquake (2020) [5], İzmir earthquake (2020) [6], etc., the main theme of our study is the mainstream use of the non-linear analysis, and even making it mandatory in the Turkish Structure Earthquake Code, for acknowledging the realistic behavior of structures and designing the structures economically before the earthquake according to the seismic force to be applied in the design phase.

Keywords: Nonlinear Analysis, Performance Based Design, Plastic Hinge, Modal Capacity, Pushover Analysis



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ISBN: 978-605-06728-5-5

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Evaluation of Earthquake Performance of High Ductility Level Transmitting Steel Frame Bearing System

Abstract

It has been observed that the damage fractures in buildings and exceeded flow capacity in the elements of the load bearing systems have caused plastic deformations as a result of the frequent recent earthquakes.

An extra ductility can be gained in the structure by preferring steel structures instead of historical reinforced concrete and masonry structures, and by doing so, it is aimed that the structure does not exhibit brittle behavior during an earthquake.

In order for the load bearing system to stay standing for long years, the loads borne by the system should not exceed its capacity, and the system should have adequate rigidity and strength.

With the new regulation, the load bearing system should be modelled more realistically, and appropriate cross-sections should be preferred. In this study, moment transferring steel frame and a low capacity in terms of strength against lateral loads was selected, and as a result, base shear force was calculated. The relative rigidity with non-reduced floor and deflection controls of the system and the rigidities with reduced load bearing system strength were used, and their second-degree analyses were carried out.

Sap2000 computer software was used for the three-dimensional calculation models and system analyses of the structure. In the model, the edges that are attached perpendicular to the weak axes of the secondary beams and main beams, and the weak axes where the column is attached to the foundation were designed as jointed.

Keywords: Moment transmitting frame, capacity design principles, earthquake resistant steel building design



INTERNATIONAL

CONGRESS OF ENGINEERING AND NATURAL SCIENCES

ULUSLARARASI M hendislik VE Doęa Bilimleri  alışmaları Kongresi

ISBN: 978-605-06728-5-5

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Comparison of Experimental and Theoretical Elasticity Modules of Medium and High Strength Concrete Samples Obtained from Basalt Origin Aggregates From Three Quarries in Two Provinces

Abstract

The fact that aggregate extraction from the Yeşilirmak basin, especially Samsun, was prohibited due to the decrease in rainfall amounts and therefore sediment movement, led to an increase in demand for crushing stone production. In the district of Samsun province and two from the army and one from Fatsa C30 C60 samples produced with basalt aggregate quarry for building materials concrete samples in the laboratory of the University of Samsun Ondokuz May elasticity modules has been experimentally determined and, a comparison is made with the results of the theoretical modulus ACI, CEB and TSE norms. Although the values obtained by TSE and CEB formulas are close to each other, ACI formulas are different for medium and high strength concretes.

As a result of tests of concrete samples produced by aggregates taken from three existing basalt quarries in the Central Black Sea region, where quarries of mostly limestone origin are located; although the experimental elasticity results of basalt aggregate taken from the quarry in Atakum district were low, it was concluded that this was due to the high water absorption rate of the material in question.

Keywords: Elasticity, Basalt, C30 and C60 Concrete



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ISBN: 978-605-06728-5-5

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The Effects of Aspect Ratio and Volume Fraction of Steel Fibre on Fracture Energy of Lightweight Concrete

Abstract

In this study, the fracture energy of steel fibre reinforced lightweight concrete (SFRLC) was investigated. Lightweight concrete specimens were produced by using pumice aggregate and additions of steel fibres to mixes at 0, 30 kg/m³ ve 60 kg/m³ for aspect ratios of 55 and 80. Reference lightweight concrete grade was chosen as LC25/28. Unit weight and ultrasonic pulse velocity tests were performed on specimens for physical properties. For the mechanical properties, compressive and splitting tensile strength tests were made on standart cylinder specimens (150mmx300mm), and flexural test was also made on a notched beam specimens. The flexural test was achieved according to EN 14651 standard. The fracture energies and post-peak strengths (residual) of steel fibre reinforced lightweight concretes were determined by using data obtained from load-crack mouth opening displacement curves in flexural test.

Depending on the test results, it is determined that first crack loads of specimens increased by increasing both fibre aspect ratio and volume fraction. Similarly, increases on compressive, splitting and flexural strengths of specimens were observed. Fracture energies were obtained higher for steel fibre with highest aspect ratio at all fibre volume fractions. On the other hand, the higher residual strengths were observed at steel fibre with a high aspect ratio.

Keywords: Steel fibre, Fracture energy, compressive strength, flexural strength



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ISBN: 978-605-06728-5-5

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The Effect of the Vertical Component of Ground Motion on Precast Reinforced Concrete Buildings

Abstract

While earthquake waves spread to all directions of the ground, the produced motions by these waves are measured through recording as two horizontal and vertical components. Horizontal ground motions are major components of earthquakes, and more attention is considered to the horizontal earthquake component in current seismic design codes. On the other hand, the vertical component effect is considered in buildings with vertical irregularities. In recent studies, it has been reported that the vertical ground motion has significant effects on the seismic behavior of structures and causes an increase in damage or collapse.

This paper, it is aimed to evaluate the effect of the vertical ground motion on the seismic response of precast reinforced concrete buildings. Linear analysis of single-story precast building models with different geometric properties was made in the time-history analysis under the effect of horizontal and vertical ground motion components. To be used in the analyzes, 12 acceleration records, which attract attention with their vertical component in the literature, have been selected. The acceleration records were scaled by the SRSS method according to the 2018 Turkish Building Seismic Code.

The results of analysis, lateral drift ratio, column axial forces, and overturning moments, were evaluated. The spectral ratio of the earthquake records and the seismic effects of the vertical ground motion on the building were compared. Axial force in the vertical structural members has increased significantly when the vertical ground motion is included. Although the buildings examined are designed and detailed according to the seismic codes, it is recommended to take into account the vertical ground motion in the seismic design and evaluation of precast reinforced concrete buildings, especially around active faults.

Keywords: Vertical ground motion, Precast reinforced concrete building, Seismic response, Time-history analysis, Spectral ratio



INTERNATIONAL

CONGRESS OF ENGINEERING AND NATURAL SCIENCES

ULUSLARARASI M hendislik ve Doęa Bilimleri  alışmaları Kongresi

ISBN: 978-605-06728-5-5

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Comparison of Japan and Konya in Smart Transportation Systems

Abstract

Making the space smart today is one of the important investments made in the future so that societies can live in prosperity, harmony and happiness. The concept of Smart Cities, which emerged in this context, requires rationalizing many areas in it. Transport is one of the basic requirements in city life. Smart Transportation Systems (STS) enable cities to become more livable and more efficient. Tokyo is one of the leading cities in the world with Japan's investments from 1970 to the present and the future. Konya promises potential in this regard with its implementation studies and investments such as the Smart Public Transportation System (ATUS), Smart Stops, and Smart Intersections it has made in the last 20 years.

In this study, suggestions for the development of STS in Konya were developed with the comparison of Japan.

Keywords: Transportation, Smart Cities, Intelligent Transportation Systems, Konya, Japan

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ISBN: 978-605-06728-5-5

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Measures Taken on Road Tunnel Portals in Landslide Sections: Case of Erkenek Tunnel, Malatya

Abstract

Following the considerable investments in construction of dual-carriageway roads, as of 2020, Turkey has become a leading country with over 350 road tunnels exceeding 430 kilometers in total length on its state highways and motorways. Having a twin-tube tunnel with a length of 1816 m, Erkenek Tunnel is situated on the state highway D-850 between the districts of Doganşehir, Malatya and Golbasi, Adiyaman. Connecting Eastern Turkey with the Mediterranean Region, this tunnel enables passing through the mountainous Erkenek Province and provides time and fuel saving, safe, sustainable, and high capacity transport for motor vehicles, particularly under hard winter conditions. During the tunneling, many geotechnical problems arose at some critical sections where the tunnel axis intersected with the East Anatolian Fault zone – a major strike-slip fault zone in eastern Turkey. Furthermore, unexpected soil conditions due to the insufficient preliminary soil survey and boring works led to a significant struggle with mass wasting and subsidence in the excavation of the tunnel portals. Accordingly, additional landslide remedial and preventative measures were arranged for tunnel, itself and its portals and this study aims to present a case study of applied projects for portals of Erkenek Tunnel.

Keywords: Erkenek Tunnel, Landslide, Soil Remediation



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CONGRESS OF ENGINEERING AND NATURAL SCIENCES

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ISBN: 978-605-06728-5-5

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Is the Harmonic Generated by the Vibrator Used as a Sweep Signal ?

Abstract

In the conventional vibroseis method, the signal processing algorithms, including cross-correlation and deconvolution, are applied to convert the raw shot data into a seismic section. Vibrators are the best of the seismic sources and are widely used in exploration worldwide. The vibroseis seismic data quality is directly related to sweep signal harmonics. In other words, if the harmonic noise level increases, seismic quality decreases.

In conventional vibrators, harmonic distortion is generated as a result of nonlinear coupling of vibrators and considered as coherent noises and consequently effects of these harmonics, contaminations are subject to the elimination from the field records. Over the years different formalisms, using sweep parameters and phases, are proposed for the attenuation of these effects. In this study a new algorithm is developed using harmonic components of the signal sweep as an auxiliary source, instead of striving to eliminate them, in order to broaden the frequency bandwidth of the seismic imaging.

Our approach is tested on synthetic and real data and results are discussed.

Keywords: Sweep, Harmonic, Harmonic Distortion Elimination, Sweep Signal, High Frequency Sweep.



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ISBN: 978-605-06728-5-5

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A Preliminary Study on the Relationships between the Grain Contact Pattern and the Tensile Strength of a Rock Salt

Abstract

Rock salt is a crystalline rock type with low permeability and high ductility. Ductile rocks are important rock environments in terms of safe storage of natural gas and nuclear wastes. Therefore, it is essential to investigate the intrinsic properties that affect the strength of these rocks. The shape of the grains/minerals and the geometry of grain-grain contacts affect the strength of fragmented rocks. In this study, the relationship between the grain contact geometry and the tensile strength of Çankırı rock salt was investigated. For the purpose, fractal dimension theory was employed to quantify the pattern of grain-grain contact lines. In this context, the contact lines of the rock salt specimens were traced manually. Then, the tracings were digitized by performing image analyses. Fractal dimensions (Db) of patterns formed by contacts of each digitized image were calculated by using the box counting method. Finally, Brazilian tensile strength tests were carried out on the specimens whose fractal dimensions were determined. The results suggest that there is a negative linear relationship between the fractal dimension of grain-grain contacts and the Brazilian tensile strength.

Keywords: Rock Salt, Tensile Strength, Fractal Dimension, Box Counting Method, Image Analysis.



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ISBN: 978-605-06728-5-5

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Target Integration of Activities of Turkish Republic, Russian Federation and Central Asian Countries towards Social and Political Development of Central Asian Region in Contemporary Conditions

Abstract

The article focuses on the prospects of the interaction between Turkey, Russia and Central Asian countries in social and political developing the region of Central Asia. The relevance of the study is connected with the respecting the international cooperation principles and state sovereignty in international relations of Turkey, Russia and Central Asian countries as well as application of integration principle and target approach in political science stand as methodological basis. The research on the effective interaction between Turkey, Russia and Central Asian countries in the social and political development of central-Asian region in contemporary conditions suggests integrating efforts of Turkey, Russia and Central Asian countries, choosing special direction (targeting) that attracts resources of all actors involved in this interaction, with integration being possible within social and political development as well as for other trajectories (for example, economy, finance and investment) of the Central Asian region development. The article analyzes reasons for interaction of Russia and Turkey as main actors in in social and political development of the region of Central Asia in contemporary conditions. The examples of target integration of activities of the Turkish Republic, the Russian Federation and Central Asian countries in social and political development of the region of Central Asia in contemporary conditions.

Keywords: target integration, Turkey, Russia, Central – Asian countries, social and political development of the region of Central Asia.



INTERNATIONAL

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ISBN: 978-605-06728-5-5

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A Research on Phytoremediation with Transgenic Plants

Abstract

In recent years, there has been a great deal of scientific and commercial interest in alternative low-cost methods due to the high cost of traditional methods to remove contamination caused by inorganic substances in agricultural fields. Phytoremediation aims to break down pollutants from vital sources such as soil and water to receive in plant structure or to make them harmless. In this way, cultivation of sensitive plants to some heavy metals becomes convenient. Although many plants have been shown as candidate plants for phytoremediation in the past, the phytoremediation abilities of ideal hyperaccumulative plants have the potential to accumulate phytotoxic elements 50 to 500 times more than normal plants.

With transgenic approaches, transfer of determined genes or providing overexpression increases the phytoremediation ability of plants. This research has been prepared to provide comprehensive information about transgenic approaches in phytoremediation. In addition, it has an enlightening and guiding for future studies.

Keywords:



INTERNATIONAL

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ISBN: 978-605-06728-5-5

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Effects of Sodium Borohydride on Seed Germination and Development in Cress (*Lepidium sativum* L.) and Rocket (*Eruca sativa* Mill.)

Abstract

Cress (*Lepidium sativum* L.) is a vegetable species with spicy leaves, which has a short vegetation duration and is sensitive to flowering. Cress is a very beneficial plant in terms of health. Its leaves are considered to be rich in many minerals and vitamins. Its seeds and green parts have been used for phytotherapy against asthma, skin diseases, and various diseases since ancient times.

Rocket (*Eruca sativa* Mill.) is a cultivated plant native to Mediterranean countries. It can be cultivated all year round. Rocket, whose leaves are also used in salads, has a wide range of use in the pharmaceutical industry thanks to the rich metabolites it contains.

Plants need boron minerals in the formation of hormones that affect growth, germination, root development, increasing fruit number, bud and flower formation. Therefore, it is very important to meet the boron requirement of the grown plants.

In this study, the effects of using 5 different concentrations of sodium borohydride fertilizer on seed germination and growth of germinating seeds in cress and rocket were investigated. The study was set up according to a randomized plot trial pattern with three replicates and 3 pots for each repeat, in 15x15 cm pots and 40 seeds per pot. Sodium borate in the amount of 0 (control), 15, 30, 45, 60 mg L⁻¹ was given to pot trials. The pots were kept at a constant temperature of 22 ± 1 °C, 12 hours light and 12 hours dark during the application. After the application, the cotyledon samples were harvested on the 4th, 8th, and 12th days. For this purpose, germinating seed percentage, cotyledon length, and dry matter amount was determined. As a result of the study, it was concluded that sodium borohydride applications which compared to the control had positive effects on both cress and rocket in terms of the criteria examined.

Keywords: Cress, rocket, seed germination, sodium borohydride.



INTERNATIONAL

CONGRESS OF ENGINEERING AND NATURAL SCIENCES

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ISBN: 978-605-06728-5-5

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Determination of Some Properties of the Traditional Beyşehir Tarhana Produced by Adding Poppy

Abstract

Among the traditional food of our land, tarhana comes forward with its types in different regions. As the manufacturing process of tarhana contains different materials and methodology, the food gains intrinsic taste, flavor, scent and aroma.

As a result of this research, by adding a certain porportion of poppy which is rich in nutritional compounds, such as fat and protein to the traditional Beyşehir tarhana, also fot developing a new product and creating a new use area for poppy were intended. For this purpose, instead of wheat, popy was added to the traditional Beyşehir tarhana at proportions of 5%, 10%, 15%, 20% and 25%, and it was examined, by physical, chemical and organoleptic analysis, in comparison to the traditional Beyşehir tarhana produced as control sample under the same conditions.

In this study, it was observed that poppy affects the chemical and organoleptic characteristics of the traditional beysehhir tarhana positively. Taking these characteristics into account, it has been determined that the most suitable ratio of poppy to be used in tarhana production are 5% and 10%.

Keywords: Beyşehir tarhanası, Traditional Turkish food, Fermented foods, Poppy



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Failure Reasons of Pesticides Used in Agricultural Control and Solution Suggestions in the Southeastern Anatolia Region. Turkey

Abstract

Diseases, pests and weeds that cause problems in agricultural production causes significant yield losses. There are various methods of control to prevent yield losses. The main methods of control are cultural, mechanical, physical, biological, biotechnical and integrated control. However, when it comes to combating harmful factors, unfortunately the first thing that comes to mind is the chemical control. Chemical controls the most preferred method of struggle by the farmers because of its easy application by the farmer and its results in a short time. However, in the long term, many of the problems it poses are inextricable. Among these are the problems such as disrupting the natural balance among living things, causing residue problems on agricultural products and gaining resistance against harmful factors in over time. In this study which was done in the years of 2008-2013 in Diyarbakır, Şanlıurfa and Mardin provinces with face to face interviews with farmers especially with cotton-producing farmers, vegetables, fruits and vineyards, and on-the-spot determinations in these areas, identified the mistakes in chemical control in the Southeastern Anatolia Region. At the beginning of the mistakes, it was determined that the chemical spraying made without paying attention to the biology and bio-ecology of harmful factors. Other factors that were effective in failure were wrong pesticide selection, failure to pay attention to dosing, time of administration and non-compliance with spraying repetitions. The problem of resistance to drugs in harmful agents has been identified as another important problem.

Keywords: Agricultural control, pesticides, failure reasons, solution suggestions



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A Study on Damage Status of *Nysius cymoides* (Spinola, 1837) (Hemiptera, Lygaeidae) in Diyarbakir Cotton Cultivation Areas, Turkey

Abstract

Cotton is one of the most important agricultural products of both in Southeastern Anatolia Region and Turkey. More than half of our country's cotton planting areas and production are produced in this region. Diyarbakir is the province with the highest rate of cultivation areas in the region after Şanlıurfa. There are different organisms that are harmful in different phenological periods of cotton. *Nysius cymoides* is a polyphagous pest with a stinging-sucking mouth structure, and it has been determined that causes significant damage during the seedling period in cotton time to time. This study was carried out during the seedling period of cotton in Diyarbakir center, Bismil and Çınar districts in the years of 2014-2017. In the study, the density of the pest in cotton seedlings, the statues of damage, its spread in the field and the damage rates were determined. It was determined that the pest caused damage from the seedling period when the cotton seedlings had 3-5 leaves until the 15-20-leaf period when the first irrigation was made, and the pest concentrated on the root neck of the seedlings and under the soil, sucking the sap, also with the sucking and contamination with dirt on the leaves of the seedlings and causing them to dry. It has been determined that the pest is mostly concentrated on the edges and decreases inward in the cotton fields in the study areas. It has been determined that the pest density per plant varies from 2-3 to 15-20, the damage rate reaches up to 90-100% up to 3-5 meters inside and requires re-cultivation. In the cotton fields adjacent to irrigated grain plantings, no significant damage of the plant was detected. It was determined that 30-40% of the damage rate between 6-10 meters from the edge towards the inside becomes insignificant. In the cotton fields adjacent to irrigated wheat plantings, no significant damage of the plant was detected.

Keywords: *Nysius cymoides*, cotton, damage status, damage rate,



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Genome-Wide Analysis of GATA Transcription Factor Family in *Amborella Trichopoda*

Abstract

Genome-wide analysis provide raw data to understand how plants respond at the gene expression level, especially in stress-related pathways. After characterization and identification, in silico data are obtained to be associated with various stresses. These informatic data are very important for future studies and to know the gene and protein family in the related pathways, even if gene expression studies are not carried out at the transcription level. GATA transcription factors are a highly conserved family of proteins that are present in a wide range of organisms from vertebrates to plants and fungi. Plants are highly adaptable organisms to their environment due to the fact that they are substantially unable to leave the conditions that cause stress. This makes their stress response mechanisms largely flexible. The molecular mechanism behind this phenomenon lies behind the proteins that regulate which gene would be expressed and when this expression would happen. Gene expression is regulated strictly by proteins called transcription factors and plants depend highly on transcription factors abilities to provide the adaptability they essentially need. In this study, It has been identified and characterized GATA transcription factor family in *Amborella trichopoda*, which a primitive species of angiosperm. 20 GATA transcription factors have been defined. Their chromosome map, exon-intron regions, cis elements, Protein patterns, 3D structure, phylogeny and miRNA analysis were made

Keywords: GATA transcription factors, Genome-wide identification, *Amborella trichopoda*

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Investigation of Inhibition Effect of Methotrexate Chemotherapeutic Drug on Paraoxonase (PON1) Enzyme Activity

Abstract

Paraoxonase-1 (PON1) is a circulating antioxidant enzyme found in cell membranes and bound to high density lipoproteins (HDL). PON1 is a lactonase (LAC). Lactones make up their primary substrate. It is this catalytic capacity that allows PON1 to reduce lipid peroxides in the cell and circulating lipoproteins. In addition, PON1 has an esterase activity that disrupts organophosphate xenobiotics and nerve agents. PON1 is synthesized primarily by the liver and to a lesser extent in the kidney and colon, and then HDL-dependent blood is released. As an antioxidant molecule, PON1 plays an important role in lipid metabolism and the control of inflammation. PON1 enzyme activity is affected by inflammation changes and oxidized low-density lipoprotein (LDL) levels. PON1 has been shown to protect against oxidative stress by hydrolyzing oxidized phospholipids, maintaining HDL integrity and function, and preventing LDL oxidation. It also exhibits atheroprotective properties by reducing the capacity of macrophages to oxidize LDL.

In this study, the inhibition effect of chemotherapeutic drug (methotrexate), which is commonly used in chemotherapy, on human serum PON1 enzyme activity was investigated. K_i constant was found as 0.042 ± 0.012 mM. Methotrexate has a strong inhibition rate. However, the inhibition mechanism of drug was determined competitively from Lineweaver-Burk curve.

Keywords: Paraoxonase, Inhibition, Methotrexate



INTERNATIONAL

CONGRESS OF ENGINEERING AND NATURAL SCIENCES

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ISBN: 978-605-06728-5-5

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Investigation of Moisture Detection in Gunpowder with Terahertz Spectroscopy Method

Abstract

In the literature research, it was seen that Terahertz technology can detect and distinguish explosives, many explosives have fingerprints in the THz area, THz rays can penetrate objects such as paper, cardboard, leather, plastic and detect the substances behind them, and it provides the opportunity to measure without damaging the substances. Due to these features, it has been determined that it is used in different fields and branches and has emerged as a developing technology in recent years. Especially, THz rays have been found to be used and successful in determining moisture and water in many studies. It has been evaluated that (THz) rays can be used effectively to detect moisture in gunpowder by passing through gunpowder pouches, since they are extremely sensitive to water and moisture. Based on this information, in this study; Moisture determination of gunpowder was made on two different types of gunpowder using Terahertz Spectroscopy (Terahertz Time Domain Spectroscopy) method.

Keywords: Terahertz, THz, Terahertz Spectroscopy, Gunpowder, Moisture, Humidity



INTERNATIONAL

CONGRESS OF ENGINEERING AND NATURAL SCIENCES

ULUSLARARASI M hendislik VE Doęa Bilimleri  alışmaları Kongresi

ISBN: 978-605-06728-5-5

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Comparison of Lead, Zinc And Copper Equilibrium Adsorption Capacities of Nano-Structured Calcium Silicate, Rice Hull Ash And Activated Carbon

Abstract

This study covers the adsorption studies of lead, zinc and copper ions on the nano-structured calcium silicate, rice hull ash and activated carbon surfaces. The laboratory scale experiments showed that, the lead, copper and zinc equilibrium adsorption capacity of calcium silicate is much higher than that of the activated carbon and rice hull ash. Nano-structured calcium silicate which was produced synthetically in the laboratory was found as very favorable for the adsorption of especially high concentrations of lead ions in the aqueous solutions compared to industrial activated carbon and original rice hull ash.

Keywords:

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Two Novel Reagent for Detecting Latent Fingermarks

Abstract

Porous surfaces such as copier paper are among important forensic evidence and fingermarks on these surfaces can be detect with special reagents. Fingermark reagents that formed fluorescent products allow fingerprint detection with less fingerprint liquid. However, reagents (DFO and 1,2-indandione) with this property are extremely expensive. In this study, 5,8-dibromo-2-((2-hydroxyethyl)thio) naphthalene-1,4-dione and 9,10-dibromo-2-((2-hydroxyethyl)thio) anthracene-1,4-dione were synthesized and the structure of these compounds were determined using spectroscopic methods (¹H-NMR, ¹³C-NMR, Mass and IR). Dipping method was used to treat the fingermarks on copier paper with the solutions of these compounds. Then the fingermarks were heated (170 °C) to complete the reaction. The results obtained showed that both compounds react with the fingermark residue to produce impressions, which exhibit strong photoluminescence when illuminated at 440 nm viewed through a red filter. Furthermore, it was found that the results obtained with 5,8-dibromo-2-((2-hydroxyethyl)thio)naphthalene-1,4-dione is better than lawsone, which is a naphthoquinone derivative and recommended as a fingerprint reagent in the literature, and the results obtained with 9,10-dibromo-2-((2-hydroxyethyl)thio)anthracene-1,4-dione is similar to those of lawsone (Fig. 1).

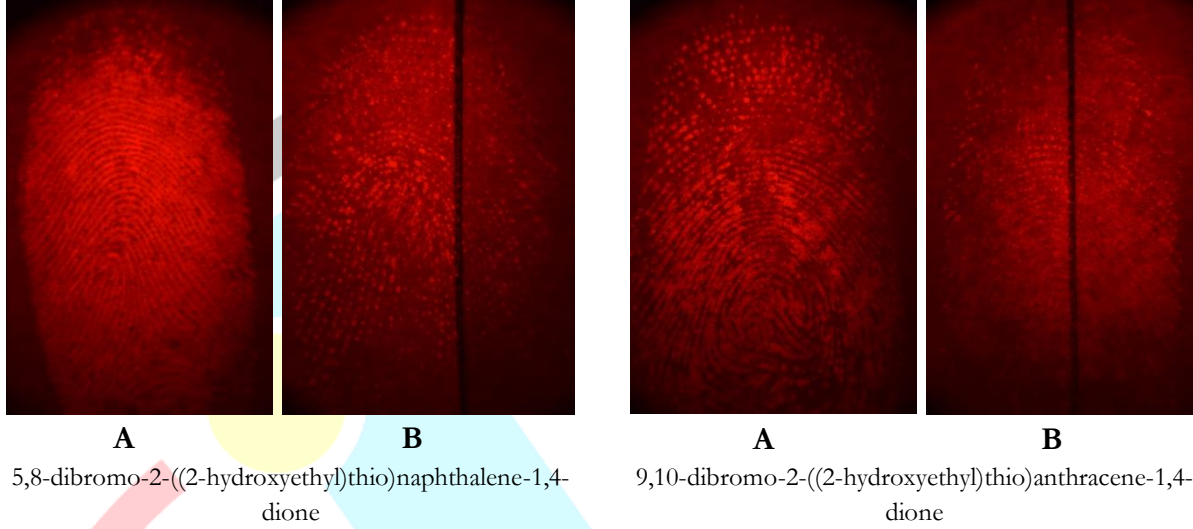


Figure 1. A) Latent fingerprints developed using 5,8-dibromo-2-((2-hydroxyethyl)thio)naphthalene-1,4-dione and 9,10-dibromo-2-((2-hydroxyethyl)thio)anthracene-1,4-dione; **B)** Latent fingerprints developed using synthesized compounds (on the left) and lawsone (on the right)

Keywords: Latent fingerprints, Fingerprint reagent, Naphthoquinone, Anthraquinone, Lawsone

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Investigation of the Tribological Properties of CuSn10 Tin Bronze Material with RF Magnetron Sputtering Coatings

Abstract

The reduction of material losses due to friction and wear is a target of tribological studies. The aim of this study is to obtain CuSn10 tin bronze with improved friction properties and high wear resistance. Bronze in copper based alloys are widely used as journal bearing material. In this study, using the Radio Frequency Magnetron Sputtering Technique, MoS₂ thin films were deposited on CuSn10 tin bronze substrates without interlayer, with Ti and Cr interlayer, respectively. MoS₂, one of the solid lubricants; It was preferred as a coating material in the study because it exhibits a low friction coefficient during sliding. Chemical compositions were determined from the surface of the substrates and films using the EDS detector of the Scanning Electron Microscope. Using the Scanning Electron Microscope, the coating thicknesses were measured from the side sections of the films obtained. Nano tribometer abrasion device was used to determine the tribological properties of the films. Graphs showing the friction coefficient-distance relationship of MoS₂ films deposited on CuSn10 tin-bronze substrates were obtained. The average friction coefficients and wear amounts of the films in the atmosphere were determined. As a result of the study, it was determined that MoS₂ film coatings with Ti interlayer on CuSn10 tin-bronze substrate gave the lowest friction coefficient and wear rate. It has been determined that MoS₂ coating with Ti interlayer on CuSn10 tin bronze is the most suitable coating pair to improve tribological properties.

Keywords: Tribology, Friction, Wear, Thin Film, Physical Vapour Deposition



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**Investigation of Design Parameters Effects on Hydraulic Coupling
Performance**

Abstract

Hydraulic couplings are devices which provide selectable power and torque transmission using hydraulic fluid and is mostly used in Automotive, Defense, Marine and Mining applications. Their main feature is enabling the power transmission between systems without mechanical connection. Transmission issues such as mechanical frictions, vibrations and shock loads can be minimised. Hydraulic couplings are designed according to their application, for example the internal blade profiles designed for power transmissions (Torque Converter) and hydraulic Brakes (Retarder) are completely different from each other. The optimum performance of a hydraulic coupling depends on its hydrodynamic design, taking into account the power or torque to be transmitted. Developments in computer processing power and Computer Aided Engineering (CAE) tools enable Engineers to optimise the couplings at the design phase. The rapid processing of computational fluid dynamics (CFD) solvers enable efficient optimisation of hydrodynamic designs. In this study, hydraulic coupling design parameters include profile angles, number of blades and inner coupling diameters. CFD flow simulations of the design parameters have been created to produce a simulated hydrodynamic performance. This investigation optimises the key design parameters of hydraulic couplings for future applications.

Keywords: Hydraulic Coupling, Retarder, Torque Converter, Transmission, Computational Fluid Dynamics (CFD).



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An Experimental Study for Optimization of Grinding Process Parameters to Avoid Grinding Burn on the Front Surface of a Diesel Injector Body

Abstract

The surfaces of diesel injector bodies subjected to high levels of fuel pressure under working conditions are generally hardened by carburizing process and then their front surfaces on which fuel holes exist are grinded. Grinding burns arising on grinded surfaces regarding improperly selected grinding process parameters could damage the injector by generating micro-cracks. In this study, the factors affecting grinding burn in surface grinding process after carburizing a diesel injector body manufactured from low-alloy steel of 18CrNi8 standard were investigated experimentally. Optimal combination of parameter levels to minimize the hardness decrease resulting from grinding burn was determined, considering the hardness decreases depending on carburization depth, as well. It was seen the most effective parameter in burn generation tendency is the revolution speed of grinding wheel for certain revolution speed of workpiece in the final grinding step carried out with fine cup wheel. Optimization study was validated by nital etching and visual inspection on grinded surface.

Keywords: Diesel Injector Body, Grinding, Low-alloy Steel, Carburizing, Grinding Burn, Hardness, Nital Etching, Taguchi Design of Experiment, Optimization



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Effect of Triangular-Shaped Winglets on Heat Transfer for Compact Fin-Tube Heat Exchangers

Abstract

Effect of air side vortex generator on heat transfer distribution over the channel walls for flat tube bank fin heat exchanger was numerically investigated. Vortex generators consists of triangular winglets which produced by punching on the fin and adjacent to the tube wall. Three different dimensionless winglet aspect ratios ($w/l=6.0, 4.0$ and 2.0) and three different winglet inclination angles ($\alpha_k=55^\circ, 35^\circ$ and 20°) were investigated to determine the most feasible design parameters. Simulations were carried out under laminar flow ($Re=400, 800, 1600$ and 2000). Numerical studies were conducted by Ansys FLUENT using RNG k- ϵ turbulence model. In accordance with the flow speed, mesh structure has been generated such that $y^+\cong 1$ and aspect ratio of the elements does not exceed $5/1$. Nu number distribution over the channel walls, average Nu number, Thermal Performance Factor (TPF) and friction factor were quantitatively investigated and results were compared with the flat surfaced fin-tube heat exchanger. Results showed that increasing w/l , winglet inclination angle and flow speed increased both heat transfer and pressure loss. Highest increase in heat transfer was obtained 27.21% by $\alpha_k=55^\circ$ and $w/l=6.0$ at $Re=2000$. However, results of TPF revealed that the most feasible design parameters of winglets are $\alpha_k=20^\circ$ and $w/l=6.0$.

Keywords: Heat exchanger, convective heat transfer, vortex generator, thermal performance, CFD



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Development of Fatigue Test Device For Torque And V-Arm Parts Used In Heavy Load Vehicles and Modeling of Fatigue Analysis

Abstract

Nowadays dynamic tests of suspension parts could not fully simulate the position on the vehicle and the loads and frequencies imposed on the part due to sample connection. Therefore within the scope of this study, a test system that can perform dynamic tests in the horizontal position of parts such as v-arm with different geometries will be developed, fatigue and displacement analysis will be made using various analysis programs and the results will be compared.

The strength and density tests of rubbers classified according to different mixing ratios for bushed parts will be carried out with three different oils. After the part and bushing are assembled, tests will be made with the apparatus designed for the test device at the angles that the part will take on the vehicle. The data obtained from the test device and the analysis program will be compared and revision will be made in the test device if necessary. The suspension system requirements provided by the vehicle manufacturer will be taken into account in the tests.

Keywords: Suspension systems, Front geometry play, Horizontal dynamic tester, Vehicle handling,



INTERNATIONAL

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ISBN: 978-605-06728-5-5

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Electric Clamp with Incombustibility and Anti-Magnetic Feature Design and Production

Abstract

The transformers are components used to increase or decrease the voltage or current in the electrical circuit. During the operation of transformer stations, problems can occur such as cracks, fractures, deformation, abrasions, corrosion, burning because of excessive load on the part, vibrations, unsuitable environmental factors, pollution and insufficient lubrication. For this reason, the need for a new generation electric clamp design in the sector has been the driving force for this study. In this study, a new electrical clamp with anti-magnetic and incombustibility features was designed and produced in order to bring a permanent solution to the mentioned problems. Within the study, determination of quality standards, customer needs and requests, creation of a three-dimensional model using computer-aided design programs, material selection, pilot production by plastic injection method, testing and characterization activities were carried out. In this context, a new electric clamp which is made of polymer material, with incombustibility and anti-magnetic features, increased strength compared to the clamps currently used usually made of wooden material, met the quality standards and requirements, customer expectations and requests was designed and produced. On the other hand, a new product was developed for the company's product range and the domestic market of the sector.

Keywords: Electric clamp, Incombustibility, Anti-magnetic, Transformer, Polymer, Plastic injection.



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Application Of Geometry Based Math Modeling Of Solidification To Complex Cast Sections

Abstract

Geometry-based mathematical modeling is used in the casting industry as a pre-design tool before full simulation is applied or before trial castings are made. In this study, the applicability of the Unit Area approach, which is a geometry based modeling tool, to the drawing of solidification isotherms on two dimensional sections of complex castings was investigated. As a method, firstly the casting section to be examined is created in the Autocad program environment, using the formulas of the Unit Area method given in previous studies for outer corners, inner corners, cylindrical circular surfaces, cylindrical planar surfaces and spheres, the solidification isotherms of the basic junction points on the casting section with the help of a simple isotherm calculator program. The regions between these basic isotherms are combined with the closest tangent and parallel taking techniques to complete the isotherms of the whole section. The isotherms completed on the casting cross section are examined and the locations of possible macro casting errors are tried to be predicted. In this study, the application of isotherms based on the Unit Area approach to combinations of rectangular, cylindrical and spherical shapes, application to the angled edges and analysis of multiple sections from the same casting was performed for the first time.

Keywords: Casting, Solidification, Geometry Based Mathematical Modeling, Unit Area Approach.



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ISBN: 978-605-06728-5-5

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Automation Supported Solution for Die Assembly / Disassembly

Abstract

In this study, a die assembly / disassembly bench has been designed for the assembly / disassembly of dies used in plastic deformation, taking into account all processes and requirements for the needs. The ability to die assembly / disassembly processes for dies, which differ a lot according to production process processes, directly affects many production items such as labor, energy, raw materials, time and work accidents in the manufacturing industry. The aim of this study is to prevent occupational accidents and to increase productivity in the parameters affecting other production by fulfilling the equipment needs specific to these dies in a single machine with automation support during the preparation of the dies produced for the product. Companies in the manufacturing industry generally perform assembly / disassembly operations manually unless they have an automatic process, and extra press force is needed for dies with mechanisms such as spring dies. In order to capture this extra pressing power and to process in hot dies, assembly operations are carried out on hydraulic / eccentric benches used in production, and the targeted piece / hour rates and production process are negatively affected as these benches work in mass production. In addition, this situation leads to unwanted deformations in the dies, loss of time and work force, and even serious work accidents. Within the scope of the study, the designs of the bench to be developed were made, and it was aimed to cover the minimum area in terms of size and to be able to operate at maximum power. In the ANSYS program, various analyzes have been made in order to reach correct results, since the load values on different points of the bench have different forces. During these analyzes, the most ideal design was achieved with the differentiation of the number of columns. Separate analyzes were made and evaluations were carried out, specific to the parts of the bench and as assembled (bench). After the design and analysis processes, the prototype bench parts were manufactured and the hydraulic unit was assembled. It is aimed to realize a system that can work according to the need by making machine software for automation works. By collecting dies on the prototype bench for spring dies, hot forging dies and many dies of different qualities, the work has been confirmed to be suitable for all uses.

Keywords: Die Assembly, Automatisations, Delta PLC, Bench Design, Assembly-Disassembly, Efficiency



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CONGRESS OF ENGINEERING AND NATURAL SCIENCES

ULUSLARARASI MÜHENDİSLİK VE DOĞA BİLİMLERİ ÇALIŞMALARI KONGRESİ

ISBN: 978-605-06728-5-5

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Development of New Die Design in Towing Hook Production

Abstract

In this study, a new design has been developed for towing hook dies used in hot forging processes. For this objective, analysis studies were carried out with different process parameters and methods for new designs in dies for both hot forging process and product. After the analysis, the die designs were determined that produced the prototype products at the optimum speed, efficiency and quality. While designing a special die for hot forging operation, a new die design has been developed in which both processes can be performed using a single die with two stages, pre-shape and final shape. Compared to the dies studied for hook groups in the literature and our old dies currently being worked, it is aimed to eliminate the errors caused by the inability to calibrate the final shape such as early wear, short die life, burr residue formation. Such a technique specific to the part as specific to the towing hook was performed for the first time, and with the die design developed by comparing the results of analysis studies, field trials and prototype studies in the Q-Form simulation program, the production of towing hook at optimum efficiency was achieved.

Keywords: Towing hook, Hot Forging, Die Design, Q FORM, Wear



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CONGRESS OF ENGINEERING AND NATURAL SCIENCES

ULUSLARARASI MÜHENDİSLİK VE DOĞA BİLİMLERİ ÇALIŞMALARI KONGRESİ

ISBN: 978-605-06728-5-5

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Breast-Pump Design

Abstract

WHO stated that infants should be only fed with breastmilk for the first six months, and then breastmilk should be given as a supplement in their feeding until the age of two. Especially for mothers who start working in the period that when the legal leave ends want to feed their baby with breastmilk. Due to that, the mother should express her breastmilk both at work and home. The most effective way the express milk with an electric breast-pump which design is expected to have that complies with the standards. In this study, it is aimed to introduce a new design that emphasizes ergonomic, user-oriented comfort for mothers. For this purpose, design criteria were determined by using the systematic construction method. The design was carried out in accordance with the criteria obtained. In today's breast-pumps, the pressure difference of 200 mm Hg determined by Egnell is taken as a reference. The pressure value in this study, which takes the mother's comfort as reference, was used. The designed pump was connected to the artificial breast model for testing. Then, the pressure values reached by a pressure sensor and the vacuum profiles formed were measured. The obtained values are compared with theoretical values.

Keywords: Electrical breast-pump, Systematic approach, Breastmilk, Industrial design, Optimization



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CONGRESS OF ENGINEERING AND NATURAL SCIENCES

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ISBN: 978-605-06728-5-5

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Nonlinear Transformations in 3-Dimensional Euclidean Space

Abstract

In this paper, we define a nonlinear transformation between space curves which preserves the ratio of τ/κ of the given curve in 3-dimensional Euclidean space. We obtain the projections of this transformation by the help of the curvatures of the curve. Finally, we consider some curves on the ruled surface as an associated curve pair to the transformation.

Keywords: Mannheim curve, constant pitch curve, nonlinear transformation

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Inverse-Nodal Problem for a Discontinuous Sturm-Liouville Operator

Abstract

We consider the following boundary value problem with discontinuous conditions inside the interval

$$\begin{aligned} -y''(x) + q(x)y(x) &= \lambda y(x), \quad 0 < x < 1, \\ y'(0) &= y'(1) = 0, \\ y\left(\frac{1}{2}+0\right) - y\left(\frac{1}{2}-0\right) &= ay'\left(\frac{1}{2}-0\right), \\ y'\left(\frac{1}{2}+0\right) - y'\left(\frac{1}{2}-0\right) &= \frac{1}{a}(a^2\lambda - b)y\left(\frac{1}{2}+0\right). \end{aligned}$$

Here, λ is the spectral parameter, $b = a^2q\left(\frac{1}{2}\right)$, $a > 0$, $q \in L_1(0,1)$ and $\int_0^1 q(x)dx = 0$. We have proved that the potential function of the problem can be uniquely determined by nodal points.

Keywords: Inverse-nodal problem, Sturm-Liouville, Discontinuity condition, Potential, Eigenvalue



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CONGRESS OF ENGINEERING AND NATURAL SCIENCES

ULUSLARARASI MÜHENDİSLİK VE DOĞA BİLİMLERİ ÇALIŞMALARI KONGRESİ

ISBN: 978-605-06728-5-5

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Investigating the Loading Abilities of Pistachia Sporopollenin Exine Capsules for Drug Delivery

Abstract

The encapsulation of molecules protects them from harsh environmental conditions. Microencapsulation is used in many areas including drug delivery for its advantages. The need for natural and compatible encapsulants arose the interest to the sporopollenin exine capsules (SECs). The SECs are the skeletal structure of the pollen grain and can be easily extracted by cheap and ecofriendly methods. Their pores make them proper materials for encapsulation.

In this study, the Pistachia SECs were included for their porous morphology. The Pistachia SECs were extracted from the pistachio pollen grains by an acidolysis method. The elemental analysis and SEM were performed for the properties of the extracted pollen grains. Then bovine serum albumin (BSA) was loaded into SECs by passive and centrifuge loading. The loading was controlled by TGA and FT-IR analyses. The cross-sectional image of pistachio SEC indicates that the inner elements are evacuated, the surface is cleaned from fat and surface components. The elemental analysis demonstrates successful protein removal. The absorbances of loaded SECs are increased when compared with SEC indicating that BSA is loaded to the SECs. After loading BSA, the mass loss steps of thermograms of loaded SECs increased to four in both loading methods. The analyses showed that pistachio SECs can be loaded by passive and centrifuge loading successfully.

Keywords: Sporopollenin exine capsule, Drug delivery, Passive loading, Centrifuge loading, Pistachio pollen

Acknowledgement

This work was supported by TUBITAK with project number 218M267 and Inonu University BAP with project number FBG-2019-1709 and FYL-2019-1710.



INTERNATIONAL

CONGRESS OF ENGINEERING AND NATURAL SCIENCES

ULUSLARARASI M hendislik VE Doęa Bilimleri  alışmaları Kongresi

ISBN: 978-605-06728-5-5

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Damage Analysis of Metal Matrix Composite Plates Under Ballistic Impact Loading: A Comparative Study

Abstract

In this study, ballistic resistance and damage mechanisms of Al/SiC metal matrix composite plate produced by powder stacking and hot-pressing method were investigated under ballistic impact loading with 0.3 caliber fragment simulating projectiles. In addition, the ballistic test results of the metal matrix plate were compared with the functionally graded plate containing the same volumetric fraction of Al and SiC constituent.

The test results of two different types of composite plates showed that the change of the volume fraction of the ceramic constituent through the plate thickness has a significant effect on the ballistic performance.

Keywords: Metal matrix composites, Functional graded materials, Powder metallurgy, Ballistic performance.

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ULUSLARARASI MÜHENDİSLİK VE DOĞA BİLİMLERİ ÇALIŞMALARI KONGRESİ

ISBN: 978-605-06728-5-5

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Investigation of the Effect of Reaction Time on Alumina Impurity in Boehmite Production

Abstract

Alumina is an intermediate product that is obtained through various phases starting from bauxite ore and is widely used industrially and also constitutes the main input in the preparation of metallic aluminum. The inputs to be used during the synthesis directly affect the purity of the product to be obtained. In this study, Bohmit was produced by hydrothermal method as an alternative to alumina synthesis over traditionally used ATH and ATH was compared with its impurities. Then, its effect on alumina impurity by calcining was investigated by comparing it with ATH. The products obtained were characterized with the help of SEM, XRD, FTIR, XRF, and Particle Size Analyzers. In addition, the thermal properties of the samples were investigated by TGA and DSC methods. The results show that synthesized Böhm structures contain 87.5% less soda impurities compared to ATH.

Keywords: Boehmite, Hydrothermal Synthesis, Crystalization, Industrial Alumina



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CONGRESS OF ENGINEERING AND NATURAL SCIENCES

ULUSLARARASI MÜHENDİSLİK VE DOĞA BİLİMLERİ ÇALIŞMALARI KONGRESİ

ISBN: 978-605-06728-5-5

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Design Optimization of Ductile Cast Iron Manhole Cover

Abstract

Access covers can be designed in many ways to provide the structural requirements such as performance, economy and appearance. The convenient design of these covers is a very important factor for their structural performance. Shape of the covers is a very important factor for their structural behaviour. A poor design might cause fault and quality problems in a structure. It may conduce to decrease quality, performance and to increase cost and unnecessary material usage. Therefore, structural design is a major concern in engineering structures. In recent years, with the improvement of computational and structural technology, there have been many studies on the optimal design selection. This study focuses on manhole covers and pursuing their best producible shape. For this purpose, a topological optimization was conducted to assist the decision of geometrical efficiency as well as structural rigidity. A conceptual model is numerically modelled and finite element analyses (FEA) for a distributed load case are carried out. Reviewing the FEA results, the most appropriate model is determined by the application of this performance qualification method.

Keywords: Ductile Cast Iron, Manhole Cover, Design Optimization, Finite Element Analysis



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ULUSLARARASI MÜHENDİSLİK VE DOĞA BİLİMLERİ ÇALIŞMALARI KONGRESİ

ISBN: 978-605-06728-5-5

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Microstructural and Electrochemical Properties of (Mg_{0.2}Co_{0.2}Ni_{0.2}Zn_{0.2}Li_{0.1}Al_{0.1})O High Entropy Oxide Anode

Abstract

One of the main driving forces in materials science is the discovery of new materials with functional properties. The discovery of high entropy oxides is one of the best examples of this situation. High entropy oxides are a new class of materials that have attracted great attention in recent years due to their superior lithium storage properties and electrochemical performances. In this work (Mg_{0.2}Co_{0.2}Ni_{0.2}Zn_{0.2}Li_{0.1}Al_{0.1})O high entropy oxide is synthesized using conventional solid state method and examined its electrochemical properties in lithium-ion cell as anode material. It has been characterized by using X-ray diffraction (XRD) and scanning electron microscopy (SEM) technique in which the high entropy oxide has a single phase rock-salt crystal structure. The electrochemical performance of the (Mg_{0.2}Co_{0.2}Ni_{0.2}Zn_{0.2}Li_{0.1}Al_{0.1})O anode is evaluated by assembling CR2016 type coin cell. As a result of the galvanostatic charge-discharge tests (Mg_{0.2}Co_{0.2}Ni_{0.2}Zn_{0.2}Li_{0.1}Al_{0.1})O was determined that the anode has an initial discharge capacity of 1429 mA h g⁻¹ at a current density of 100 mA g⁻¹. This value shows that the (Mg_{0.2}Co_{0.2}Ni_{0.2}Zn_{0.2}Li_{0.1}Al_{0.1})O high entropy oxide anode is good potential for use in lithium-ion batteries.

Keywords: Li-ion Batteries, Conversion-Type Anode, High-Entropy Oxide, Rock-Salt Crystal Structure, Electrochemical Properties.



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CONGRESS OF ENGINEERING AND NATURAL SCIENCES

ULUSLARARASI MÜHENDİSLİK VE DOĞA BİLİMLERİ ÇALIŞMALARI KONGRESİ

ISBN: 978-605-06728-5-5

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Synthesis and Characterization of rGO@SiO₂ Nanostructures for Li-Ion Batteries

Abstract

Nanostructured materials are widely investigated as anodes in Li-ion batteries due to their outstanding chemical and electrical properties. Among them, silicon (Si) based anode materials of great interest due to their known high theoretical specific capacity and high abundance. However, high volumetric changes in Si anodes cause irreversible capacities. For this reason, SiO₂-based anode materials offer an alternative way. In this study, reduced graphene oxide/silica (rGO@SiO₂) nanostructures was prepared and its electrochemical performances was observed in CR2016 coin cell as anode. The galvanostatic charge-discharge tests showed that the rGO@SiO₂ anode, initial and reversible discharge capacity of 591.4 mA h g⁻¹ and 243.3 mA h g⁻¹ at current density 100 mA g⁻¹, respectively. Although the initial discharge capacity is relatively low, the cycling stability of rGO@SiO₂ is quite satisfactory compared to Si based anodes. Therefore, it has the potential to be used in Li-ion batteries as an alternative to Si based anodes.

Keywords: Li-ion Batteries, Nanostructures, Si-based Anodes, SiO₂ Nanoparticles, Reduced Graphene Oxide



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CONGRESS OF ENGINEERING AND NATURAL SCIENCES

ULUSLARARASI MÜHENDİSLİK VE DOĞA BİLİMLERİ ÇALIŞMALARI KONGRESİ

ISBN: 978-605-06728-5-5

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Installation of Metal-Organic Chemical Vapor Deposition (MO-CVD) System and Process Optimization for Iron Oxide Thin Film Coatings

Abstract

Surface engineering has gained significant importance in recent years. Modification of only the outermost atomic layer enhances different chemical and physical properties of a material such as its catalytic activity, and its corrosion, wear and antimicrobial resistance. Considering the impact of COVID-19 pandemic, enhanced surfaces are becoming more utilized in daily applications. In this context, a custom-designed Metal Organic Chemical Vapor Deposition (MO-CVD) furnace was established including four mass flow controllers for enabling the inlet of gas mixtures with a controlled ratio, a bubbler for evaporation of the precursor and a high temperature furnace for deposition of thin films. In the current study, iron oxide thin films were deposited on copper and glass substrates. As precursor, iron (III) acetylacetonate was evaporated in bubbler and carried into deposition chamber by nitrogen. Volatile precursor was thermally decomposed into amorphous iron oxide film inside the deposition chamber. For promoting the formation of a crystalline structure, as-deposited films were heat treated under controlled atmosphere. Phase analysis was conducted by X-ray diffraction analysis. To evaluate the effect of optimized operating condition on film growth and surface morphology, scanning electron microscopy imaging was performed. Finally, presence of impurities was investigated by energy dispersive spectroscopy.

Keywords: Iron Oxide, MOCVD, Surface Engineering, Thin Film Coatings, Thin Film Deposition



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ULUSLARARASI MÜHENDİSLİK VE DOĞA BİLİMLERİ ÇALIŞMALARI KONGRESİ

ISBN: 978-605-06728-5-5

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Identifying Differentially Expressed Genes Based on Nonnegative Matrix Factorization Using Gene Expression Data of Glioblastoma Stem Cells

Abstract

Background: Glioblastoma multiforme (GBM) is one of most lethal and an aggressive malignant brain tumor that allowing an average progression-free survival of 7 months and an average survival of 15 months even in multimodal therapy. Glioma stem cells (GSCs) play a key role in tumor formation of astrocytomas (grade II and III) and glioblastoma multiforme (grade IV-GBM). Using nonnegative matrix factorization, this study aimed to characterize the differences in gene-expression profiles among GSCs specifically glioma cell line, and a human GBM tissue sample.

Materials and Methods: In this study, we try to demonstrate the capability of NMF to recover meaningful biological information from malignant brain tumor RNA-microarray data. NMF clearly shows to have advantages over other methods such as principal component analysis or hierarchical clustering. Results: The NMF clearly found the five groups of metagenes. The metagenes of the NMF suggested that solute carrier family 27 member 3 (SLC27A3), checkpoint kinase 1 (CHEK1), and ring finger protein 113A (RNF113A) contribute to the stemness of GSCs. The biological pathway and gene ontology enrichment analyses resulted associated details about the functions of metagenes in GSCs.

Conclusion: The novel application of NMF bioinformatics pipeline was an effective method to elucidate the common features and discrepancies among samples of gene expression data.

Keywords: Glioblastoma stem cells, differentially expressed genes, Glioblastoma multiforme (GB), nonnegative matrix factorization, gene expression



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ULUSLARARASI MÜHENDİSLİK VE DOĞA BİLİMLERİ ÇALIŞMALARI KONGRESİ

ISBN: 978-605-06728-5-5

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Optimization of Waterproof Bulkheads in Warships against Underwater Blast Loads

Abstract

Unlike commercial ships, warships are designed to withstand military operational loads. This ability of warships, which still have the ability to continue when the weapon is hit, is called survivability. Within the scope of survivability analysis, damage to the structures of the warships can be detected by performing explosion simulations in order to design warships that are resistant to many enemy threats that can be exploded underwater or above the water.

The gas bubble with high temperature and pressure, which occurs as a result of the explosion of underwater explosives (mines, torpedoes, etc.), moves towards the water surface at the speed of sound due to the buoyancy of the water. There are several studies about underwater explosions that can empirically calculate this pressure, called shock wave, have been carried out by various researchers. By determining the type of threat and the explosion configuration, empirically calculated underwater blast pressures can be applied to the structure using the Finite Element Method (FEM) to examine the behavior of the structure. In this study, the structural analysis of different types of watertight bulkheads that divide ships into compartments against calculated blast loads was examined by the FEM, and it was aimed to determine the type and details of the watertight bulkheads which have the highest strength.

Keywords: Underwater explosion, Watertight bulkhead, Shock, Warships, Survivability



INTERNATIONAL

CONGRESS OF ENGINEERING AND NATURAL SCIENCES

ULUSLARARASI Mühendislik ve Doğa Bilimleri Çalışmaları Kongresi

ISBN: 978-605-06728-5-5

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A Quantitative Risk Assessment on Microbial Dynamics and Human Health Risks between Beach Water and Sand

Abstract

The potential impacts of climate change require a change in recreational beach management and policy. It is expected that the pollution in the sand-water continuum on the beaches, changing storm frequency, and flood effects will create the need for an effective beach management to protect public health.

In this study, between sea water and beach sand in Antalya, Konyaaltı beach was aimed to examine the seasonal differences and recreational relationships. Quantitative microbial risk assessment (QMRA) was performed using disease risks of pathogenic microorganisms in wet and dry seasons, region-specific seawater characteristics, water ingestion based on literature data, pathogen dose response and morbidity data. According to the results of this study, it has shown that QMRA is applicable for recreational risk estimation in wet weather conditions and wet beach sand. It can help the development of recreational water quality criteria specific to the region, depending on the climatic conditions.

Keywords: Quantitative microbial risk assessment (QMRA), Beach sand, Pathogens, Bathing water quality, Antalya



INTERNATIONAL

CONGRESS OF ENGINEERING AND NATURAL SCIENCES

ULUSLARARASI M hendislik ve Doęa Bilimleri  alışmaları Kongresi

ISBN: 978-605-06728-5-5

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Face Detection and Tracking Using SVM and HaaR Features

Abstract

The main objective of the project at a personal level is to be able to increase knowledge about Artificial Intelligence, more specifically about the recognition applied to people. Another objective raised in this project is to know and apply different algorithms training methods. As for the project, the main objective is to achieve an acceptable error rate in recognizing and detecting facial features, being possible greater than 70% in terms of facial recognition. Another objective is to acquire software with an interface oriented and easy towards the user and the possibility that the database can be modified by the user.

Keywords: AI. Machine learning. Face recognition.

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CONGRESS OF ENGINEERING AND NATURAL SCIENCES

ULUSLARARASI MÜHENDİSLİK VE DOĞA BİLİMLERİ ÇALIŞMALARI KONGRESİ

ISBN: 978-605-06728-5-5

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Application of Geometry Based Math Modeling of Solidification to Complex Cast Sections

Abstract

Geometry-based mathematical modeling is used in the casting industry as a pre-design tool before full simulation is applied or before trial castings are made. In this study, the applicability of the Unit Area approach, which is a geometry based modeling tool, to the drawing of solidification isotherms on two dimensional sections of complex castings was investigated. As a method, firstly the casting section to be examined is created in the Autocad program environment, using the formulas of the Unit Area method given in previous studies for outer corners, inner corners, cylindrical circular surfaces, cylindrical planar surfaces and spheres, the solidification isotherms of the basic junction points on the casting section with the help of a simple isotherm calculator program. The regions between these basic isotherms are combined with the closest tangent and parallel taking techniques to complete the isotherms of the whole section. The isotherms completed on the casting cross section are examined and the locations of possible macro casting errors are tried to be predicted. In this study, the application of isotherms based on the Unit Area approach to combinations of rectangular, cylindrical and spherical shapes, application to the angled edges and analysis of multiple sections from the same casting was performed for the first time.

Keywords: Casting, Solidification, Geometry Based Mathematical Modeling, Unit Area Approach.



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Volatil Composition of Ginger (*Zingiber Officinale*) in Relation to Different Cultivation Practices

Abstract

Ginger (*Zingiber officinale*), herbaceous perennial plant of the family Zingiberaceae, probably native to southeastern Asia. Its use has been known from ancient times in countries like India and China and by the 1st century Arabs introduced to the Mediterranean region. In the middle ages this product was introduced in the Europe. Its aromatic, pungent rhizome (underground stem) is used as a spice, flavoring, food, and medicine. The plant rhizome posses several medicinal effects, such as antidiabetic, antibacterial, anti-inflammatory, antitumoral, etc.

The major constituents that ginger contains includes carbohydrates (over 50%), lipids, ~6.0% and a several terpenes and phenolic compounds. Terpenes include zingiberene, b-bisabolene, etc. Phenolic compounds include zingerone, shogaol. Together with phenolic compounds, volatile terpenes are responsible for its characteristic odour and flavour.

In this paper we have studied the volatile oils content, organoleptic characterisation, microbiological status, nutritional value, and microelements from ginger rhizome, produced from two different agricultural practices, conventional and organic agriculture, marketed in spices shops of imported origin.

We have found a difference among content per dry weight from samples of different origins. In samples of conventional agriculture, the volatile oils were found 1.5 %, while the samples from organic agriculture 1.7 % per dry weight. Fresh ginger oil had more oxygenated compounds (27.9%), and geranial (8.5-9.2%) as the second main compound.

Keywords: Ginger, *Zingiber officinale*, volatile oils, agricultural practices, spices and herbs



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Experimental Investigation of the Classification Performance of Two-Stage Particle Classifier Mini Cyclone

Abstract

Particles of different sizes are produced during the production of micro and macro sized particles, which are widely used in industrial applications. On the other hand those in a certain size range produce effective solutions. In this case, the particles produced must be classified in certain size ranges. In this study, both the separation and classification potential will be examined with one of the new applications, cyclone classes. Speed, separation height and outlet pipe plunging height will be taken as parameters. Working with mine cyclone which is specially designed considering the laboratory facilities.

Keywords: cyclone separator, cyclone classifier, two-stage cyclone classifier



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Usage of Wooden Composite Material in Space Design

Abstract

The concept of material has gained importance and evaluated in the context of the areas where people live their lives throughout the historical process, the designs of these areas and the meanings they attach to these areas. Many materials such as wood, glass and metal, which are actively involved in the design of buildings, have ceased to be structural elements with the advancement of technology, and have taken their places in the organization as decorative and surface coating materials. When examined as a spatial organization and design approach, it is seen that each material has a meaning in the interior, as well as solutions such as forming more easily in the formal sense or choosing equivalent materials for these materials due to cheaper costs. Wood composite materials come out as one of these materials. The aim of this study is to examine the reasons of preference and usage of wood composite materials used in different areas in space design with visual examples in the context of working offices selected as examples and to reveal the effect of the design within the spatial whole.

Keywords: Interior Design, Wooden Composite Material, Office Design, Space Organization.



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Coastal Landscape Design Project of Gideros Bay (Cide-Kastamonu)

Abstract

Coastal areas where sea and land meet; are special areas that should be protected as a natural resource and preferred by many sectors. The attractiveness of the coasts is an important factor in the excessive use of these areas as recreational areas and attracting people to the shore. Coastal landscape design projects are balance tools in protecting the ecological value of coastal areas and using these areas systematically. In this study, Gideros Bay of Kastamonu province Cide district was chosen as the study area. Besides attracting visitors with the visual richness of the area, there is no regulation for visitors. The area is used uncontrolled. These factors influenced the selection of the area. In the study, three different landscape design projects presented for the area. The projects were drawn and visualized with computer aided software and hand drawn designs. It is anticipated that projects and proposals prepared as a result of the study will be add economic value to the region. So the area will be included in the tourism route of the West Black Sea Region and the area will be an alternative to the visitors. At the same time, planned use will prevent the natural resource values of the area from being damaged.

Keywords: Coast, landscape design, coastal project, Gideros, Kastamonu, Bartın.



INTERNATIONAL

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ULUSLARARASI M hendislik ve Doęa Bilimleri  alışmaları Kongresi

ISBN: 978-605-06728-5-5

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Evaluation of Solar Envelope Method on the Sample of Konya

Abstract

Meeting the energy needs of buildings from renewable energy sources is one of the main objectives of sustainable architecture. In this context, solar energy is an important renewable energy source that can be utilized in the design of sustainable buildings. Passive utilization of solar energy without being dependent on mechanical arrangements in buildings is a basic approach that should be addressed in the context of energy-efficient design. In the urban environment where many adjacent buildings are located, buildings can prevent each other from sunbathing at certain intervals. In order to control this situation, the Solar Envelope method developed by Knowles can be used in architectural designs. With the inclusion of this method, which is based on the right to sunbathing, into the architectural design process, it can be controlled in advance that the buildings have sufficient sunbathing times during the day.

Within the scope of the study, firstly, an analysis study was carried out using the Solar Envelope method in a building block where there is more than one building currently implemented in Konya. With this analysis study, the effects of the current layout and the number of floors of the existing buildings on the sunbathing possibilities of the buildings in the building block were tried to be determined. Subsequently, in order to make consistent comparisons within the same area, alternative layout arrangements varying according to the number of buildings and building positioning were proposed by preserving the number of floors in the existing floor area. In each proposed site arrangement, the total residential areas and the floor heights of the buildings were determined by the Solar Envelope method. With the use of the method in architectural design processes, the maximum settlement areas and building floors that can be obtained depending on the number of buildings and the positioning of the buildings within the building block have been determined. It has been determined that the floor area coefficient of the building island varies according to the number of buildings and positioning.

Keywords: Solar Envelope, Sunbathing, Sustainability, Energy Efficiency, Housing Design



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Moisture Defectives in Historical Buildings: Diyarbakır Suriçi Example

Abstract

In cases where significant deterioration correct use of all the components to water and humidity, which constitute foundation to the roof structure. In order to prevent water and moisture problems, precautions should be taken at necessary places on the structure and its outer shell.

All components of the structure to the knowledge of good moisture problems must be examined. This is down to the source of the problem, it should go the way of isolation and protection. Moisture problems in structure design and processing steps of detecting the first embodiment in the use phase, it is extremely important to discover the source of this problem structure.

Many structural deteriorations are observed in historical masonry structures. These can be listed as cracks, ruptures, joint discharge, moisture, surface loss, etc. Structural deterioration due to moisture and humidity can have a negative effect on many structural elements of the building from the foundation to the roof or on the whole structure. Therefore, in the formation process of the moisture, and the area or areas in the present state of the structure must be well determined.

Diyarbakır Suriçi Area is an important and cultural center with historical and monumental structures. The main materials used in the historical masonry structures in this region are basalt, brick and wood. Moisture-related deterioration in buildings varies according to the location and function of the building. There are many examples of faulty application, functionalization and user-related deterioration due to moisture.

In this study, firstly, the building components that are in constant or indirect contact with the humidity are explained and examples of historical masonry buildings in Diyarbakır Suriçi Region are shown.

By examining the internal and external factors in the formation of moisture in historical masonry buildings, suggestions are presented for the problems caused by moisture in the building.

Keywords: Historical building, humidity, deterioration, Diyarbakır, Suriçi



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Determination of Structural Problems in Historical Buildings by GPR (Georadar) Method: The Example of Diyarbakir Hoca Ahmet (Ayn Minare) Mosque and İskender Paşa Mosque

Abstract

Historical buildings are important cultural heritages in the history and memory of the city. Historical buildings have survived to the present day by going through structural problems and deterioration due to many reasons over time. It is necessary to know the problems that occur in the detection of deteriorations in the structures and the interventions for the problems. Many methods are used to detect structural problems and deteriorations.

With the Georadar (GPR) method, cracks-fractures, voids or deteriorations in the gap and bearing walls in the ground can be determined. As a result of the data obtained, the damage levels and locations in the building are determined and make a significant contribution to the strengthening interventions.

In this study, georadar (GPR) scans were made in two mosques in Diyarbakir's Suriçi Region and damage locations and levels were determined. The radargrams obtained as a result of the scans were filtered to investigate the current state of the ground and the effect of cracks-fractures on the walls, which are not visible from the outside, and existing damages.

Georadar scans in mosques were carried out by expert geophysical engineers. The working area was divided into locations by the relevant experts, and GPR sections were taken in the form of line / profile at the determined locations. Measurements were made by selecting a depth of 2.00-4.00 meters in wall scans and a depth of 10.00-20.00 meters in the ground. 100 Mhz and 1.8 Ghz antennas were used throughout the study.

As a result of the georadar scans carried out in Hoca Ahmet (Ayn Minaret) mosque and İskender Paşa Mosque, it was determined that there were gaps in the floors and cracks and fractures in the walls of both mosques.

Keywords: Georadar, GPR, Diyarbakir, Hoca Ahmet Mosque, İskender Pasha Mosque



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ISBN: 978-605-06728-5-5

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The Effect of Architectural Designs on Urban Segregation: Odunpazarı Modern Museum and Arter

Abstract

It is inevitable that our cities, -which are shaped by the traces of their experiences, have a historical past and can be defined as a living organism- to renew, change and transform over time. During this transformation, human movements can also be seen in certain areas. The change of the city, the change of life style, economic, political and technological changes affect human movements. These transformations, which can occur in a natural process or can occur very quickly and suddenly from time to time with radical decisions.

In the city, projects that are created by making an evaluation on the basis of parcels with the intervention made to the existing texture can not only be integrated with the people living in that area, but also may appear visually incompatible in the structural environment. Although it is known that the designs affect the region economically, it is a normal result to exclude the people living in it.

The Odunpazarı Modern Museum in Eskişehir, which was completed and opened to visitors in 2019, and the Arter museum in Istanbul were selected as the study area. Both museums were examined in terms of the environmental data of the area they are located in and their life styles and the architectural language of the buildings. The positioning of architectural designs, especially with aesthetic concerns, ignoring its immediate surroundings and urban texture, was evaluated in terms of the people living in that region and the visitors in the design field, and determinations were made with environmental data.

Keywords: Urban Segregation, Gentrification, Architectural Design, Eskişehir Modern Museum, Arter



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ISBN: 978-605-06728-5-5

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Reclamation of Historical Buildings: The Case of Samsun Tobacco Factory

Abstract

Re-exploration to historical buildings. In addition to ensuring that the building is preserved, not passed on to the next generation and there is an awareness of history. With a correct restoration and re-functioning, the historical building also contributes to economic development. Contributes to social life has increased the quality of urban life. In addition to meeting the requirements and bringing a new structure to the city in terms of the city. It also positively affects the urban silhouette. At this point, the important thing is to ensure that the effective factors in the selection of this new home are carefully examined and guided the historical structure with an interdisciplinary study. With the right method selection, the building should be brought to the city with its new function.

The purpose of this report is to reveal the Samsun Tobacco Factory, which was built during the Ottoman Empire and is one of the most important buildings of its period, to reach the present day by re-functioning in the historical process and to examine and reveal the renovation and preservation Works that it has undergone today.

Keywords: Reconditioning, Architectural Design, Samsun Tobacco Factory, Space Organization



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ISBN: 978-605-06728-5-5

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Evaluation of Re-functioning in Terms of Conservation: The Case of Çukurhan Abstract

Changes that occur in today's living conditions negatively affect the use of historical buildings in accordance with their original functions and may cause these structures to become idle and disappear. This situation may require the original uses of these buildings to be modernized and adapted to today's conditions or to give a new function to the building. The city of Ankara, which has hosted many civilizations starting from the antiquity, has come to the fore since the Roman Period because it is on important commercial roads. Especially in the city, which stands out with the trade of sof and angora, the Khans Area during the Anatolian Seljuks and the Ottoman Period formed an important role in the commercial life of the city. Within the scope of this study, the re-functioning of Çukurhan in Atpazarı (Hisar) Square, the oldest part of Ankara-Ulus Historical City Center, will be discussed. Atpazarı Square has become the symbol of the city of Ankara for hundreds of years, has an important place in the commercial life of the city and is a very important area in terms of the identity of the city. In this study, first of all, literature review and archive research related to the area and Çukurhan has been made. Then the Boutique Hotel function given to Çukurhan was discussed. The restoration decisions taken and the interventions made were examined in the context of conservation.

Keywords: Ankara, Re-functioning, Çukurhan, conservation, restoration.

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ISBN: 978-605-06728-5-5

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The Effects of Various Production Factors on the Mechanical Properties in the Production of Plywood from Spruce Wood

Abstract

This study aimed to determine the effect of growth conditions, steaming, drying temperature, number of layer and type of adhesive on the mechanical properties (bending strength and modulus of elasticity) of plywood produced from spruce wood. Five and seven-layer plywood was prepared by using thin veneers of spruce (*Picea orientalis*) which were taken from the Eastern Black sea region in the Rize (Çayeli/ Çürükbel) and Trabzon (Maçka/ Kapıköy) with phenol-formaldehyde and melamine-urea-formaldehyde. were determined.

According to the experimental results, the bending strength of 5-layer plywood produced from spruce wood (Maçka) treated with phenol formadehyde adhesives is the highest for the samples steamed for 6 h at a drying temperature of 110 °C and. Furthermore, the modulus of elasticity of 7-layer plywood produced from spruce wood (Maçka) treated with phenol formadehyde adhesive is the highest for the samples steamed for 12 h and subjected to a drying temperature of 110 °C.

Keywords: Wood, Adhesives, Bending strength, Modulus of elasticity, Plywood



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Design and Implementation of Solar Charger Using Microgrid

Abstract

Electricity networks are omnipresent in our daily life. They provide continuous energy from various and varied production sources such as hydroelectric dams, nuclear power plants, etc. They must provide quality electricity while maintaining the amplitude and frequency of the voltage wave at values acceptable by industry standards. The electrical voltage output from the generators is distributed in the network so that it can serve each point of the territory covered by the network. Transformers connected directly to the output of the alternators will produce this voltage. In this work we design a system used for harvesting the solar energy and directing it into a solar charger based microgrid system

Keywords: AI. Microgrid. Solar charger

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Botnet Detection in E-Government Networks Using Machine Learning

Abstract

In this paper we use a reliable database, properly classified and in enough classes to obtain a classification model based on machine learning., there is a public database generated by network traffic flows from different devices simulated in a controlled environment with the presence of different known types of botnets. Thus, we can implement a system of botnet detection using the Support Vector Machine (SVM) and K-nearest neighbor KNN algorithm, which is currently one of the most used methods in the context of machine learning. SVM and KNN are a relatively easy to use algorithms, has a robust performance in pattern recognition, being considered the state of the art in pattern recognition.

Keywords: SVM. KNN. BOTNET. Machine learning

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Ultraviolet Protection Property of Reduced Graphene Oxide Coated Polyamide 6,6 Fabric via Environmentally Friendly Reducing Agent

Abstract

In this study, graphene oxide nanosheets were synthesized using the improved Hummers' method and the prepared homogenous aqueous dispersion applied to the polyamide warp knitted fabric thorough the dip coating method using laboratory type Jigger dyeing machine. Then, the graphene oxide is reduced with chemical reduction process by using carob extract powder as a 'green' reducing agent. The effect of reduction time (12 and 24 hours) and concentration of aqueous solution of carob extract powder (20 and 30 % wt.) are studied. The surface morphology of the coated and reduced polyamide 6,6 fabric is characterized by scanning electron microscopy (SEM). The easy and simple method to determine the coating and reducing of graphene oxide on the fabric is the observation of color change. Therefore, the color coordinates and color difference of the graphene oxide (GO) coated and reduced graphene oxide (RGO) coated fabrics were examined. Also, the most important criteria of the reduction is the change of the electrical conductivity of graphene oxide. The electrical resistivity measurement of graphene oxide coated polyamide 6,6 fabric was carried out by the four point probe technique before and after reduction process. The ultraviolet (UV) transmittance and ultraviolet protection factor (UPF) of graphene oxide coated and reduced fabrics were determined. The effect of washing process on the color properties, electrical resistivity and UPF was also studied. The results reveal that the GO coated polyamide 6,6 warp knitted fabric is successfully converted to the RGO coated polyamide fabric with the effective elimination of oxygen containing functional groups in the graphene oxide structure. The electrical surface resistivity of graphene oxide coated polyamide 6,6 fabric decreased from $5.44 \times 10^7 \text{ k}\Omega/\text{sq}$ to $1.32 \times 10^2 \text{ k}\Omega/\text{sq}$ after the reduction process using carob extract powder. Furthermore, the UV transmittance of the graphene oxide coated fabric decreased and the UPF value increased with the reduction process. While the UPF value of Polyamide 6,6 fabric was obtained as 13.42, the highest UPF value of reduced graphene oxide coated samples was obtained as 159.54. After the washing process, increase of electrical surface resistivity and decrease of UPF value of the reduced graphene oxide coated samples was determined.



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Hydrophilic Silicone Emulsions Developed for Use in %100 Cotton and Cotton/Elastane Blended Fabrics and Their Optimization Studies

Abstract

This study was aimed that the hydrophilicity of the fabrics including 100% cotton and mixture of cotton and elastane was improved by the hydrophilic silicone emulsions and analyzed the effects of those emulsions with hydrophilicity and physical tests on the 100% cotton and cotton/elastane fabrics. According to the results of these experiments, the most suitable silicone emulsion recipes which can be used was determined. Furthermore, these products developed were compared with the commercial products. In this study, 72 recipes were obtained by Minitab considering the amount of water and pes resin, and the amount and type of carbon-based and silicone-based lubricants, glycerin and hydrophilic, polyether, carboxyl-terminated silicones and quart silicone, co-solvent and emulsifier. The analyzes of pH, solid, appearance, viscosity, solubility, shear strength, electrolyte resistance, shelf life and optical were performed on hydrophilic silicone emulsions and commercial products prepared according to prescriptions. Trade products and hydrophilic silicones were applied two different fabrics of towel and knit with methods of padding and exhaustion. Hydrophilicity values and hand feels of fabrics applied silicone emulsions were measured. According to the obtained results, it was determined that they had better degrees of hydrophilicity while having hand-feel as fabrics treated with commercial products.

Keywords: Hydrophilic Silicone, Silicone Softener, Silicone Emulsion, Knitting, Textile



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Filtering and Image Restoration Using Genetic Algorithm and Fuzzy Logic

Abstract

In images, noise can be defined as changes in the intensity and color of a pixel in relation to what is being captured or transmitted originally. These deformities can arise due to several external factors, such as physical-electrical factors in digital capture sensors, grains present in photographic films, or even by failures in transmission or reading / recording. In this paper we propose the use of fuzzy rules to optimize the generations of genetic algorithm in order to analyze the impulsive noise of an image and properly filter it.

Keywords: AI. Machine learning. GA. Fuzzy logic

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CONGRESS OF ENGINEERING AND NATURAL SCIENCES STUDIES

ULUSLARARASI MÜHENDİSLİK VE DOĞA BİLİMLERİ ÇALIŞMALARI KONGRESİ

ISBN: 978-605-06728-5-5

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Segmentation, Classification, and 3d Reconstruction of Brain Tumors in Mri Using Deep Learning and Pso

Abstract

The segmentation of brain tumors, especially gliomas, presented, has been in use for more than 20 years; important changes did not shake it, the purpose of the segmentation and its great success are due to the establishment of an order in the chaos existing in brain tumors and its importance to allow a prognosis of the different types of tumor. In this paper we propose the use of a modified PSO algorithm to segment the brain tumor in MRIs, our method proved to have high DICE and Jaccard scores and low MSE. In addition, we reconstruct the segmented tumor in 3d space into 3d volume and classify the tumor into malignant and benign using CNN algorithm.

Keywords: MSE. DICE. PSO. Segmentation. 3D. CNN



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ISBN: 978-605-06728-5-5

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Detection and Classification Malicious URLs on Online Social Media Using Machine Learning

Abstract

Recently, the variety and size of malware on the social networks has increased dramatically, bearing phrases and headings aimed at attracting attention and pushing them to enter the link that contains malicious software, causing theft (bank accounts, financial transactions, installing malicious software) and therefore it is necessary to discover These risks and threats are addressed. The purpose of this thesis is to discover malware and classify it into benign or malicious URLs using a machine learning algorithm called Support vector machine, which is used in binary classification and the algorithm was utilized for creating a model for malware detection. This study is conducting comprehensive experiments for the purpose of comparing and verifying the suggested method's results with the ones of other techniques utilized via researchers. The experimental results are showing that the presented approach is achieving strong detection and high accuracy of up to 93%, and it is a method that achieves strong detection compared to other results for detecting malware.

Keywords: Detection, Malware, Machine learning, Social media



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ISBN: 978-605-06728-5-5

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Detect Malware URL Using Naive Bayes algorithm

Abstract

Hacking and fake pages are the basis of problems and suspicious activities on the Internet, Therefore, the disadvantages of those pages are the reason for the increased request for safeguard which prevents the user from accessing, our study explains the possibility of identifying suspicious links from the URL-based features of its addresses, we demonstrate that our problem is consistent with machine learning algorithms, it also fits to the modern features of the continuously evolving distribution of malicious URLs, we have also developed the model for those predictive addresses and categorized it into safe or unsafe URL by using naive Bayes algorithm we also compare this work with the researchers' other studies.

Keywords: Malicious, URL, Machine learning, naive Bayes

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**Some Characteristics of Soils and Mineral Nutrition Status of Orchis anatolica
Orchid Species Growing in Kahramanmaraş Natural Flora**

Abstract

In this research, the plant nutrient contents of Orchis anatolica orchid species growing in the natural flora of Kahramanmaraş and some physical and chemical properties of the soils where it grows were tried to be determined. It has been determined that the soils in its natural flora have sandy clay loam texture, neutral reaction, very slightly saline, extremely calcareous, good in terms of organic matter, poor available magnesium and medium level of phosphorus, and other plant nutrients do not cause a problem in terms of plant nutrition. Leaf, stem and tuber analyses were carried out separately in plant analysis. According to the results of the analysis, it was understood that the orchid plant uptook enough plant nutrients from the soil and transmitted these nutrients to the organs subject to analysis in sufficient concentrations. It has also been found that it makes sufficient use of the available Mg in the soil. This means that the available magnesium, which is below the adequacy limit for many plants, is sufficient for Orchis anatolica orchid species. With this study, important data were obtained regarding the characteristics of the soil in which the orchid species grow and the amount of nutrients it contains and how they are distributed to the different organs of the plant.

Keywords: Plant nutrients, Soil properties, Soil and plant analysis, Orchid, Flora



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ISBN: 978-605-06728-5-5

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Decision Tree Applications in Soil Quality Index Based on Analytical Hierarchical Process Approach- Gelemen Example

Abstract

Biological activity, structure, nutrient content and production capacity of soil which is one of the most fundamental elements of the ecosystem reflect the quality of the soil. Soil quality shows the functionality of the soil which has a heterogeneous structure in terms of sustainability. Investigation of soil quality is of great importance in determining the factors limiting the yield. This current study was carried out on agricultural lands of the Gelemen Station of the Black Sea Agricultural Research Institute. In this study, soil quality index was determined by analytical hierarchical process approach and linear combination technique and estimated by decision trees, one of the machine learning algorithms. Regarding the physical, chemical and nutrient content properties of the soil, 21 parameters were used in the total data set. According to considered parameters, soil quality was classified as very low (I), low (II), medium (III) and high (IV) for fifty-six samples taken from the surface soils. In addition, in the created decision tree, clay parameter was determined as root node. Clay, pH, Ca and Zn were also determined as internal nodes. After obtained results, soil quality class was estimated as 91.1% by using the decision tree. Receiver operating characteristic (ROC) curve was created to evaluate the accuracy of the prediction and area under the Curve (AUC) values were obtained. This value was found as 0.981, 0.986, 0.930 and 0.867 for each quality classes (I, II, III and IV), respectively ($P \leq 0.05$).

Keywords: Soil Quality, AHP, Decision Tree, ROC curve, Soil properties



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ISBN: 978-605-06728-5-5

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Physico-chemical and morphological properties of soils in Black Sea Agricultural Research Institute

Abstract

In this study, morphological and physio-chemical properties of soils formed under semi-humid ecosystem conditions were determined and their classification was made by taking into consideration of soil survey and mapping. The research was performed in the area of Black Sea Agricultural research Institute located in Tekkeköy district of Samsun. The research area is 53 ha and its elevation is about 5m a.s.l. Area has been used for fruit, wheat and paddy cultivation for long term. Soil samples were from genetic horizon from each profile located on different land use pattern. Physical and chemical analysis results and morphological data obtained from field studies were evaluated together for soil samples. Two of the profiles were in the vertisol class whereas, another was classified as entisol. The sand content in the research area is 20.72%, while the clay content is 65.97%. Values of samples taken from all three profiles; the FC is 30.78%, while the WP is 10.33% and the AWC is 21.27%. pH is 7.93, EC is 0.403 dS/m, while OM is 2.45% in surface horizon. Dominant exchangeable cation (Na, K, Ca and Mg) is Ca ion. In addition, under different agricultural activities, some variations of soil properties were also determined.

Keywords: Soil Survey, Soil Classification, Soil Properties, Physico-Chemical Properties



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ISBN: 978-605-06728-5-5

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Multifaceted Evaluation and Importance of Basin Mining in Turkey

Abstract

Mining has been one of the leading sectors that have shaped civilizations throughout history and provided raw materials to the industry. Minerals are natural resources that are formed over millions of years and cannot be renewed when consumed. Therefore, social benefit should always be at the forefront in the production and consumption of mines. Environmental and geological events that create differences in the formation of a mineral deposit and a mineral basin; also greatly affect the method of mineral exploration, evaluation and exploitation in the region. When the relationship between economic development and the mining sector is investigated, it is seen that developed countries are partially rich in natural resources and use this wealth correctly and effectively. Our country has several minerals in terms of mineral resources (boron, chromium, lignite, trona,... except), although it does not have large reserves, it is rich in mineral diversity. However, we can make our existing mineral resource potential more useful by implementing the right policies and programs. In the research conducted for this purpose, basin mining in Turkey was examined in a multifaceted way by addressing legislation, productivity, occupational health and safety dimensions.

Keywords: Mining, Basin, Legislation, Coal, Productivity, Occupational Health and Safety.



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ISBN: 978-605-06728-5-5

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The Effect of Wintering with Wooden Hives with Differently Materials Manufactured Bottom on Bee Covered Frames and Hive Weights

Abstract

This research was carried out to determine the effects of wintering honeybee (*Apis mellifera* L.) colonies on beehive frame numbers and hive weights in wooden based (WB) and screened-pollen trapped plastic based (SPTPB) wooden hives. A total of 21 honeybee colonies were used as bee material in the study. Colonies were wintered in 12 WB and 9 SPTPB wooden hives. While the wintering ability was calculated as 42.03% in WB hives and 47.27% in SPTPB wooden hives, the colony loss in all beehives was determined as 55.35%. Differences between the number of bee frames before and after wintering in each hive type were statistically significant at different levels ($p = 0.041-0.007$). It was determined that the wooden hives and SPTPB wooden hives retain 51.60% and 51.89% respectively of their weight at the beginning of the winter. In this study, differences between WB and SPTPB wooden hive types were not found statistically significant in terms of hive weights both before and after wintering ($p > 0.05$). However, differences among the beehive weights of each beehive type before and after wintering were found statistically significant at different levels ($p = 0.028-0.008$). As a result, it was concluded that both types of hives can be preferred in beekeeping by considering other yield characteristics, cost, longevity and health conditions.

Keywords: Wooden hive, Bee frame, Honeybee (*Apis mellifera* L.), Colony, Hive weight.

Dr. Öğr. Üyesi Musa TÜRKMEN¹

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The Effect of Harvest Numbers on Yield and Yield Components in Purple Basil Genotypes**Abstract**

Ocimum basilicum L. is the main species of economic importance among *Ocimum* species. Basil, which is a common aromatic herb, differs greatly in terms of morphology. In this study, 3 different purple basil genotypes (Arapgir, Piros and Midnight) were carried out to determine the effect of one harvest and two harvests at full flowering period. In the study, the average highest plant height for single harvest basil genotypes was measured in Arapgir genotype with 76.2 cm. It was determined that 72.3 cm with piros and 63.2 cm with midnight genotype, respectively. In two harvested plots, the plant height in the first harvest was determined as 39.93 cm in the arapgir genotype and 38.70 cm in the piros genotype, while the lowest plant height was measured in the midnight genotype with 37.6 cm. Second harvest plant heights were obtained from Arapgir (51.4 cm), piros (50.03 cm) and midnight (48.97cm) genotypes, respectively. In the study, average fresh herb yield for single-harvest basil genotypes was determined in the midnight genotype with the lowest 4014.53 kg/da, and the highest in the arapgir genotype with 5637.82 kg/da. Dry weights of single harvested genotypes were determined as arapgir 2077.99 kg/da, piros 1248.05 kg/da and midnight 1082.39 kg/da, respectively. In 2 harvested plots, fresh herb yield in the first harvest was determined as 1322 kg/da piros, 1235 kg/da at midnight and 753 kg/da arapgir. Dry weights were determined as piros 314.76 kg/da, midnight 282.54 kg/da and arapgir 179.34 kg/da, respectively. In the second harvest, fresh weights were respectively determined as arapgir 6867.17 kg/da, midnight 4387.85 kg/da and piros 4056.04 kg/da. When the dry weight yields are examined, it has been determined that respectively arapgir 1416.58 kg / da, piros 876.28 kg / da and midnight 874.38 kg/da.

Keywords: Basil, *Ocimum basilicum* L., Arapgir, Purple, Herb



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ISBN: 978-605-06728-5-5

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The Effects of Age and Storage Period on the Egg Quality Properties in Quail (Yellow Japanese Quail) (*Coturnix Japonica*)

Abstract

The yellow feather color of Japanese quails (*Coturnix Japonica*), also known as jumbo or Italian quail, occurs in the case of homozygous dominance of the ASIP gene in mammals ASIP is an important pigmentation gene responsible for dorsoventral and hair cycle-specific melanin-based color patterning in mammals, The aim of this study is to determine the effect of age and storage time on the internal and external quality characteristics of the yellow feather-colored Japanese quails. The eggs as trial material were obtained from yellow feather-colored Japanese quails at 8, 12, 16, 20, 24, 28 and 32 weeks of age. Eggs were obtained in two days from a total of 100 female animals placed in 5 cage layers with 20 animals in each cage layer. External and internal quality characteristics for the eggs of 75 for each storage period , 225 for each age period and totally 1575 for each age period were determined.. The investigated properties were age-varying egg weight, weight loss rate during storage, shape index, white index, white weight, white ratio, yellow weight and yellow ratio, yellow index, haugh unit value, shell thickness, shell ratio, shell weight per unit surface area and number of pores. In this study, one-way analysis of variance was used to compare the effect of age and storage periods; and Duncan's multiple comparison test was used to compare the means. The effect of age on egg weight was significant; at the beginning of the experiment, 11.67 g of egg weight was 12.15 g at the end of the experiment.

Keywords:



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ISBN: 978-605-06728-5-5

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Determination of Soil Moisture Content by Microwave Drying Method Under Different Soil Texture Conditions

Abstract

Monitoring soil moisture has great importance for planning irrigation systems and efficient agricultural production, and also basin hydrology, flood forecasts, erosion and drought studies. Traditional gravimetric method gives the most accurate results and is simple to apply but not being able to get instant results, and the long time required to obtain the oven dry weight is the main disadvantages. If the drying time can be shortened, it will be possible to use the method more effectively. Some studies conducted for this purpose have shown that this period can be shortened by microwave drying method. Microwave drying method has found wide application area, especially in fruit and vegetable drying applications with developing technology. However, a limited number of studies have been conducted by soil scientists on this subject, and indirect methods have gained popularity. In this study, the obtainability of soil moisture by microwave drying method was investigated at different moisture content and for three soil texture samples. For this purpose, oven dry weights were obtained by using 2450 MHz and 900 W microwave oven in parallel with the traditional oven measurements. Consequently, constant weight was achieved in approximately 25 minutes under high moisture content condition and approximately 15 minutes in medium and low moisture content condition for each soil structure. According to the observations, it was understood that encrusting and cracks on the sample during the drying process may have an effect on the drying time. As a result of the comparison with the oven results, it was observed that there was an agreement between the two methods range of R^2 : 0.9763-0.9986. In addition, no statistically significant difference was found in the organic matter contents of the samples after microwave drying. These results show that microwave drying has an important potential in soil moisture measurements. However; it was concluded that the weight and temperature control should be carefully to ensure that constant dry weight and oven dry weight are achieved.

Keywords: Soil moisture, gravimetric, oven, microwave, oven dry



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The Effect of Different Cutting Numbers on Yield and Yield Components in Green Basil Genotypes

Abstract

Basil (*Ocimum basilicum* L.), belonging to Lamiaceae family, is locally known as "Fesleğen" or "Reyhan". Basil can be harvested more than once during a vegetation period. This study was conducted in the Experiment Area of the Field Crops Department of HMKU, Faculty of Agriculture Research and Application Farm in 2020 in order to determine the effect of one harvest and two harvests at full flowering time on different green basil (*Ocimum basilicum* L.) genotypes. As a trial material, five different green basil genotypes obtained commercially were used. In the study, the mean fresh herb yield for single-harvest basil genotypes was determined as the lowest with 2257.04 kg/da and the highest with 3696.18 kg/da, the dry herb yield as the lowest with 746.43 kg/da and the highest with 1096.35 kg/da. Fresh leaf ratio was found to be as the lowest with 16.50 kg/da, the highest with 28.20 kg/da, the lowest fresh flower ratio as 43.53 kg/da and the highest as 74.50 kg/da. When the dry leaf ratios were examined, the lowest dry leaf ratio was found to be as 10.39 kg/da and the highest was 17.42 kg/da. The mean fresh leaf ratio of basil genotypes at two harvests was found to be the highest as 60.80 kg/da, the lowest as 33.33 kg/da, the highest fresh herb yield was 1317.50 kg/da and the lowest was 542.51 kg/da. The highest dry herb yield was detected as 313.69 kg/da and the lowest was 129.17 kg/da.

Keywords: Reyhan, Dry, Fresh, Herba



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ISBN: 978-605-06728-5-5

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Post Germination Seedling Growth Performance of Two Safflower Cultivars Dincer and Remzibey against Drought and Salt Stress Tolerance

Abstract

Salinity and drought are very common environmental obstacles affected especially early stages of growth and development of crops. This study was evaluated the effects of PEG 6000 (0.0, -0.2, -0.4, -0.6, -0.8, -1.0, -1.2, and -1.4 MPa) and NaCl (0, 5, 10, 15, 20, 25, 30, and 35 dSm⁻¹) on germination and early seedling growth of Dincer (spineless) and Remzibey (spiny) safflower varieties which are registered cultivar of Turkey. The study aimed to evaluate the salt and drought tolerant behavior of two safflower cultivars. Final germination percentage, root length, shoot length, seedling dry weight, seedling fresh weight were investigated. The results revealed that the varieties showed different responses to PEG and NaCl stress. A gradual decrease in final germination percentage along with seedling growth was noted using >-0.2 MPa PEG and >10 dSm⁻¹ NaCl. Overall, in accordance with the decrease in final germination percentage, root and shoot length, seedling dry and fresh weight Remzibey was found to be more tolerant when compare with Dincer under NaCl and PEG stress. The seed germination was completely stopped using >-1.2 MPa PEG levels and at 35 dSm⁻¹ NaCl induced stress levels in both varieties. The outcomes of NaCl stress were less pronounced on germination percentage and growth of seedlings compared to these effects due to PEG. The results suggested varieties had different responses to stress levels and could be used in genetic improvement or breeding programs positively.

Keywords: Safflower, PEG and NaCl stress, Seedling growth



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ISBN: 978-605-06728-5-5

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Molecular Characterization of Some Squash (*Cucurbita pepo* L.) Genotype Growing from Erzincan province of Turkey by Simple Sequence Repeat (SSR) Markers

Abstract

Plant genetic resources constitute the most valuable resources of countries. It is of great importance to determine the genetic variation between these resources and to use them in breeding studies accordingly. 29 squash genotypes collected in order to determine the genetic diversity of some snack gourd genotypes widely cultivated in Erzincan were examined. SSR (Simple Sequence Repeat) markers were used to determine the genetic diversity of these genotypes. Polymorphism rate was determined to be 100% in all primers in the evaluation made using SSR markers. The 7 SSR markers used produced a total of 15 polymorphic bands, the number of alleles per marker ranged from 2 (GMT-P41, GMT-M61, GMT-M259, GMT-P18, GMT-P25 and GMT-M30 markers) to 3 (GMT-P68 markers). changed and the average number of alleles was found to be 2.14. Gene diversity per marker varied between 0.064 and 0.314 for GMT-M61 and GMT-P41 markers. The expected heterozygosity of the SSR locus ranged from 0.068 (CMTp18, CMTm61) to 0.422 (CMTp41), with a mean of 0.192. The mean of Nei gene diversity was (h) 0.477. Polymorphic information content (PIC) varied between 0.06 (GMT-M61) and 0.247 (GMT-P41), and the average PIC value per marker was found to be 0.152. In the clustering analysis using Nei's genetic distance, it was determined that 29 genotypes were divided into 3 main groups. Genetic relationships calculated based on molecular genetic data can be used in planning squash breeding programs for future studies by determining the degree of diversity in the population.

Keywords: *Cucurbita pepo*, Genetic diversity, Squash, SSR



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ISBN: 978-605-06728-5-5

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The Structural Characteristics of Small Ruminant Breeding of Ankara

Abstract

Turkey has approximately 55 million sheep and goats, including indigenous culture breeds. In this study, it was aimed to give information about sheep and goat farm which are members of the Breeding Sheep and Goat Breeders Association in terms of the number, herd sizes, breeder profile and breeds in Ankara districts. In the light of the data obtained, there is an increase in the number of sheep and goats in Ankara, as in our country. When the age groups of breeders are examined it is seen that the number of breeders between the ages of 50 and 60 is higher, and the majority of the farm sizes are between 0 and 250 heads. Also it has been observed that the district where the most sheep breeding is carried out is the Polatlı district, and the majority of the breeders prefer the Central Anatolian Merino and Akkaraman breeds as sheep breed. Additionally, it has been determined that goat breeders mostly carry out Ankara Angora goat and Hair goat. In general, the geographical structure and central location of Ankara and its proximity to other metropolitan cities is of great importance for the market. Considering the increase in the number of small ruminant, it is predicted that breeding in the region will increase in the coming years. Suggestively, preserving the pasture areas in the region and reducing the input costs will make a great contribution to the animal husbandry of the region.

Keywords: Ankara, Sheep, Goat, Breeding, Small Ruminant



INTERNATIONAL

CONGRESS OF ENGINEERING AND NATURAL SCIENCES

ULUSLARARASI MÜHENDİSLİK VE DOĞA BİLİMLERİ ÇALIŞMALARI KONGRESİ

ISBN: 978-605-06728-5-5

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Correlation between Seed Fatty Acid Compositions in Some Wild *Crambe* (*Brassicaceae*) Accessions

Abstract

Wild *Crambe* species have potential for industrial use. *Crambe abyssinica*, the cultured species, is preferred in production of bioplastic and industrial lubricant, due to the high erucic acid content of the oil. In this study, 18 accessions of *C. orientalis* var. *orientalis* and 26 accessions of *C. tataria* var. *tataria*, collected from the natural flora of Turkey, were used. The fatty acid composition of the seed oils were analyzed. Significant correlations were determined between the fatty acid compositions. There was a negative correlation between linoleic acid (C18: 2) and palmitic acid (C16: 0). Eicosenoic acid (C20: 1) was negatively correlated with palmitic acid (C16: 0), while it was positively correlated with oleic acid (C18: 1) and linoleic acid (C18: 2). A positive correlation was found between linolenic acid (C18: 3) and linoleic acid (C18: 2). Erucic acid (C22: 1) was found to have a positive correlation with palmitic acid (C16: 0), and a negative correlation with oleic acid (C18: 1), linoleic acid (C18: 2) and eicosenoic acid (C20: 1). Nervonic acid (C24: 1) is positively correlated with palmitic acid (C16: 0) and erucic acid (C22: 1), but it has a negative correlation with linoleic acid (C18: 2), eicosenoic acid (C20: 1) and linolenic acid (C18: 3).

Keywords: Wild *Crambe*, Correlation, Fatty acid composition



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ISBN: 978-605-06728-5-5

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Research on Some Physical and Quality Features of Bread Wheat Grain

Abstract

Wheat is widely used in industry as well as in human and animal nutrition as a strategic product. For this reason, wheat varieties that have adapted to the region where they grow, are important in terms of securing our future, determined, collected and protected rich gene resources. In the study, it was aimed to determine the physical and some quality characteristics of the seeds of different bread wheat populations grown in Muğla region. In the study, 11 bread wheat populations were used and purity ratio, 1000 grain weight, test weight, grain size (width and length) and protein ratio were determined. In addition, the relationships between the examined features were determined by correlation analysis. The purity ratio of bread wheat seeds was varied between 90.6-99.24%; thousand grain weight 31.1-50.92 g; test weight 72.7-78.7 kg; width 2.73-3.44 mm and length 6.09-8.00 mm as seed sizes and crude protein ratio 10.33-12.37% in the research. In accordance with the data obtained, according to the bread wheat standard; it is above 99% of majority in terms of purity rate except from P5 and P9 populations, high in terms of thousand seed weight (excluding P3 population), crude protein ratio of all of populations was below the standard, except for P1 population. In the study, the highest positive and significant correlation was determined between the thousand grain weight and test weight ($r = 0.79$); the highest negative and significant relationship was again determined to be between thousand grain weight and crude protein ratio ($r = -0.87$). As a result, it was determined superior properties that P8 population in terms of physical characteristics; P1 population in terms of protein ratio compared to the others. Due to the low protein content of the wheat seed samples obtained from Muğla and its surroundings, it was concluded that, in addition to the cultural practices that increase the protein ratio in its production, new varieties with high protein ratio can be recommended to the farmers.

Keywords: Bread wheat, seed quality, physical characteristics, correlation



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ISBN: 978-605-06728-5-5

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Spatial Distribution of Soil Penetration Resistance under Long Term Apple Orchard Cultivation

Abstract

Soil compaction is well known to be effective in crop yield. One of the important fruit products that are exported is the apple product. Therefore, soil compaction in apple orchards affects the yield and internal and external trading of the product. In this present study, the penetration resistance values of the surface soils where apple has been produced for many years were determined and their distribution was investigated by different interpolation models (Inverse distance weighted, radial based functions, ordinary kriging, simple kriging and universal kriging) in the Isparta-Gönen district. Also, correlations of penetration resistance values with other some soil properties were determined. According to results, penetration resistance values of soils varied between 1.13-2.62MPa. The lowest RMSE (0.354MPa) value was obtained with simple kriging interpolation from different methods for distribution maps. The lowest estimation accuracy (RMSE:0.493) maps was determined in the radial based functions interpolation model. Penetration resistance showed a statistically significant positive correlation with the bulk density (0.415;p<0.05), negative correlation with field capacity (-0.388;p<0.05). With the increase of organic material and clay, aggregate stability increased and penetration resistance decreased. But these changes were not found to be statistically significant. As a result of the study, it was determined that the penetration resistance increased in the southern region, in which apple production has been made on semi-dwarf and seedling rootstocks for many years. Penetration resistance was found to be lower in the northern and western parts where dwarf rootstocks are dominant.

Keywords: Soil compaction, apple orchard, interpolation, soil physical properties



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ISBN: 978-605-06728-5-5

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The Usage of the Ultrasound Technology in the Food Industry

Abstract

Recently, the novel non-thermal technologies have been developed to shorten process time, decrease energy consumption, extend shelf-life, and improve food quality. Ultrasound, one of the novel technologies, has become widespread in food industry due to accessibility, low-cost investment and compatible to traditional process. The ultrasound is defined as high frequency waves, that is above threshold of human ear, spread in solid, liquid and gas mediums. The waves of the ultrasound are divided into three sections: low frequency (16-100 kHz), high frequency (100 kHz-1 MHz) and recognitory ultrasound (1-10 MHz). The usage of the ultrasound depends on the formation of cavitation bubbles. In this context, the application of the ultrasound in food processes are performed via ultrasonic bath or probes. The ultrasound can be considered as a promising method due to favorable results. The usage fields of the foods are inactivation microorganisms and enzymes, extraction, emulsification, homogenization, filtration, crystallization, removing foam, cutting, and forming, drying pretreatment, freezing and surface cleaning. In the future, it is thought that the ultrasound will be used more effectively and widely. In this study, the usage fields of the ultrasound in food industry have been investigated.

Keywords: Ultrasound, Non-thermal Technologies, Food Process, Cavitation





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ISBN: 978-605-06728-5-5

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Production of Cocoons in Different Materials for Sterile Medical Leech (*Hirudo verbana*) Breeding

Abstract

In these days, medical leeches are used for various treatment methods but medical leeches must be sterile and not carry any disease. In this study, the breeding opportunities of medical leech (*Hirudo verbana*), which has an economic value and faces the danger of extinction, and the production of cocoon were examined in different sterile conditions.

Three different materials were chosen for six-month study. The leeches were grown in environment 1 with semi-humid peat, in environment 2 with semi-humid tea pulp and in environment 3 with semi-humid tea pulp and humic acid.

During the experiment, the mold problem occurred in environment 2. But there was no problem with environment 3. In this study, the mold inhibiting effect of humic acid for leech breeding was examined and confirmed for the first time.

As a result, it was determined that the humic acid added tea pulp is suitable for the production of leeches like peat when the survival rates and reproduction considered.

Keywords: Medical Leech, *Hirudo verbana*, Sterile Leech Breeding, Cocoon, Humic Acid



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ISBN: 978-605-06728-5-5

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Plant Extract Obtained from the Fruits of the Gilaburu (*Viburnum Opulus*) Plant And Green Synthesis Investigation of the Biological Activities of Silver Nanoparticles

Abstract

Plants have been used in the treatment of many diseases from the past to the present. Thanks to the phenolic compounds they contain, many studies have been carried out to alleviate or eliminate disease factors. The new technology of our age is the Green Synthesis Nanoparticle Production Technique, which enables the reduction of metal salts to the nanoscale by using plant materials.

In the scope of this study; It was focused on obtaining extracts of gilaburu (*Viburnum opulus*) fruits in distilled water (dH₂O) environment by soxhlet extraction method, synthesizing green synthesis silver nanoparticles (AgNPs) using the obtained extract and investigating their biological activities (antimicrobial, antibiofilm and anticancer).

Antimicrobial activities of gilaburu extract and AgNPs were determined by Minimum Inhibition Concentration (MIC), Minimal Bactericidal Concentration (MBK) and Disk Diffusion methods on 15 bacterial strains.

According to the disk diffusion method results, Gilaburu extract exhibited 6-8.2 mm and AgNPs 6-7.1 mm zone diameter. 200-6.25 mg / mL gilaburu extract and 1- 0.03 mg / mL AgNP concentrations were studied in MIC and MBK methods. The MIC value of the gilaburu extract was 25 mg / mL and the MBC value was 50 mg / mL. It was observed that AgNPs were between 1-0.25 mg / mL.

Four bacterial strains were studied for antibiofilm activity findings. When the results obtained were examined, they showed a tendency to reduce biofilms between 59-0% in bacteria at 200 - 6.25 mg / mL concentrations of Gilaburu extract, and 86-50% in the concentration range of 1-0.03 mg / mL for AgNPs.

IC₅₀ values were calculated on MCF-7 (Human Breast Cancer Line) and HUVEC (human umbilical vein endothelial cells) cell lines in anticancer activity findings. As a result, it has been observed that while Gilaburu extract and AgNPs show cytotoxic effects on breast cancer cells even at low concentrations, they do not harm healthy cells at the same concentrations.

This work was supported by a grant from the Kahramanmaraş Sütçü İmam University Scientific Research Projects Unit, Project Number: 2019/6-25M

Keywords: Gilaburu, Anticancer, Antimicrobial, Antibiofilm, Green Synthesis



INTERNATIONAL

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ISBN: 978-605-06728-5-5

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Investigation of Biological Activities of Methanol Extracts of *Acantholimon kotschyi* subsp. *kotschyi* (Jaub. Et Spach) Boiss. and *Acantholimon libanoticum* Boiss. Plants in Kahramanmaraş Province

Abstract

In this study; *Acantholimon libanoticum* Boiss. and *Acantholimon kotschyi* subsp. *kotschyi* (Jaub. Et Spach) Boiss. Antimicrobial, Antifungal and Antibiofilm properties were examined on 16 bacteria species and 2 *Candida* species. Antioxidant properties with DPPH Radical Sweep Method and Anticancer properties on MCF-7 (Human Breast Cancer Cell Line) and HUVEC (Human Umbilical Vein Endothelial Cells) cell lines were investigated.

When the antibacterial activity findings of methanol extracts obtained from plants were examined; *Acantholimon* species showed a zone diameter of 12-18 mm. Concentrations of 16 mg / ml - 0.5 mg / ml by the dilution method were used to determine the Minimum inhibited concentration and the Minimum bactericidal concentration. It was observed that the MIC values of the plants were mostly between 4 mg / ml-2 mg / ml, and MBC values between 8 mg / ml-4 mg / ml. Antifungal activity findings are remarkable for both species and it has been observed to have very high effects especially on *Candida parapsilosis*.

When the antibiofilm activity findings were examined, *Acantholimon* species showed a tendency to reduce biofilms of 50-10% mostly in all bacteria at concentrations of 16 mg / ml - 8 mg / ml.

When the antioxidant activity findings were examined, it was observed that *Acantholimon libanoticum* showed 100% antioxidant activity at a concentration of 1 mg / ml, and *Acantholimon kotschyi* had approximately 75% antioxidant activity at 1 mg / ml. There are mostly directly proportional findings between concentrations and antioxidant activity capacity.

IC50 values of MCF-7 and HUVEC cells in anticancer activity findings were calculated. As a result, it has been observed that while plant extracts have a cytotoxic effect on breast cancer cells at low concentrations, they do not harm healthy cells at the same concentrations.

We would like to thank Kahramanmaraş Sütçü İmam University scientific research projects unit (BAP Project 2020 / 6-3) for their support to the study.

Keywords: *Acantholimon*, Antimicrobial, Antioxidant, MCF-7



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ULUSLARARASI MÜHENDİSLİK VE DOĞA BİLİMLERİ ÇALIŞMALARI KONGRESİ

ISBN: 978-605-06728-5-5

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Determining the Effects of Lichen Extracts on *Staphylococcus aureus* Quorum Sensing and Biofilm Form

Abstract

The prevalence of antibiotic resistant bacteria poses a serious threat to human health, leading to increased and prolonged bacterial infections. *Staphylococcus aureus* is one of the most important causes of infections in the community and hospitals due to food and intensive care units in the World. Quorum sensing (QS) is a bacterial communication process to modify their pattern of gene expression in response to activation of defence mechanisms via production of virulence and biofilm formation. Inhibition of QS systems by natural compounds may be an alternative approach to conventional antibiotics. Potential to produce bioactive metabolites from lichens extracts have been attracting attention for new natural drugs. This study investigates the QS and biofilm inhibition potential by *Bryoria capillaris* lichen extract against *S. aureus*. We collected *B. capillaris* lichen from Bursa-Alaçam region and extracted by acetone solvent. Dosages were tested at certain concentrations. *S. aureus* P2 *Lac-gfp* biomonitor strain and *S. aureus* ATCC25923 wild type strain were used for QS and biofilm inhibitions. The QS inhibition rates for P2 *LAC-gfp* and biofilm were determined as approximately 61,73% and 87,82% ($\pm 4,07$) respectively, at concentration of 160 $\mu\text{g/mL}$. Screening natural compounds such as lichen extracts can provide opportunities for future QS inhibitor drugs.

Keywords: *Staphylococcus aureus*, *Bryoria capillaris*, Lichen, Quorum Sensing, Biofilm.



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ISBN: 978-605-06728-5-5

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Investigation of Torque Control in Wide Speed Range of IPMSM Motors under DC Bus Voltages Variations

Abstract

In this study, torque control of IPMSM motors, which are preferred in applications requiring high speed due to its high power density and CSPR ratio, is discussed. Considering the change in machine parameters and the variations in dc bus voltage, calculating the current values to be applied for the desired torque creates a multi-dimensional problem. In the low speed region d, q current references are calculated with the MTPA algorithm to obtain optimum point from the reluctance moment and magnet moment, d axis current reference is calculated with the field weakening algorithm in the high speed region. In addition, the d-axis current reference changes according to the dc bus voltage and the applied torque value in the field weakening region. The results of the investigated methods under the variations of dc bus voltage were applied on the test system with a low voltage 4kW IPMSM and the experimental results are evaluated.

Keywords: IPMSM, Torque Control, MTPA, FW

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ISBN: 978-605-06728-5-5

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Production of Yogurt Ice Cream with Different Methods

Abstract

In this study, the aim was to compare the physicochemical properties of yoghurt ice creams produced using three different methods.

The three methods used in the production of yoghurt ice cream were follows: Method 1, ice cream mix was fermented with yoghurt bacteria until a pH was reached 6.0, 5.8 and 5.5 prior to freezing; Method 2, milk (10, 25, 50% of total milk used in the preparation of ice cream mix) was taken and subsequently fermented with yoghurt bacteria; the fermented milk was introduced to the remaining ice cream mix prior to freezing; Method 3, yoghurt was added to the ice cream mix at different ratios (1:4, 1:2, 1:1) the mix prior to freezing.

The pH values of all yoghurt ice cream samples were ranged from 6.18 to 4.75. The physicochemical properties of yoghurt ice cream samples changed with pH values. The hardness and completed melting time values of the of yoghurt ice cream samples increased with decreasing the pH values. The lowest overrun and the highest hardness and completed melting time values were observed for the samples produced using the method 3. In general, the yoghurt ice cream samples produced using the method 3 had the highest sensory score compared to other counterparts. The results showed that the best method for production of yoghurt ice cream was the method 3 with pH value of 5.5 .

Keywords: Yoghurticecream, productionmethods, physicochemical properties



INTERNATIONAL

CONGRESS OF ENGINEERING AND NATURAL SCIENCES

ULUSLARARASI M hendislik ve Doęa Bilimleri  alışmaları Kongresi

ISBN: 978-605-06728-5-5

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The Relationship of Food Sauces with Nutrition and Comparison of Soy Sauce Production Methods

Abstract

Food sauces are auxiliary ingredients that have a leading role in flavoring food in many of the world cuisine. The duty of a good sauce should be having the properties that can add flavor, moisture, nutritional value and richness to the food to which it is added. A sauce should be in harmony with the food and support the flavors in the meal. It is a fermented sauce obtained by fermenting soy sauce, soybean, roasted wheat and brine with natural or special cultures. The sauce, originating from china, is now preferred in western cuisines while, widely used in East and Southeast Asian ones. Soy sauce production time is significantly affected by heat and sodium chloride concentration, and the sauce is now produced under more controlled technological conditions. Soy sauces are diversified depending on the proportion of raw materials, cultures and fermentation conditions. In the prepared presentation, the production of soy sauce, which has been used in Chinese and Japanese cuisines since ancient times and gradually becoming widespread, the studies on soy sauce and its relationship with health were mentioned.

Keywords: Sauces, Soy Sauce, Nutrition, Production



INTERNATIONAL

CONGRESS OF ENGINEERING AND NATURAL SCIENCES

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ISBN: 978-605-06728-5-5

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Compressed Candy Formulation and Process Studies With Wet Granulation Method

Abstract

As the demand for compressed candy products in the confectionery industry has increased by 5% each year in recent years (Euromonitor International, 2017). In this study, the product will be obtained by applying the Response Surface Methodology on the formulation with wet granulation method. It will be an alternative to the tablets in the form of compressed sugar produced by the conventional dry granulation method, will be produced with wet granulation, which is a different production technique, will contain granulated sugar as the main ingredient instead of sorbitol in its formulation, does not dissolve easily, does not melt during the shelf life, does not easily dissolve in powder pieces during the melting period in the mouth. In addition, studies on the compressed tablet candy product and its process that provide long-term mint refreshment during its stay in the mouth and after consumption will be detailed. The proportional use predictions of the raw materials to be used in the formulation phase and a numerical based test pattern were created and the intermediate product outputs and final product quality were confirmed by test analysis studies. At the end of the study, the optimum usage amounts of the ingredients in the recipe were optimized in line with the experimental design and the *Granulation Time* and *Drying Temperature Range* were determined accordingly. After granulation, the intermediate product viscosity was determined to be the ideal 1375 mPa.s in parallel with the literature. Accordingly, the drying time after granulation was 5-30 minutes and the drying temperature was between 40-80 °C, and the particle size after grinding and mixing was determined between 30-100 µ.

Keywords: Response Surface Methodology, Wet Granulation, Compressed Candy



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ISBN: 978-605-06728-5-5

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Sugar Reduction in Industrial Foods

Abstract

In recent years, eating habits include high consumption of junk food (rich in saturated fat, salt and added sugars) and increased consumption of alcoholic beverages. These new habits, together with a more sedentary lifestyle, have led to an increase in obesity. The data confirm that obesity rates among the youth in some countries surrounding the Mediterranean basin are > 80%. According to data by WHO, 1,9 billion adults are overweight. Studies show that 90% of consumers think about sugar consumption and 44% of them think about low sugar food, when it comes to healthy eating. Therefore consumer demand is increasing for the products that are sugar-free or include low sugar. While the use of white sugar in sparkling beverages increased by 6% in 2019, the use of sweeteners increased by 18%. In 2016, the sugar substitute market reached 13.7 billion USD. The food companies take action for the reduction of sugar in current recipes. In addition when creating a new recipe, sugar content is an important parameter due to the demand of consumers. But the sugar is also an important ingredient for the product taste and texture. In this stage, the recipe development process is necessary to provide demanded taste and texture. Some solutions are sugar flavors, fruit juice concentrates, stabilizers. In this study market situation, various applications at food industry and regulation about nutritional claims are included.

Keywords: Sugar Reduction, Nutritional Claims, Sugar, Obesity, Food



INTERNATIONAL

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ISBN: 978-605-06728-5-5

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Development of Extract and Deyonized Sugar Poduction Processes from Posa and Peel Which Are Fruit Juice Industrial Wastes

Abstract

Döhler Gıda A.Ş., wastes are generated during the processing of various fruit and vegetable juices or concentrates. These wastes, cause the loss of many useful compounds. These compounds can be added to foods by being extracted and enriched as well as being used directly with wastes. In this context, peel concentrates were obtained from pomegranate peel, watermelon peel and orange peel waste by using standard fruit juice production process steps. Then, colorless product was obtained by passing through the adsorber resin with using deionized resin system, firstly positively charged ions in the cationic resin and then negatively charged ions in the anionic resin were kept. In the processes of pomegranate concentrate, watermelon peel concentrate and orange peel concentrate, 45 brix concentrates with a yield of 7,25 and 5,8 respectively, deionized fruit concentrates were obtained from these concentrates with 50%,80% and 75% yield in deionized resin system. The amounts of sucrose,glucose,fructose, D-sorbitol were determined by analyzing the sugar profile of the fruit concentrate by HPLC. As result, process wastes were evaluated and consumer expectations were met by using them as input in different food systems without the need for extra investment.

Keywords:



INTERNATIONAL

CONGRESS OF ENGINEERING AND NATURAL SCIENCES

ULUSLARARASI MÜHENDİSLİK VE DOĞA BİLİMLERİ ÇALIŞMALARI KONGRESİ

ISBN: 978-605-06728-5-5

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The Use of Sprouted Seed Flours to Make Sour Bread

Abstract

In this study, the effects of sprouted radish and wheat germ flour on sourdough fermentation and bread were examined. In the first stage of the study; radish and wheat seeds were germinated, and then flour was obtained from germinated seeds through drying and grinding processes. Afterwards, the total phenolic content, pH, dry matter ratio, moisture ratio, total oil and protein ratio, and antioxidant capacities of these two types of flour were determined. In the second stage of the study, the germinated radish and wheat flour were added in certain proportions (0%, 5%, 15%, and 25%) to the wheat flour to be used for the production of Type I sourdough. It was determined that as the ratio of germinated radish and wheat flour added to sourdough was increased, the content of phenolic matter increased significantly ($p < 0.05$). It was also determined that as the ratio of germinated radish and wheat flour was increased, the antioxidant capacity increased significantly ($p < 0.05$). The number of lactic acid bacteria (LAB) in sourdough varied inversely proportional to the rate of addition of germinated radish flour. While the LAB number in sourdough with an addition rate of 25% was 3.2×10^8 , it was found as 1.8×10^9 cfu/g with an addition rate of 5%. It was found that the addition rate of germinated wheat flour did not affect the LAB numbers, as 1.2×10^8 and 2.7×10^8 cfu/g in sourdough. It was determined that as the addition rate of germinated radish flour increased, the number of yeast decreased (8.0×10^4 , 8.0×10^5 , and 3.0×10^6 cfu/g for 25%, 15%, 5%, respectively). However, the addition rate of germinated wheat flour did not significantly affect the yeast number of the sourdough (1.2×10^8 , 9.2×10^7 , and 1.2×10^7 cfu/g for 25%, 15%, 5%, respectively; 7.7×10^7 cfu/g for control (0%)). It was determined that as the germinated radish and wheat flour rates increased, the pH of the sourdough (except for 5% radish flour) remained higher than the control. In the last stage of the study, the sourdough was added to the bread dough, and this mixture was used for bread production. It was determined that the phenolic content and antioxidant capacity of bread were at the highest level for the bread in which germinated flour was added by 25% to the sourdough, and there was no statistically significant difference between the other ratios and the control bread ($p < 0.05$). For the bread made with sourdough to which germinated wheat flour is added, specific volume and hardness did not change significantly compared to the control bread ($p > 0.05$). However, for the bread made with sourdough to which radish flour was added; it was determined that as the radish ratio was increased, the internal hardness and crust hardness increased and the specific volume decreased ($p < 0.05$). According to the color analysis, it was determined that as a result of the increase in the radish ratio, the brightness of the bread increased and there was a decrease in red and yellow colors in terms of crust and internal color ($p < 0.05$). In addition, according to the results of the sensory analysis, bread with 25% germinated radish addition rate was found to be the least preferred bread, and no significant difference was found in terms of wheat added bread preference ($p < 0.05$).

Keywords: Sourdough, germinated radish flour, germinated wheat flour, phenolic content, antioxidant capacity, sourdough bread



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ISBN: 978-605-06728-5-5

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Chitosan (CTS) Polymer Mimicking Peroxidase Enzyme for 3,3 '5,5' - Tetramethylbenzidine (TMB) Substrate Sensor Analytical Applications

Abstract

In this poster, sensor applications in electrochemical and absorbance ranges of chitosan (CTS), which can mimic problems peroxidase enzyme, are discussed. First of all, the structure of CTS was examined with the FTIR-ATR characterization technique. Then, its results against 3,3 '5,5' tetramethyl benzidine (TMB) in the electrochemical environment were compared with the peroxidase enzyme. For clarity of comparison, the results of enzyme and CTS were compared on the microplate. Carbon glassy electrode was used as working electrode for peroxidase and CTS tests against TMB in 0.1 M KCl + citrate + phosphate buffer solution at 5.5 pH in the electrochemical voltammetric environment, mercury electrode as reference electrode, and platinum wire as the counter electrode. In the electrochemical results, it was observed that CTS did not react at absorbance results, partially reminiscent of peroxidase.

Keywords: chitosan, sensor, TMB, enzyme



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ISBN: 978-605-06728-5-5

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Comparison of Modeling 3D Transient Heat Transfer Problem with Different Commercial Finite Element Method Solvers

Abstract

In this study, three dimensional transient steel plate heating problem simulated with two different finite element commercial softwares. The modeling consists of two parts. At the first part steel thermal properties considered as constant while temperature changing. At the second part, steel heat capacity assumed changing with temperature. For each simulation case, boundary conditions were with constant temperature boundary condition at the sides and lower face of the plate and upper face of the plate has convection boundary condition. Ansys 2021 R1 Transient and Thermal tool and Matlab PDE toolbox compared in this study. According to results, temperature distribution compared for different points. Calculation timings also compared and it is found that for as a given heat transfer problem, using Ansys PDE Toolbox is solving 10 times faster than Ansys Transient Thermal tool. Temperature distribution results were only varied 1,8%.

Keywords: Transient heat transfer, Numerical modelling, Finite element method, Mesh independency

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Simulation and Modeling of Threading Operations in Multiple Products

Abstract

In this period of rapid development of technology and increasing competition in manufacturing companies, the automation system is very important for companies. Especially in the automotive industry, low cost, mass production and high quality requirements affect the development of manufacturing systems.

The production of metal parts such as plates and pistons that make up the air suspension systems of heavy commercial vehicles takes a lot of time. In these parts, which are given geometric form, threading is applied to the blasting area in order to create an air inlet and outlet zone. This process can be done on a single product in a single operation. Due to this situation, mass production needs of the automotive industry cannot be met.

In this paper, a research has been made on the development of the apparatus for the threading operation in the air suspension systems air inlet and outlet area. As a result of the research, an apparatus that can rotate around its own center and can be integrated with more than one product was designed. With this design, the positioning of more than one product in the system and the operation time were examined through simulation and modeling.

Keywords:

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Analysis of Hybrid Fiber Reinforced Thermoplastic Suspension Piston by Finite Element Method

Abstract

Today, environmental approaches such as low emission values and economic approaches such as efficient use of energy play an important role in the development of the automotive industry. For these reasons, lightening of automotive parts and vehicle designs are made for this purpose. The researches made stand out with the development of materials science, and in this case, they greatly affect all research and development activities in all sub-sectors.

Since the suspension parts are aimed to be both high-strength and light, light and durable materials are required. For this reason, plastic material developments are made for the new generation suspension pistons. Although this developed piston type is 30-35% lighter than its metal equivalents, it is known that it is not sufficient in terms of strength.

In this study, the elastoplastic behavior of glass and hybrid (glass and carbon) fiber reinforced thermoplastic suspension piston under vertical axial loading was analyzed by finite element method. As a result of the analysis, by comparing the stress and deformation values of the glass and hybrid fiber reinforced thermoplastic suspension piston, it was concluded that the values of the hybrid fiber reinforced thermoplastic suspension piston were better than the glass fiber reinforced thermoplastic suspension piston values.

Keywords: Air suspension system / Heavy commercial vehicles / Composite / Hybrid fiber / Finite element analysis / Strength



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Examination of the Different Heat Treatment After Hot Bending of Anti Roll Bar Used in Heavy Commercial Vehicles

Abstract

Anti-roll bar is the most important suspension system used to provide safety and comfort together, especially in heavy commercial vehicles. Anti-roll bars must have high variable fatigue and strength due to their operation under variable loads.

Anti-roll bars developed for heavy commercial vehicles can be exposed to distortion after hot bending. After straightening this distortion, the bar can be exposed to high stress. High stress on the bar causes it to have a shorter cycle time.

This study is about determining the effect of hardening conditions on fatigue behavior during heat treatment process of full the bar. For this purpose, the distortion amounts and fatigue life of 2 different bar materials in 2 different hardening environments were examined.

Keywords: Anti-roll Bar, Cycle, Heat Treatment, Heavy Commercial, Polymeric Water



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ISBN: 978-605-06728-5-5

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Design Optimization with 2D Dynamic Mesh in Helical Gear Bitumen Pump Abstract

Bitumen is a hydrocarbon waste with high viscosity and high correlation with temperature, which is obtained from crude oil and is used in a wide range in the construction industry, especially as road constructions, road maintenance and insulation material. Bitumen plays a key role in the asphalt mixture due to its durability and visco-elastic properties. Its cohesion, adhesion and durability properties are its advantages that enable it to exhibit the required performance in road designs. The viscosity of bitumen at 180°C is approximately 200 mPa.s. Pumps are designed according to the properties of the fluids they will deliver in industrial applications. A bitumen pump is used to transport bitumen in asphalt plants. Helical gear pumps are generally used as bitumen pumps. As the gears exit the net at the pump inlet side, they form an expanded volume. In this case, the pressure decreases and the bitumen flows into the gaps. Bitumen entering between threads is transported along the pump body to the discharge line. As the gears engage with each other on the discharge side of the pump, the volume decreases and is ejected under pressure. In this study, design optimization has been made with CFD analysis using ANSYS FLUENT program in helical gear pumps. Using the results of these simulations, a discussion of design improvements for the bitumen pump is included. As a computationally less complex approach to simulate helical gears, two-dimensional analysis was preferred and the cross-section of helical gears was used.

Keywords: Asphalt, Bitumen, CFD, Helical Gear, Pump



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First Principal Calculation of Structural, Elastic and Thermodynamic Properties of Ycu Intermetallic Compound

Abstract

In the present work, we investigate the equation of state parameters, elastic constants, and several other physical properties of (B2-type) Yttrium-Copper (YCu) rare earth intermetallic compound using the projected augmented wave (PAW) pseudopotentials method as implemented in the Quantum Espresso code. Using both the local density approximation (LDA) and the generalized gradient approximation (GGA), our finding on the lattice parameter of YCu intermetallic compound agree very well with the experimental ones. Our obtained results of the elastic constants and the Debye temperature are also in general in good agreement compared to the theoretical ones reported previously in literature. Furthermore, several thermodynamic properties of YCu intermetallic compound have been studied using quasi-harmonic approximations (QHA). Our calculated data on the thermodynamic properties shows that the free energy and both isothermal and adiabatic bulk moduli decrease gradually with increasing of the temperature, while all other thermodynamic quantities increase with the temperature.

Keywords: Yttrium-Copper (YCu) intermetallic compound, Thermo_pw package, Elastic constants, Thermodynamic properties, *ab-initio* calculations.



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ISBN: 978-605-06728-5-5

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Researching Antimicrobial, Antibiofilm, Anticancer Activities and Silver Nanoparticles Syntheses Using Ruscus aculeatus L. Plant in Green Synthesis Method

Abstract

In this study, green synthesis and characterization of silver nanoparticles (AgNP) using the leaf extract of Ruscus aculeatus L. plant and their characterisation was achieved. The characterization of nanoparticles has been identified by Uv-vis spectrophotometer (UV-vis), X-Ray Diffraction (XRD), Scanning Electron Microscopy (SEM), Fourier Transform Infrared Spectroscopy (FT-IR). As a result of the characterization, it was determined that there are nanoparticles with a spectrum at 426 nm wavelength, approximately 32.56 nm in size and in spherical size.

The antimicrobial activity studies of the leaf extract of Ruscus aculeatus L. plant and green synthesis AgNP were examined with a total of 15 different bacterial strains, 6 gram positive and 9 gram negative bacteria strains, using disk diffusion method. Additionally, their antimicrobial activities examined by the minimum inhibitor concentration (MIC) and minimum bactericidal concentration (MBC) methods. The method of connecting to the crystal cello was used in the evaluation antibiotic film activities of plant extract and AgNP's. Enterobacter aerogenes ATCC 13048, Salmonella infantis, Escherichia coli CFAI ATCC 25922, Staphylococcus aureus ATCC 25923, Staphylococcus epidermidis DSMZ 20044 and Bacillus subtilis DSMZ 1971 bacteria strains were used in the evaluation of biofilm formation inhibition activities. These methods have been studied in three parallel ways. The

data obtained at the end of the study were made using IBM SPSS Statistics 23.0 (SPSS Inc; Chicago, IL, USA) program.

Breast cancer cell line (MCF-7) and human umbilical vein endothelial cells (HUVEC) were used in anticancer activity studies. The number of cells was measured spectrophotometrically using the MTT method to determine the viability. The data obtained at the end of the study were evaluated using GraphPad Prism (Ver. 6.01) program.

As a result, AgNP gave the best result in the MIC and MBC study while the plant extract were the best result in the disk diffusion method in antimicrobial study. In the antibiofilm activity study, *Enterobacter aerogenes* ATCC 13048 was the highest activity result in plant extract, while *Staphylococcus aureus* ATCC 25923 showed the lowest activity. AgNP showed the highest activity in *Salmonella infantis* bacteria strain, while *Escherichia coli* CFAI ATCC 25922 showed the lowest activity.

At the concentrations determined in cytotoxic activity studies, the lowest concentration value of the plant-AgNP complex on MCF-7 and HUVEC cell lines was determined as 10⁻³ µg/ml. It was observed that the extract had no cytotoxic effect on the MCF-7 cell line, but the lowest concentration was 10⁻³ µg/ml on the HUVEC cell line.

This work was supported by a grant from the Kahramanmaraş Sütçü İmam University Scientific Research Projects Unit, Project Number: 2020/1-7 YLS

Keywords: *Ruscus aculeatus* L., AgNP, antimicrobial activity, antibiofilm activity, anticancer activity



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