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FACULTY OF TECHNOLOGY

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ABSTRACTS BOOK

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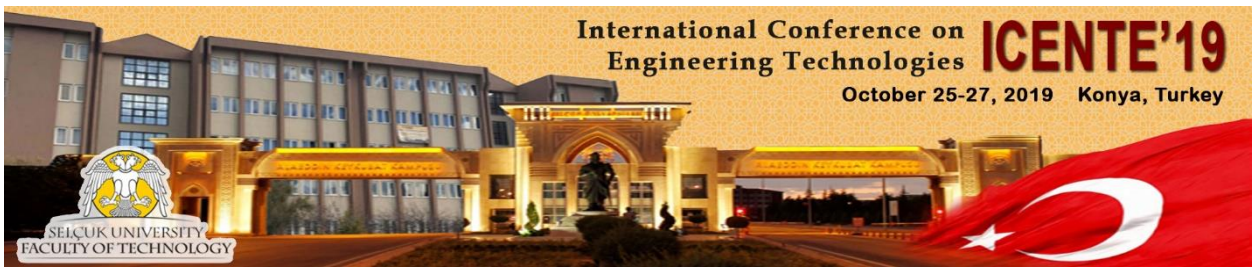

International Conference on Engineering Technologies

3th International Conference, ICENTE
Konya, Turkey, October 25-27, 2019

Abstracts

Editors
Ismail SARITAS
Mehmet CUNKAS
Fatih BASCIFTCI

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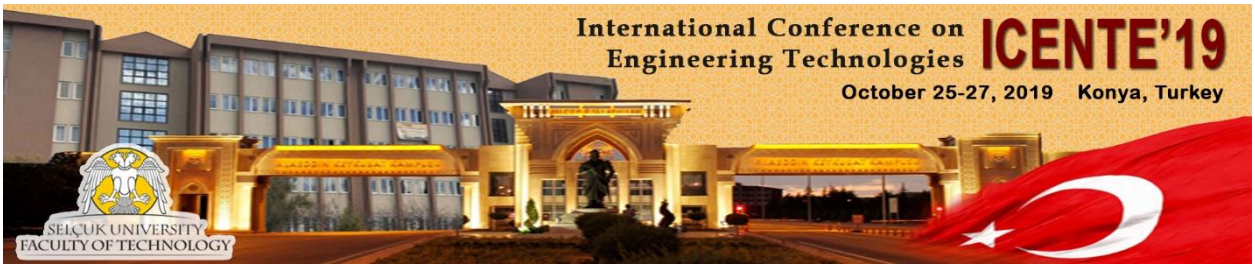

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PREFACE

International Conference on Engineering Technologies (ICENTE'19) was organized in Konya, Turkey on 25-27 October 2019.

The main objective of ICENTE'19 is to present the latest research and results of scientists related to Electrical and Electronics, Biomedical, Computer, Civil, Mechanical, Mechatronics, Metallurgical and Materials Engineering fields. This conference provides opportunities for the delegates from different areas in order to exchange new ideas and application experiences, to establish business or research relations and to find global partners face to face for future collaborations.

All paper submissions have been double blind and peer reviewed and evaluated based on originality, technical and/or research content/depth, correctness, relevance to conference, contributions, and readability. Selected papers presented in the conference will be published in the Journal of Selcuk Technic if their content matches with the topics of the journal.

At this conference, there are 203 paper submissions. Each paper proposal was evaluated by two reviewers. And finally, 123 papers were presented at the conference from 8 different countries (Albania, Azerbaijan, Bulgaria, Crotia, Iraq, Macedonia, Latvia, Turkey).

In particular, we would like to thank Prof. Dr. Mustafa SAHIN, Rector of Selcuk University; Prof. Dr. Prof. Dr. Jurgis Porins, Riga Technical University (RTU); Prof. Dr. Tzvetomir Vassilev, University of Ruse; Journal of Selcuk Technic. They have made a crucial contribution towards the success of this conference. Our thanks also go to the colleagues in our conference office.

Ismail SARITAS – Mehmet CUNKAS – Fatih BASCIFTCI
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CONTENTS

ADVANCES IN OPTICAL AMPLIFICATION TECHNOLOGIES FOR HIGH CAPACITY FIBER OPTICAL TRANSMISSION SYSTEMS

JURGIS PORINS[1]

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ABSTRACT

Increasing volume of transmitted data per channel in today's fiber optic transmission systems (FOTS) brings up a necessity for greater optical capacities and higher output powers. It is difficult to satisfy those requirements with a conventional erbium-doped fiber amplifier (EDFA) because of its limited bandwidth and noise characteristics. Therefore, one of the strategic directions for optical network resources optimization and efficiency improvement is design of new-type optical amplifiers, which would ensure larger output power, as well as increase the range of amplification wavelength [1], [2], [3]. One of the promising solutions in this area is the combination of erbium-doped silica fibers and fibers with other rare-earth dopants such as ytterbium (Yb3+) and thulium (Tm3+) because of their beneficial spectroscopic characteristics. Yb3+ has a larger absorption cross section than erbium and wider range of possible pump wavelengths (800, 915, 940, 975, and 1060 nm) while thulium emission wavelengths of 1460 and 1650 make it suitable for amplification in S frequency band [4]. In this talk, physical layer options such as integration of new type optical fibers and combined rare-earth doped optical amplifiers (REDFA) are reviewed according to their potential to reduce an impact of nonlinear effects and broaden spectral band respectively.

TRY ON OF VIRTUAL GARMENTS ON VIRTUAL BODIES

TZVETOMIR VASSILEV[1]

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ABSTRACT

This paper describes a virtual try on (VTO) system which dresses a virtual human body, acquired via a 3D scanner, with digitized garments, represented by their garment panels and seaming information. The cloth is physically simulated with a mass-spring system using a velocity modification approach to overcome super elasticity. The cloth-body collision detection is based on image space tests with pre-generated depth and normal maps, used for collision detection and response. The system also checks for collisions between layers of cloth, in case the body is dressed in several garments, using the same image space approach with several maps generated. The simulation is implemented entirely on the graphics processing unit (GPU) which significantly accelerates the computations. As the results show a body can be dressed in a garment in a fraction of a second. The paper also discusses how the simulation can be implemented on a mobile device.

KEYWORDS - Virtual try-on, cloth simulation, General purpose GPU programming, Collision detection, Mobile computing.

SEMI AUTOMATIC CARDIAC VECTOR AND ANGLE CALCULATOR DEVELOPMENT

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ABSTRACT

One of the important diagnostic data in ECG is determining Heart axial vector. This vector can help doctors to diagnose a disease or to state the heart's medical condition from electrical signals. However, determine these vectors have some difficulties like drawing and calculating QRS or any other important regions like S-T on the ECG paper. This is also a very long process. Besides during the process, there is a high possibility to make mistakes by human hand. To shorten this process and at the same time to avoid the mistakes by human hand during the measuring and calculating heart vectors, we approached via image processing techniques and designed a Python-based Graphical User Interface. The program was designed manually calibrating-globally usable. We aim to make this process short and more reliable. This program can measure the distance between two dots that the user has determined on ECG papers and according to data program can calculate the aVf, aVl, aVr and Lead 1 deviations' heart axis and their angle. Thus, the user can measure any region on these deviations mathematically and calculating the heart vectors from these deviations. We analyze ECG Papers from real patients by the program and by hand. As a result, the recorded data are correlated with high accuracy.

KEYWORDS - ECG, GUI, Biomedical, Image Processing, Cardiac Axes

REVERSIBLE DISULFIDE FUNCTIONALIZATION OF PEGYLATED CHITOSAN BASED HYDROGELS SCAFFOLDS FOR SELECTIVE THIOL IMMOBILIZATION AND RELEASE

MEHMET ARSLAN[1]

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ABSTRACT

Novel PEGylated chitosan-based hydrogel scaffolds incorporating reversible thiol anchoring groups were fabricated. A novel mercaptobenzothiazole based disufide containing methacrylic monomer was synthesized and utilized in gel formation along with O- poly(ethylene) glycol modified chitosan. Hydrogel formation was established via amine-Michael addition of chitosan amino groups onto methacrylic disulphide monomer and PEG diacrylate crosslinker. A series of hydrogel incorporating various degree of functional disulfide groups were synthesized. The resulting hydrogels were characterized by equilibrium swelling, structural morphology and rheology. These materials were investigated as reversible thiol immobilization platforms by conjugating thiol-bearing compounds onto network-embedded disulphide groups. These hydrogels combined efficient crosslinking and functional disulfide incorporation into clinically important chitosan scaffold and might serve as reactive platforms for reversible conjugation of thiol-bearing molecules.

KEYWORDS - Hydrogels, thiol-disulfide exchange, biofunctionalization, chitosan-based biomaterials.

BLOOD GLUCOSE CONTROL ALGORITHMS AND EXPLANATION OF INSULIN AND CARBOHYDRATE MECHANISMS FOR TYPE 1 DIABETES MELLITUS

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ABSTRACT

There are approximately 50 million Type 1 Diabetes Mellitus (T1DM) patients in the world. All of these patients need external insulin injection. Because this disease is an autoimmune disease, the best treatment foreseen in the short and medium term is insulin supplementation. With proper insulin administration, T1DM patients can lead a near-normal life. Artificial pancreas is the most accurate way to administer correct insulin. Therefore, artificial pancreas studies are gaining speed. Artificial pancreas systems deliver insulin with a closed-loop control system according to blood glucose value from continuous glucose monitoring system and food intake. In use of artificial pancreas; it is very important to model carbohydrate and insulin mechanism correctly, to determine metabolic parameters of the patients and to develop an algorithm suitable for the regulation of blood glucose. It is one of the most important parameters for good blood glucose management that a thorough understanding of insulin and carbohydrate mechanisms for patients, relatives and physicians. But, the mechanisms of insulin and carbohydrates involve differential equations. Therefore, they are not easy to understand for people who do not have a certain level of mathematical knowledge. T1DM patients, their parents or physicians do not have to know high mathematics and often do not. Therefore, the mathematical models used are far from these people. However, the fact that both patients and physicians know and actively use these models increases the effectiveness of blood glucose management. In this study, in order to provide an easy understanding of the mechanism of insulin and carbohydrate, these mechanisms were exemplified on PIMF function which was a MATLAB function. Through this model; the mechanism of insulin and its effect on blood glucose, carbohydrate mechanism and its effect on blood glucose were explained. In addition, the correct overlap of these two mechanisms was expressed mathematically. Hypoglycemia and hyperglycemia status estimation related to the change in blood glucose value were explained. Insulin and carbohydrate mechanisms have been tried to be expressed in a simple way for physicians, patients and their relatives to use without having to know high mathematics.

KEYWORDS - Carbohydrate, Insulin, Mathematical Models, T1DM

BIOMEDICAL APPLICATIONS OF COLLAGEN

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ABSTRACT

Collagen is one of the most common biomaterials. It is perfectly biologically compatible and safe, because of its variety of properties such as biodegradability, poor antigenicity, and self-aggregation. Collagen has also ability of forming extra-strength fibers with cross-linking between molecules. Collagens are used in many different forms such as sponges, mini-pellets, shields, gel formulation as well as in many drug delivery systems including skin replacement, artificial blood vessels, bone substitutes and valves. Thus, we discussed, in this article, different applications of collagen in biomedical sciences. These properties make collagens a primary source for medical applications.

KEYWORDS - Collagen, Beiomedical, Drug Delivery, Biomaterial

A MICRO SCALE BIOSENSOR FOR THE DETECTION OF BACILLUS STEAROTHERMOPHILUS SPORE GERMINATION

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[2] Antalya Bilim University, Turkey

ABSTRACT

Germination of Bacillus Stearothermophilus bacterial spores is being used as a marker in sterilization monitoring systems to verify the success of sterilization processes in healthcare facilities. Such systems mainly employ optical detection techniques that are expensive and time consuming. This work presents the first micro-scale biosensing platform that is capable of detecting this specific spore germination through impedance measurements. Starting from theoretical calculations on ion concentrations, a simulation model is built on COMSOL software to analyze the conductance change of the medium during germination. It has been demonstrated that even 1% germination ion yield results in a 5-fold drop in germinant solution resistance, reaching up to more than two orders of magnitude decrease when the spores are fully germinated. A microfluidic biosensor consisting of interdigitated electrodes was designed, and a fabrication approach has been presented. This device, when fully fabricated, poses an inexpensive solution that can provide sterilization verification results in under 10 minutes.

KEYWORDS - Biosensor, Impedance, MEMS, Lab on a chip, Germination

LYAPUNOV EXPONENTS AS A STATISTICAL TEST TOOL

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ABSTRACT

One of the application areas of chaotic systems is chaos based cryptography studies. Many design studies have been proposed using the relationship between chaos and cryptography. In this study, it has been shown that this relationship can be used in cryptanalysis of cryptographic designs. The usability of chaos analysis methods in the analysis of cryptographic protocols has been investigated. Lyapunov exponents, which are a chaos analysis method, have been used to measure the quality of random number generators. The analysis results showed that Lyapunov exponents can be used as a criterion in the evaluation of random number generators.

KEYWORDS - Cryptanalysis, Random Number Generator, Lyapunov Exponent, Chaos, Cryptography.

A NEW METHOD FOR PERFORMANCE IMPROVEMENT OF CHAOTIC S-BOX STRUCTURES

YAŞAR SELİM BAHÇECİ[1], FATİH ÖZKAYNAK[2]

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ABSTRACT

In cryptographical protocol design, substitution boxes have an important place. One common method for creating substitution boxes is random selection based designs. Chaos-based designs are the most effective method in the literature for random selection. In this paper, it is aimed to improve performance of chaos based substitution box designs by using new methods. Nonlinearity is one of the most prominent features used as performance measurement in substitution boxes. It is aimed to improve the nonlinear criterion with the proposed method.

KEYWORDS – Chaos, Cryptography, S-Box, Nonlinearity

FEATURE SELECTION FROM ELECTROENCEPHALOGRAM SIGNALS BY MEANS OF USING PRINCIPAL COMPONENT ANALYSIS

***SEMA YILDIRIM*[1] *, HASAN ERDINC KOCER*[2]**

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ABSTRACT

The aim of this study is to determine the success of the feature vector (FV) that was obtained by a variety of feature extraction methods and the success of the eigenvalues that were obtained by Principal Component Analysis (PCA). EEG signals (EEGs) that were collected retrospectively from Selcuk University Faculty of Medicine Hospital were used in this study. Feature vector was obtained from 30 epilepsy patients and 30 normal via statistical methods and discrete wavelet transform (DWT). Dimensions of these feature vectors were reduced via Principal Component Analysis (PCA) method. Four eigenvectors with the highest relationship that include 71, 52, 33 and 15 according to PCA correlation matrix were included in the study. The performances of the eigenvectors were calculated and compared using an Artificial Neural Network (ANN). Performance evaluation of the used ANN algorithm were carried out by performing Receiver Operation Characteristic (ROC) analysis. Experimental results have shown that eigenvector 3 (EV3) including 33 features is more successful than the other feature vector and eigenvectors with 93.67% training and 88.30% test. Furthermore, the performance of all eigenvectors was observed to be higher than the performance of the feature vector. As a consequence, the use of more meaningful eigenvectors improves the classification performance instead of high-dimensional feature vectors.

KEYWORDS - Electroencephalogram, Discrete Wavelet Transforms, Principal Component Analysis, Artificial Neural Network, epilepsy.

ANALYSING RESTING STATE FUNCTIONAL MRI USING DYNAMIC CAUSAL MODELING IN SCHIZOPHRENIA

GUZIN OZMEN [1] ***, BURAK YILMAZ*** [2]

[1] Selcuk University, Turkey
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ABSTRACT

Schizophrenia; is one of the most important psychiatric diseases which affect the daily life negatively and cause disruption in emotion and behavior. Functional MRI studies have shown that there are differences between schizophrenia patients and healthy individuals. In this study, effective brain connectivity of a schizophrenic patient and a healthy person of the same age were analyzed with functional MRI. Spatial preprocessing steps were applied to the resting-state data used for this purpose and dynamic causal modeling analysis was performed. At the analysis stage, effective connectivity between the medial prefrontal cortex, posterior cingulate cortex, right inferior parietal lobe and left parietal inferior lobe were investigated. According to the analysis, it was observed that effective connectivity was increased between the medial prefrontal cortex and right IPL regions in a schizophrenic patient

KEYWORDS - Schizophrenia, Fmri, Resting-State, Effective

WEIGHTED 3D DWT BASED DENOISING ON BRAIN MRI APPLICATIONS WITH SIMULATED AND REAL MS MRI

***GUZIN OZMEN*[1] *, BURAK YILMAZ*[2]**

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ABSTRACT

Multiple sclerosis (MS) is defined as a severe, chronic, persistent inflammatory demyelinating disease that occurs in the central nervous system. When working on MRI images, all techniques may not always achieve the desired performance because there are some special cases of brain MRI images. The most important parameter in MS diagnosis is the identification and visualization of plaques, which can be determined with precise accuracy thanks to MRI. Because of all these benefits of the MRI, it is mandatory to use MRI in MS diagnosis. Generally, MRI images contain extra noise data which adversely affects MS diagnosis. In this study, the Weighted-3D-DWT technique is used to suppress the effects of the noise while protecting the plaque data. To apply the proposed algorithm to 3D brain images, high and low-frequency sub-bands of the images are obtained by 3D discrete wavelet decomposition. For this purpose 3D volumes are decomposed by 3D-DWT. Then the energy value of the original image and sub-bands are calculated. The weight factor is obtained by dividing the energy of the sub-band to the energy of the original image. Each sub-band is multiplied with their weight. Finally, the denoised volume is reconstructed from the weighted 8 sub-bands. In this study, the performance of denoising algorithms was evaluated by using Mean Square Error (MSE), Peak Signal-to-Noise Ratio (PSNR) and Structural Similarity Index (SSIM) which are used in image denoising assessments in literature. The results were compared with the Median filter and the Gaussian filter. As a result, we have obtained 0.0698 MSE value with Median Filter and 0.0608 MSE with Gaussian Filter. Also, w-3D-DWT provided 0.0279 MSE with 66.01 PSNR and 0.9982 SSIM for % 9 noise simulated MS MRI. Moreover, while maintaining the plaques in the brain w-3D-DWT gave the lowest MSE with 0.0036 and the highest PSNR with 75.514 for the real MS MRI.

KEYWORDS - MS, Weighted-3D-DWT, Denoising

BRAIN ATLAS REGISTIRATION WITH OPTIMIZATION ALGORITHMS

BURAK YILMAZ [1] **, *GUZIN OZMEN*** [2]

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ABSTRACT

A variety of methods have been developed to provide standardization in both density and form in the processing and analysis of biomedical images. One of these methods is to register images to atlases or standard models. By registering biomedical images, it is possible to determine how much the tissue under examination conforms to the anatomical model or the amount of deterioration. In the literature, there are different image registration algorithms based on various methods, the algorithm developed in this study is designed to be based on non-rigid, affine transformation. Also optimization methods used for determining the conversion parameters. The algorithm has been developed to use both shape properties and density properties at the same time. In order to provide maximum correlation between the input image and the atlas, both images were processed with Cellular Artificial Neural Networks to reveal basic shape properties. The method was tested and compared with 3 different optimization algorithms.

KEYWORDS - Optimization, Affine Transform, Cellular Neural Networks, Biomedical Image Registration

FRACTURE TOUGHNESS AS A KEY ASPECT OF BONE FRACTURE RESISTANCE

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ABSTRACT

Bone fractures are among the biggest health concerns in the world. Understanding the factors leading to bone fracture is the essential step to develop new strategies for dealing with this costly and deadly health problem. Studies published in recent years highlighted that all bone fractures are not only associated with low bone strength. In fact, fracture toughness, which is the material property focusing of resistance of the material to sudden and unstable growth of cracks, is an emerging field in bone research to better understand bone fragility associated with diseases and aging. Fracture toughness may be more closely associated with hip fractures and atypical femoral fractures which are two of the most common of bone fractures seen in the clinics. In this study, the possible association between fracture toughness and bone fractures was discussed in light of recently emerged studies.

KEYWORDS - Bone Biomechanics, Mechanical Properties , Fracture Toughness, Bone fracture

IMPLEMENTATION AND PERFORMANCE OF SORTING ALGORITHMS IN TERMS OF TIME AND SPACE ON INTEL CORE I7 TM PROCESSOR BY USING C JAVA PYTHON AND PHP AS A PROGRAMMING LANGUAGE

ELISSA MOLLAKUQE[1] , MENTOR HAMITI[2] , VESA MOLLAKUQE[3]

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ABSTRACT

Data sorting is the placement of data in a particular way, such as ascending or descending. It is one of the most important computing applications. Data sorting is an intriguing problem that has attracted an enormous research effort. Sorting algorithms are efficient algorithms that perform an important task by putting the elements of a list in a particular order or in a particular order. With the advent of computing, many data sets were born which then revealed many complexities about sorting and research problems. In 1956 came the first tests for sorting algorithms - bubble sort algorithm. The first algorithms had low capacities and used object comparison to meet the basic requirements of the form O (n log n) - some sequences were treated as inputs multiplying by n log n comparisons.

KEYWORDS - Performaces, Sorting, Algoithms, Data, Time Complexity And Space Complexity

HOURLY DAILY AND MONTHLY ANALYSIS OF BIG DATASET OF BITCOIN BLOCKS

AHMET SAKIR DOKUZ[1] *, ALPER ECEMIS*[2] *, METE CELIK*[3]

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ABSTRACT

Recently, BlockChain network protocol is proposed for safer and more transparent communication among the peers of the networks. Bitcoin is one of the popular application of BlockChain that provide anonymity, traceability, and crowdsourcing based security to the network peers. The increasing attention in Bitcoin led wind range of usage over financial and investment domains, and the usage frequency end up a big dataset of Bitcoin transactions. In this study, we analyzed Bitcoin blocks data to answer what is the daily, weekly or monthly trends of Bitcoin transactions of dataset. The answers to these questions would provide better understanding of Bitcoin transactions and their USD value, and would become a more reliable investment option. The experimental results show that Bitcoin transactions have different characteristics on hourly, daily, and monthly scales.

KEYWORDS - Blockchain, Bitcoin Analysis, Hourly Daily and Monthly Analyses, Bitcoin Big Data, Data Mining

DATA CLUSTERING WITH BAT ALGORITHM USING BENCHMARK DATASETS

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ABSTRACT

Clustering is the assignment of separating the element of population or data points by employing unsupervised learning methods. Clustering methods are usually used as a first step in analyzing a problem. The purpose of clustering process is to separate groups with similar behaviors and allocate them into clusters. It is important to find the best cluster centers among the data. In literature there are different clustering algorithms but optimization algorithms were preferred for clustering problems, recently. Bat Algorithm is a successful metaheuristics optimization algorithm and mostly preferred for discrete optimization problems. In this study, Bat Algorithm was used for clustering problems. The performance of bat algorithm is investigated using four benchmark datasets (Iris datasets, Wine datasets, Tae datasets and Wbc datasets) obtained from UCI Machine Learning. Sum of Squared Error (SSE) and Rand Index were used to measure the performance of algorithm according to the datasets. The best performance was obtained with Iris and Wbc Datasets.

KEYWORDS - Clustering, Bat Algorithm, Metaheuristis.

AN ENHANCED FIREFLY ALGORITHM WITH OPPOSITION BASED LEARNING

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[2] Necmettin Erbakan University, Turkey
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ABSTRACT

This paper presents a modified Firefly algorithm (FA) improved with the opposition-based learning (OBL) method. OBL has an attractive interest in the field of metaheuristic optimization. OBL methods provide a rapid convergence to global optima without tackling local extrema. On the other hand, FA is an exclusive algorithm, which is inspired from the behaviors of fireflies. In this study, the Type-I OBL method is added to FA at two-phase and the modified version of FA is named as OBL-FA. Four well-known test problems were used to evaluate the performance. The effect of OBL methods on the FA algorithm is investigated and the results show that the proposed method has been achieved superior values than the original version of FA.

KEYWORDS - OBL, FA, Optimization.

VOIP NETWORK SECURITY ISSUES VIA LAYERED ARCHITECTURE

SEVKI GANI SANLIOZ [1] ***, MUHAMMED ALI AYDIN*** [2]

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ABSTRACT

In this study, the structure of VOIP technology, it's logic, protocols and the vulnerabilities are reviewed within the layered architecture. Internet Protocol VoIP security issues, which are analyzed in five layers over the Stack architecture, are handled separately in each layer. Various vulnerabilities of VOIP security, from the physical layer to the application layer, are detailed and the possible security measures against these vulnerabilities are presented.

KEYWORDS - VoIP, SIP, RTP, Layered Architecture, VoIP Countermeasures.

TIME SERIES ANALYSIS WITH DEEP LEARNING APPROACHES FOR REMAINING USEFUL LIFE PREDICTION

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ABSTRACT

Industry 4.0, which has recently become very popular, is a term used for data exchange and automation for production technologies. The manufacturing industry produces a large amount of data which can be used to improve processes and product quality. Analyzing time series data collected from multiple sensors can provide information for active preventive maintenance, which is essential for the sustainability of the factories and automation. Therefore, in this paper, we focus on the prediction of remaining useful life of a machine and proposed a prediction model using a deep learning approach. We perform our experiments on PRONOSTIA dataset, which consist of run-to-failure bearing sensor data. Features, such as mean, kurtosis, skewness, standard deviation, root mean square, crest factor, variance, are extracted from this dataset. Also, health indicator values are calculated to determine the remaining useful life of the bearings. We construct the remaining useful life prediction model, particularly using the LSTM (long-short-term memory) neural network. Finally, we compare the results of our model with the results of previous studies on this dataset. Our results are underperformed from other studies. This dataset is not directly applicable for LSTM network and preprocessing needs high effort.

KEYWORDS - Long-Short Term Memory, Deep Learning, Remaining Useful Life, Active Preventive Maintenance.

SECURITY FEATURES OF ACORN AND ASCON AS COMPETITION FOR AUTHENTICATED ENCRYPTION SECURITY APPLICABILITY AND ROBUSTNESS CAESAR

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ABSTRACT

CAESAR: Competition for Authenticated Encryption: Security, Applicability, and Robustness is now calling for submissions of authenticated ciphers. This competition follows a long tradition of focused competitions in secret-key cryptography[7]. CAESAR competition aims at finding authenticated encryption schemes that offer advantages and those schemes will give us more security. CAESAR tries to identify a portfolio of authenticated ciphers that [7] offer advantages over AES-GCM and [7] are suitable for widespread adoption. Now CESAR is organized into three use cases: Lightweight applications (resource-constrained environments), High-performance applications and Defense in depth. Candidates of this use case give different advantages depends on designs – block-cipher, stream cipher, functions and so on. This paper will give some characteristics of ACORN v1 ACORN v2, ACORN v3, and ASCON v1, ASCON v1.1 and ASCON v1.2by comparing security aspects.

KEYWORDS - Caesar, acorn, ascon, encryption, decryption and authenticated.

A DIFFERENT APPROACH TO FEATURE SELECTION WITH APRIORI ALGORITHM

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ABSTRACT

The rapid development of technology facilitates the recording of many transactions in digital environments and the storage of recorded data, while at the same time accelerating access to data. In business life, these data are used when making future decisions and analyzing the current situation. The data that are stored in the computer environment can be evaluated by means of data mining. In this article, the association rules were applied on Breast Cancer, Vote, Spect test data sets obtained from UCI Machine Learning Store, the results were analyzed and a method and application about the selection of qualified properties which had the most effect on the classification were explained and the algorithm details related to the application were explained. After the classification procedures performed on the data set with association algorithms, accuracy rates increased by 12.79 in Breast Cancer, 1.32 in Vote and 7.14% in Spect. Thus, more effective working on smaller data sets is provided.

KEYWORDS - Data Mining, Association Rules, Apriori Algorithm, Feature Selection

A REVIEW OF WEB USER BEHAVIOR STUDIES

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ABSTRACT

Any web site logs action of its user in a file. This helpful information assists us to analyze the behavior of user. Analyzing the behavior of user makes a great opportunity for Web site to predict the behavior of its user in future sessions. In this study a brief of studies related with user behavior in literature was given. It is also given a classification of these studies. This information will provide a basis for future studies.

KEYWORDS - Web log, web mining, Web user behavior

SHORT TERM ELECTRICAL LOAD FORECASTING USING ARTIFICIAL NEURAL NETWORK

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ABSTRACT

In the efficient operation of power systems and future planning, electrical load forecasting is very important. Load forecasting is based on the estimation of future electrical load by examining past conditions. Estimates from a few minutes to a day are called short-term forecasts. Short-term load forecasting has a decisive role in the load sharing of power plants. It also enables to overcome the deficiencies caused by sudden load increases and power plant losses. Weather conditions are effective in the short-term electrical load forecasting. Daily or hourly electricity consumption data are generally used for short-term load estimation. The last three years of daily electrical energy consumption data of Turkey used in this study. Days were categorized according to the seasons. And past electrical load values, as well as temperature values, were used to improve forecasting accuracy. In this study, a short-term electric load estimation model has been developed by using Artificial Neural Networks (ANN). The results obtained with this model were examined by statistical methods and it was found that this model has a good electrical load estimation performance.

KEYWORDS - Short-term electrical load forecast, Artificial Neural Network, Predicition Model

AN APPLICATION TO PROVIDE RADIO CONTROL WITH VOICE COMMANDS FOR VISUAL IMPAIRED INDIVIDUALS

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ABSTRACT

Using technology, we can control many things in our lives. Our life has become more comfortable with technology. Some situations that were previously difficult to manage thanks to technology have become much more practical. The use of technology has made life easier especially for people with disabilities in many areas. In this study, a radio program was developed for individuals with disabilities to listen to radio via voice commands over the internet. This application was developed to address the needs of people who cannot listen to music on their own due to any disability. The application was implemented in C# programming language. In order to manage the radio program with voice commands, voice recognition libraries were first used. In the application developed, the desired radio can be listened over the internet without using keyboard and mouse.

KEYWORDS - Voice recognition, Radio program, Visually impaired individuals

CHEST X RAY IMAGE DENOISING BASED ON CONVOLUTIONAL DENOISING AUTOENCODER

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ABSTRACT

Nowadays, medical imaging plays important role in medical settings to obtain high resolution images for the human body. The medical imaging techniques usually suffer from many types of noises such as gaussian, salt and pepper and speckle noises. So, getting a high-resolution body image is so difficult. The accurate medical images is necessary for diagnosis of many diseases. In this paper, medical imaging denoising technique based on convolutional denoising autoencoder is proposed. The NIH chest X-Ray dataset has been used for the training and testing of the proposed model. The model consists of 10 layers to learn the representation of the noise in the image and then reconstruct a new image without the noise. The model performance evaluated by using mean squared error and peak signal to noise ratio. For the training purpose we added gaussian noise to the dataset. The total number of images used is 25,000 splitted into training set 22,500 images and testing set 2500 images. The model achieved excellent results on the testing set with 0.01 mean squared error.

KEYWORDS - Image Filtering, Image Processing, Deep Learning, Convolutional Neural Networks, Autoencoder.

MODERN APPROACHES TO THE APPLICATION OF MACHINE LEARNING AND DATA MINING METHODS IN THE HEALTHCARE INDUSTRY

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ABSTRACT

In recent decades, the amount of data has grown exponentially in various sectors, especially in the healthcare industry. Extracting hidden value from such massive medical data has become one of the most relevant topics for both industry and academia. Healthcare institutions are faced with the need to process big medical data at an increasing rate. Today's demands on the volume of data processed and the speed at which it is processed are such that the processes need to be almost fully automated. These requirements apply not only to direct digital processing, but also to procedures for setting up, adapting and even building appropriate quantitative models. Traditionally used models in the health care industry have been combined with new computational methods, which are referred to as machine learning and data mining. The article provides an overview of the current state of research in this field. Our goal is to classify modern methods of analysis applicable in the healthcare industry. Description of models for comparing the effectiveness of its various methods. This article presents the classification of modern methods of machine learning and data intellectual analysis used in health care. Models that use machine-learning procedures and hybrid models that use combined methods can provide the level of efficiency required in modern healthcare.

KEYWORDS - Big Data Technology, Machine Learning, Data Mining, Healthcare

INFORMATION EXPLOITATION AND DIGITAL PIRACY

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ABSTRACT

Data is one of the most important things today and their value can not be measured, they can reinforce a business, drive new ideas, create opportunities, increase productivity etc, but in bad hands, data can be very critical and dangerous to the person who pronounces it, so everyone who keeps them online must take care of them. Here is discussed data, piracy, piracy impact, data disclosure, offensive technologies, defense technologies, preventive methods, familiar terms for computer engineers and, in general, exploitation art, art and most importantly, defense and war for their safety.

KEYWORDS - Data, Information Systems, Piracy, Exploatation

INFORMATION SECURITY AND PRIVACY ON INTERNET OF THINGS

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ABSTRACT

Privacy is defined as the right to be relieved of supervision and to determine when and for which personal or organizational information should be disclosed. Companies such as Facebook have privacy policies and can protect your privacy from external intruders, but what are they doing with your information and with whom are you sharing? Similarly, large corporations can have secure networks to protect themselves from hackers and other criminals online, but what are they doing with your information and with whom are you sharing?

KEYWORDS - IoT, Security, Privacy, Cyber Attacks, Information Security

SKIN DISEASE CLASSIFICATION USING CONVOLUTIONAL NEURAL NETWORKS

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ABSTRACT

In this paper, briefly explains the approach. The LMU team will produce estimates for Task 3 (Disease Classification). The score we obtained in the 2018 ISIC validation set of the 2018 ISIC Challenge was 0.881 balanced precision. Skin cancer, the most common human malignancy is diagnosed visually by starting the first clinical screening and possibly potentially by dermoscopic analysis, biopsy and histopathological examination. Automatic classification of skin lesions using images is a challenging task due to the fine-grained variability in the appearance of skin lesions. Deep convolutional neural networks (CNNs) show potential for general and highly variable tasks in many fine-grained object categories. Here, we have demonstrated the classification of skin lesions using a single CNN, trained thoroughly from direct images, using only pixels and disease labels as inputs. We train CNN using 129,450 clinical picture data sets (two larger sizes12 larger than the previous data sets) of 2,032 different diseases.

KEYWORDS - Skin Disease, Classification , Neural Networks,CNN.

COMPARISON THE PERFORMANCE OF CLASSIFICATION ALGORITHMS ON INTRUSION DETECTION SYSTEMS

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ABSTRACT

Intrusion detection systems are security systems against attacks commonly used in internet technology and computer networks. The purpose of security systems is to identify, log and prevent malicious network traffic. The performance of intrusion detection systems depends on the classification accuracy of the classification or prediction algorithms used in these systems. In this study, Naive Bayes, decision tree C4.5 and artificial neural network classification algorithms are used efficiently for developing machine learning based intrusion detection systems. The performances of the classification algorithms were evaluated with the confusion matrix results on the Kyoto University honeypots traffic dataset and the results of the classification algorithms were compared with each other. According to experimental results, the artificial neural network classification algorithm enhanced better performance than Naive Bayes and decision trees C4.5 Classification algorithms for the intrusion detection system.

KEYWORDS - Artificial Neural Network, Classification, C4.5, Naïve Bayes, Intrusion Detection System.

KNOWLEDGE BASED ADAPTIVE EXPERT SYSTEM FRAMEWORK FOR TRACKING WATER POLO PLAYERS BASED ON COMMONKADS METHODOLOGY

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ABSTRACT

Tracking players in water sports is very challenging task. Previous papers are usually based on tracking algorithms and background modeling or players extraction. In this paper it is presented expert system framework application organized from different angle. All system is described through CommonKADS methodology and it can be applied by any algorithm. This methodology is implemented and evaluated on real water polo match.

KEYWORDS - Common KADS, Tracking Players, Water Polo, Computer Vision

REMOTE HOME CONTROL USING ARDUINO WITH ANDROID BASED APPLICATION

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ABSTRACT

Technology has brought many innovations and conveniences to human life. Nowadays, some applications are frequently used to make people's lives easier. In this study, a model house was developed in order to make it easier for people to meet their needs in daily life. The doors and lights of this model house were controlled wirelessly by the phone. Arduino's wireless communication technology is used in the control process. Application we use daily in our house door, lamp, etc. the tools are remotely controlled thanks to the android supported phone. The application is very convenient for everyone, especially disabled-elderly people.

KEYWORDS - Arduino, Remote control, Home control, Android, Blueterm.

CONVOLUTIONAL NEURAL NETWORK BASELINE MODEL BUILDING FOR PERSON RE IDENTIFICATION

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ABSTRACT

Nowadays, there has been a wide range of critical issues that made the person re-identification task as a challenging task, these issues include human pose variation, human body occlusion, camera view variation, etc. To overcome these issues, most of the modern approaches are proposed based on deep convolutional neural network (CNN). This paper, sheds light on how to utilize a pre-trained CNN models which were developed for image recognition, to create a powerful CNN baseline model that could be utilized for the task of person re-identification. To build such a powerful model, this study has proposed to adjust the architecture of the CNN model by adding batch normalization and dropout layers to the classifier part of the CNN to prevent an overfitting and re-train it with the available dataset. Then this research study has utilized cosine similarity to calculate the resemblance among the extracted features. The extensive experiments conducted on the proposed CNN baseline model using the three large and well-known standard re-identification datasets to validate the performance of the proposed method, proved that the proposed approach could be compared with the state-of-the-art approaches.

KEYWORDS - Computer Vision, Person Re-Identification, Deep Learning, Convolutional Neural Network.

AGGREGATION OF MULTI STAKEHOLDER PREFERENCES ON FEATURE MODELS

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ABSTRACT

Feature models are one of the most important techniques to manage variability and commonality for modeling the attributes of a software product line (SPL). When building an SPL, as in most practical cases, there exist multiple stakeholders with their preferences on various and optional features. In this paper, we propose using fuzzy integral operators to integrate various preferences of stakeholders in SPL. Proposed method aims to aid multi-stakeholder feature model configuration which is known to be hard, error-prone and time-consuming activity

KEYWORDS - Software Product Lines, Feature Models, Fuzzy Integral

OBSERVATIONS ON THE EVALUATION OF DORSAL HAND VEIN DHV RECOGNITION AND IDENTIFICATION

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ABSTRACT

Despite the fact that there is a demand of the optimal security framework nowadays; the dorsal venous system is a system of veins in the shallow belt on the dorsum of hand-shaped by the dorsal metacarpal veins. It is found on the back of the hand and offers to ascend to veins, for instance, the cephalic vein and the Dorsal vein. Biometrics validation is a sectional domain utilized to enhance the general self-determinations domains communicated worry over security as well as characteristic issues (Sontakke et al., 2017). This observational research will move forward on observing the electronic database to review diverse methods utilized for designing the framework has been discussed in this paper. A dorsal hand vein (DHV) recognition framework consists of the following steps, for instance, image acquisition from the database as well as post-processing, pre-processing, segmentation, finding of the region of interest, extraction of DHV pattern features as well as algorithm of DHV. Several models are utilized to enhance the accuracy as well as real-time of DHV authentication and the utilization of neural networks for the final evaluation of the testing sample as well as training samples to identify an individual has been presented in Table.A-1.1., Table.A-1.2. as well as Table.A-1.3. In addition, an outcome of this observational study will be beneficial for organizations and firms even individuals that seeking for ensuring privacy and security. In addition, this study will move to implements the accuracy compression of the Real-time DHV biometric identification utilizing faster neural networks in future.

KEYWORDS - Biometrics, Physical shape, Dorsal hand vein, Vein biometric feature, biometric identification framework, dorsal hand vein pattern, High security, system recognition, Dorsal hand vein recognition and identification , Feature Extraction

DYNAMIC ANALYSIS OF MALWARE IN WINDOWS OPERATING SYSTEMS FROM PREVIOUSLY CAPTURED NETWORK PACKETS

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ABSTRACT

This research gives a basic introduction to malicious software applications by describing the infection vectors. Here, we have defined the layers of malware analysis with a distinction between static and dynamic analysis. Focal point was performing dynamic malware analysis over previously captured network packets over Windows XP Operating System by building a software platform or safe environment for malware analysis with required software tools and resources. In this research, we tried to determine a working practical solution to how the malware has to be analyzed with its constraints, which standard operating procedures shall be implemented and at least how a security expert should deal to minimize the security problems infected by malicious software codes.

KEYWORDS - Malware, Static Analysis, Dynamic Analysis, Safe Environment

IMPLEMENTATION OF MOTH FLAME OPTIMIZATION ALGORITHM FOR THE PREDICTION OF TURKEY S ENERGY DEMAND

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ABSTRACT

In this study, a linear model based on the moth-flame optimization (MFO) algorithm was developed for estimating Turkey's energy demand. Input parameters of this model consist of Turkey's gross domestic product (GDP), population, import and export data. The results of the developed EMFO model were compared with the results of 2 different models in the literature. Results show that the EMFO model is more successful than the compared models. Finally, in this study, the developed EMFO model was used to forecast Turkey's energy demand up to 2030.

KEYWORDS - Moth-Flame Optimization, Energy Demand Estimation, Metaheuristic, Optimization, Turkey.

IMAGE PROCESSING BASED FAULT DETECTION IN ELEVATOR CIRCUIT BOARDS

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ABSTRACT

In recent years, the development of electronic devices with a more compact design and more complex functions has led to electronic circuit boards becoming smaller and more intensive with circuits and components. Because bare printed circuit boards are an important part of the electronic device, they must be properly inspected before being placed on the market. Various methods are applied to detect defects in the printed circuit board (PCB). Of these, optical images are compared with reference images and errors are detected. In this study, a software has been developed to detect defects of elevator print circuit boards in transmission paths. Three types of image processing libraries are used on the Python platform. These are Scikit-Image, Pillow and OpenCV libraries. Three different types of defects (mouse bite, open circuit and pin hole) were detected by using XOR operator, structural similarity index and template matching.

KEYWORDS - Image Processing, Fault Detection, Printed Circuit Boards

AN EFFICIENT APPROACH TO SIMULATION OF SEPIC CONVERTER WITH MUTUAL INDUCTANCE

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ABSTRACT

DC-DC Converters are used to convert a variable or constant DC voltage level to another. According to input and output DC levels, DC-DC Converters operate as step-up or step-down. A SEPIC (single ended primary inductance converter) DC-DC converter can operate as either step-up or step-down depending on duty cycle and commonly used in photovoltaic systems and battery charger systems. In this paper, modified nodal analysis is used to analyze SEPIC Converter with coupled inductor and switching elements are modeled with two valued resistor approach. The simulation results show that two valued resistor approach is more efficient than classical modeling approaches in modeling switching elements.

KEYWORDS - SEPIC, DC-DC Converter, Analysis, Switch, Model

SEE THE WIRELESS

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ABSTRACT

This paper presents the design and implementation of a system that allows visualizing the WiFi signals around us. The system is based on a Yagi antenna and a Raspberry Pi processor equipped with a camera. Using image processing techniques received signal strength is encoded into a color scale and overlaid with the corresponding image of the surrounding environment. MATLAB code ensures high conversion precision. Excluding the Yagi antenna which was custom designed from the project, the rest of the components are cheap, off-the-shelf components which make it a simple low cost solution. It can be used as a simple preliminary method to visually determine the availability and strength of WiFi signals when designing 802.11 wireless networks.

KEYWORDS - Yagi-Uda Antenna, 2.4 GHz Wireless Network, Stepper Motor, Image Processing

DESIGNING A SYSTEM FOR NATURAL GAS STORAGE FACILITIES IN SALT CAVERNS

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ABSTRACT

Natural gas is most widely used resources for energy and is also used by people in homes for heating up. Countries cannot produce natural gas try to keep the balance between demand and supply. So, importance of natural gas storage increases and investments increase day by day. Generally, these facilities are operated manually. When the operation starts, operators take all decisions. Which units are working, which cavern should be used, which valves are open or close, all decisions made by operators. This type of facilities has complex process and possibility of man-made mistake is high. It is aimed that minimize the man-made mistakes, operate the facilities effectively and continuously. Therefore, a software tool is designed for the operations. The purpose is makes a PLC programming that include definition of operating parameters for all units in natural gas storage facilities, full automatic and semi-automatic operation, programming of the parameters and create SCADA pages.

KEYWORDS - SCADA, Natural Gas Storage, Gas Operation, Salt Caverns

USING AD7746 FOR HIGH PRECISION CAPACITANCE MEASUREMENT IN INDUSTRIAL APPLICATIONS

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ABSTRACT

Capacitive sensors have been widely used in industry for many years. The basic measurement logic is to measure, analyze and linearize the changes in the dielectric coefficient of the environment. Thanks to the developing technology, these sensors have been used in new sectors in recent years. The use of these sensors has increased considerably in areas such as agriculture, biomedical devices, MEMS and mobile telephones. There are different methods of measuring the change of dielectric coefficient of the medium. Capacitive measurement is generally an inexpensive measurement method. However, there are weaknesses due to problems in capacity measurement. Magnetic noise and temperature variations adversely affect the measurement accuracy of these sensors. One of the most important reasons for this is that the measuring circuit contains a large number of elements and is susceptible to interference. However, the capacitive digital converter chips developed in recent years have made these sensors very reliable. The prices are also quite economical. The Ad7746 is one of these chips. This chip converts the capacitance in 24 bit resolution. It has temperature sensors in itself to compensate for temperature changes. The measured value from the electrodes is immediately converted to digital information. The measured values are transmitted directly to the device associated with the i2c protocol, with no distortion on the road. In this study, the characteristics of AD7746 sensor, its industrial applications and the technological features it provides are examined. It used an AD7746 circuit to measure the water level. The circuit has been tested for water presence and proportional water level. It has been found that the circuit is very successful against noise and temperature changes. It was concluded that the capacitive measurement sensor developed using AD7746 can be used reliably for liquid level measurements in the industry.

KEYWORDS - AD7746, Capacitance to Digital, Liquid Level Measuring

BIAXIAL FUZZY LOGIC BASED SOLAR TRACKING SYSTEM

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ABSTRACT

Solar energy is an ecologically clean, inexpensive and easy to apply energy source compared to other alternative energy sources. The efficiency of the solar panel reaches its maximum value when the sunlight is at its best angle. The aim of this study is to design a solar tracking system based on fuzzy logic that can move in two axes following the solar movement in order to increase the efficiency of the solar panel by several times. In this system, the angles of the motors used on two axes are adjusted by subjecting the current values of the LDR light sensors and the panel to the fuzzy logic rules to monitor the position of the sun. According to the experimental results, it is observed that the panel works most efficiently from sunrise to sunset

KEYWORDS - Fuzzy Logic, Raspberry Pi3 B +, Solar, Tracking System.

IMU SENSOR SUPPORTED BLUETOOTH BASED FALL DETECTION SYSTEM FOR SAILORS

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ABSTRACT

Nowadays, more people attend sports for both their health and social gains. Especially sports such as sailing and mountaineering became popular among the sportsmen who prefer to be in nature during performing a team sport. In this study, it was aimed to improve the safety of sailors by enhancing a Bluetooth based fall detection system. A previously developed fall detection system was enhanced by implementing new sensors and electronic components such as IMU (inertial measurement unit) sensor, temperature sensor, MP3 player. The designed system consisted of a master and many slave systems. The master system was planned to be located in the center of a sailor yacht and the slave systems were placed into sailor garments. The master system consisted of GSM, GPS, OLED screen and various electronical components. The slave system has heart rate sensor, temperature sensor, IMU, MP3 player, OLED screen and some controller units. In addition to all these components, both systems have Bluetooth modules to provide wireless communication. According to the developed concept, the master system continuously scans slave units by means of Bluetooth modules. Safety function of the master system is activated when any of the sailors goes out of communication range of the master system. In that case, the sailor who has the missing communication is accepted as fallen from the boat and the location of falling is found by the master by means of GPS. Then the location information is sent to rescue operation center. The sailor also gets warning signals from the electronic system, which can also detect the falling, and initiates the emergency procedure. The study was improved over a previous study with addition of new electronical technologies and new software programs. The realized waterproof tests showed that the designed system provides satisfactory results. The designed system can also be used in different sport areas which requires team activities and communications within team members such as mountaineering, entertainment activities and daily lives. This study is funded by The Scientific and Technological Research Council of Turkey (TUBITAK) via 1505 scientific research project (Project No: 5160070) with support of CU Tekstil San. Tic. A.S. (Izmir, Turkey). Authors thank for their supports.

KEYWORDS - Fall Detection, Heart Rate, Sport Activity, Distress Signal, Smart Sailing Garment, Embedded System.

A FREE FORM LENS DESIGN FOR LONG RANGE LED ILLUMINATION

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ABSTRACT

In this study, a procedure for designing a free-form lens for long-range LED illumination is presented. The geometrical form of the free-form lens is obtained by minimizing optical path lengths of the rays emitted from the light source. Also, a prototype of the proposed lens is manufactured by the plastic injection method using PMMA material whose transmittance for the visible and near infrared optical regions is greater than 90%. Optical power measurements of the lens for two diferent LEDs are compared with the simulations based on Zemax OpticStudio.

KEYWORDS - Free-Form Lens, Long Range Illumination, PMMA

IMPLEMENTATION OF BABYLONIAN SQUARE ROOT COMPUTATION ALGORITHM WITH VHDL

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ABSTRACT

One of the most important calculation operation in many systems is the calculation of the square root of numbers. In digital systems and digital signal processing there are some different algorithms to calculate the square root of numbers. Designing of the square root calculator depends on the algorithm or method for the programming format. The Babylonian method was examined and used as a different approach in this study. The digital square root calculator designed is mainly based on the Babylonian method and design was implemented with VHDL language.

KEYWORDS - VHDL, Square Root, Babylonian Method, FPGA

LOCATING THE SENSORS POSITIONS IN WSN BASED ON MUSIC ALGORITHM

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ABSTRACT

Wireless sensor networks are often randomly deployed using an aircraft, for example, so the position of these nodes cannot be obtained previously. Therefore, we will produce a so-called site identification problem, i.e. how to obtain the site information of the unspecified node, and this is one of the most important topics of these networks. The Global Positioning System (GPS) is the most used positioning system for this time. But usually the disadvantages of these nodes are its high expenditure, its large volume, and its high cost, so the (GPS) is not applicable in these networks which are inherently self-configured low cost, and also it is impossible to install GPS for each node. In this paper, non-GPS positioning mechanisms will be used and studded for the wireless sensor networks. The effectiveness of the use of the MUSIC algorithm will be tested in the identification of signal flower angles based on SDMA technology and ESPAR antenna.

KEYWORDS - WSN, SDMA, ESPAR, Antenna

DETECTING THYROID CANCER BY USING CONVOLUTION NEURAL NETWORK

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ABSTRACT

The thyroid gland is below the Adam's apple (called the thyroid cartilage) in the front of the neck. Due to increasing in the number of people who diagnosis with thyroid cancer and also it has been difficult to inspect the disease within the gland. Deep into the problem, a model of classical machine learning techniques or machine learning system needs to extract the feature vector first, these processes are time consuming. Besides, the techniques cannot process raw data without preprocessing and without expert assistance. The CNN algorithm features are less time consuming and higher accuracy when data is preformed which leads to the objectives of this study, to adders them, deep learning is considered to be a successful tool to solve the problem. Deep networks perform the learning process on raw data unlike the traditional techniques. In this study, the transfer learning method (Pre-trained Model Approach) is used to detect thyroid cancer by recalling the pretrained network (AlexNet). Results show the deep network gives an accuracy of 100% with less time consumed. However, the data used is few in terms of number of images processed.

KEYWORDS - Deep Learning, Networks, Image Processing, Thyroid, Transfer Learning

A CURRENT LIMITING CONTROL STRATEGY OF GRID CONNECTED INVERTER FOR OVERCURRENT PROTECTION

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ABSTRACT

With the growing proliferation of the grid connected inverter (GCI) in modern power systems, the utility grid faces the challenge of flowing excessive current under unbalanced grid fault conditions. Therefore, a proper control strategy is important for the GCI during grid faults to prevent damage to semiconductor switches of inverter. To make progress in this direction, this paper presents a current limiting control strategy for overcurrent protection. Computed peak phase currents are integrated into the reference current generator to remain the peak current in the safe limits. Control of active and reactive power oscillations are performed by using an adjustable control parameter. A set of simulation results based on PSCAD/EMTDC software confirms the accuracy of the analysis and the effectiveness of the current limiting control strategy.

KEYWORDS - Grid Connected Inverter, Current Limitation Control, Overcurrent, Unbalanced Grid Faults

IMPLEMENTATION OF RENEWABLE ENERGY INTEGRATED AUTOMATION TRAINING SET

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ABSTRACT

In today's world, the need for energy is increasing day by day with the developments in technology. This energy is mostly supplied from fossil fuels. However, the future depletion of fossil fuels, environmental damage and price increases have led people to use alternative energy sources. Although there are various alternative energy sources, Solar and Wind energy are the most widely used. The use of alternative energy sources is as important as the efficient use of these sources. Therefore, the use of control and automation technologies in alternative energy systems is of great importance. In this study, automation experiment set with integrated alternative energy source was realized. Thanks to the experimental set, the students have become interested in the alternative energy and automation world together and contributed to their development in this field.

KEYWORDS - Automation, Industry 4.0, Renewable Energy

AN EFFECTIVE SOLUTION OF ERAB PROBLEMS IN LTE

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ABSTRACT

E-UTRAN Radio Access Bearer (ERAB) is an important parameter in LTE Key Performance Indicator analysis. That's why optimization engineers insist on making improvement on it. This parameter is formed by combining the S1 bearer and the corresponding radio bearer. It can be noted that this function is related to the E-RAB ID and Quality Class Identifier. The E-RAB ID parameter is used to determine the ERAB on the S1 interface. In a mobile network, there are values that affect the quality of service, such as Bit Error Rate and the end to end delay. These values define the QCI in LTE. The planned improvements are not easy; hence the ERAB parameter is composed of these different complex parameters. In this paper, ERAP and parameters related to the Handover are improved by proposed solutions of the results. As a result for downlink and uplink, ERAB Call Drop Rate is 0.05 and 72.41, respectively. Also, SINR Intra Frequency Handover is 337 and 406, respectively. All of these initiatives were successfully completed.

KEYWORDS - Mobile Network, LTE, Radio Access Network, Optimization

MEASUREMENT OF DIELECTRIC CHARACTERISTICS OF FIG AND MULBERRY LEAVES BY WAVEGUIDE TRANSMISSION LINE TECHNIQUE

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ABSTRACT

Recently, the use of microwave technologies has become widespread in studies on plants. The basis of these technologies is based on the determination of the dielectric properties of the material studied. The dependence of dielectric properties to water and frequency facilitates the automation of management by remotely sensing the needs of plants to water. In this way, both yield and quality increase in plants can be achieved. In this study, dielectric parameters of the fig and mulberry leaves intensively produced in Turkey are measured by Waveguide Transmission Line Method. Measurements are conducted between 4.90-7.05 GHz (for WR159 waveguide) and the dielectric characteristics of the leaves are examined depending on the moisture content and frequency. A new model with a curve fitting method based on frequency and moisture content (MC) is proposed used dielectric measurement data of fig leaves. This model is compared with the dielectric measurement results of mulberry leaves which belong to the same family with fig type to see the accuracy of the proposed model is tested.

KEYWORDS - Microwave Applications, Dielectric Measurement, Moisture Content, Fig Leaves, Mulberry Leaves.

FIXED AND VARIABLE ANGLE SOLAR ENERGY PLANT ANALYSIS

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ABSTRACT

Developments in science and technology cause increasing energy demand every day. Renewable energy sources already have a significant place in electricity production both around the world and also in Turkey and the share of solar energy going higher within the renewable energy sources. Solar energy is extremely easy to use, it is preferable too because it is environmentally friendly-clean energy. Solar energy plant is the energy source of the future, because the production costs of solar plants are lower than other energy sources and the economic difficulties are overcome. To get optimal production, the solar energy plant must make maximum use of the sun. In the designed system, solar panels are provided with both fixed and seasonal variations. The first variations of solar panel systems is are placed at constant 25° angle and the position angle of second variation is shifted from 10° to 30°in summer and winter accordingly. In this study, the performance of 1148 kWp PV plants which is established in Altınekin district of Konya and planned to be connected to the grid was evaluated by PVSYST analysis program. Power generation of the two different systems, specific data and performance value are calculated. Result of the study shows that the seasonal system produced 32.2 MWh more per year than the fixed system. Global irradiation in the seasonal system is 26.4 kWh/m², and the specific yield is concluded to be more than 28 kWh / kWc / year.

KEYWORDS - Solar Power Plant, Solar Energy, Fixed System, Variable Angle System.

SOLUTION OF PROBLEMS ON BAD SIGNAL QUALITY VIA RF OPTIMIZATION IN CELLULAR NETWORK

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ABSTRACT

Quality of service is a significant indicator that gives an idea of technology and success of mobile operator/vendor. Call integrity, call retainability and call set-up success rate are the important key performance indicators (KPIs) that define and create the quality of service. In addition, operators expect the complaints of customers using the network to be resolved immediately to increase customer satisfaction. The low network quality in these complaints is not easy to solve for planning and optimization engineers. The aim of this study is first to solve the quality problems by hardware configuration and changing optimization parameters in the global system for mobile communication (GSM) 900 frequency band. The second is to examine the RxQual, Speech Quality Index (SQI) and the Carrier to Interference ratio (C/I) values of the test region where voice quality problems have been solved and to determine whether the network contributed to the network quality. The network quality, which is very important for operators, has been investigated in the test regions. As a result, the average RxQual value from 7 to 3 has increased the quality of the received signal. The average SQI value from 9 to 25 has increased speech quality. The average C/I value from 7 to 13 has increased the MOS which is related to the voice quality on the grapevine.

KEYWORDS - QoS, Mobile Network, KPI, Radio Access Network, Cellular Communication

USE OF PMSM IN ELECTRIC MOBILITY SCOOTER PROPULSION

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ABSTRACT

In battery-operated wheelchairs are commonly used permanent magnet direct current (PMDC) motors. However brushless motors are more efficient than brushed motors. Therefore, in this study, PMDC motor was removed in electric mobility scooter type disabled vehicle which is used as a test vehicle and permanent magnet synchronous motor (PMSM) was mounted. The PMSM was driven by a sensorless field-oriented control method. The vehicle was been successful in the outdoor tests. So, PMSM was used for the first time in a disabled vehicle with a shaft system.

KEYWORDS - Disabled Vehicle, Battery-Operated Wheelchair, Electric Mobility Scooter, PMDC Motor, PMSM.

DESIGN AND COST OF SPEED TRAIN SYSTEM WHICH GET ENERGY FROM SOLAR

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ABSTRACT

The utilization rate of solar energy, which we know as a clean energy source, using in rail systems is a very popular issue. Because all possible solutions should be considered in order to meet increasing energy and transportation needs. In this study, it is assumed that the Ankara-Istanbul YHT train is operated entirely with solar energy except of the loss of transformers and other additional equipment. As a result of this assumption, the number of needed panels are calculated by SOLIMPLEX program and how much time this system could pay for it self are calculated according to the found number of these panels. In addition to these, CO2 emission values of the system are given and the environmental benefit is mentioned. Finally, the ways of reducing the cost of this system are mentioned and the study is finished with various recommendations.

KEYWORDS - Railway, Transportation, Solar Energy, Energy Efficiency, CO2 Emission.

MOSFET ONLY CURRENT MODE BP LP FILTER

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ABSTRACT

In this work, a current mode dual output, analog MOSFET ONLY BP/LP filter is presented. Transconductance and gate-to-source capacitances of the MOSFET's are used instead of passive circuit components like resistors and capacitors. The proposed filter exhibits some advantages compared to classical analog filter circuits which are low voltage and low power operation, reduced chip area and wide frequency range. The functional core circuit of the proposed filter has only two MOSFET transistors. LTSpice simulations are performed to verify the theoretical results and it is shown that theoretical results are in good agreement with the simulated ones.

KEYWORDS - MOSFET-Only, Analog Filter, Current-Mode

EFFECTS OF STATOR SLOT OPTIMIZATION ON EFFICIENCY AND TORQUE IN INDUCTION MOTOR

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ABSTRACT

Due to a number of advantages, induction motors are the most widely used the industry. Many output parameters such as efficiency, torque and power factor of these motors can be changed thanks to changes in the motor structure. In the optimization study, the most important factor is which output parameter to change. Of course, when changing this output parameter, there will be changes in other parameters. Therefore, all parameters should be kept under control in the design to be realized. In this study, only small changes were realized in the stator slot structure and changes in the magnitudes such as current, moment, power factor and efficiency were observed. It was observed that the higher efficiency in the narrow and long slot structure. However, higher starting torque and break-down torque were obtained in the large and short slot structure for same slot volumes.

KEYWORDS - Induction Motor, Slot Optimization, RMxprt, Efficiency

LOW VOLTAGE GAIN BOOSTED TWO STAGE CMOS OPERATIONAL AMPLIFIER

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ABSTRACT

In this work, two-stage gain boosted CMOS operational amplifier (OPAMP) design is realized for use in analog signal processing. The input and output stages of the designed circuit have a wide dynamic range between the supply voltage and ground. The transistor sizes of the designed operational amplifier and biasing currents are selected to provide low power consumption with high gain. The designed circuit is proposed for 2kΩ resistive and 200pF capacitive load. Simulations are performed in Cadence Spectre Circuit Simulator using 180nm CMOS technology.

KEYWORDS - Operational Amplifier (OPAMP), Analog Signal Processing, Analog to Digital Converter (ADC).

INVESTIGATION ON DIELECTRIC PERMITTIVITY OF PZT MANUFACTURED BY ELECTRIC FIELD ASSISTED SINTERING

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ABSTRACT

By using submicron PZT(Pb[Zrx,Ti1-x]O3 (0≤x≤1)) materials system, we provided electric field assisted sintering at 482–520 oC temperature range in conjunction with 60 V/mm dc electric field on the specimen. The furnace temperature increased up to 520 oC with 10 oC/min increment. 0.3 amp current cut off was set by dc power supply to eliminate further temperature increase on specimen due to joule heating. The electric field assisted sintering system was prepared with sandwich type experimental setup. The specimen showing initially insulator behavior, revealed current leakage at 482 oC. Maximum current draw of 0.3 amp was reached at 502 oC with total power absorption of 5.27 watt/mm3 during whole experiment. The power supply spontaneously decreased the electric field 20 V/cm due to variation conductivity behavior of specimen and maximum current cut off. Reaching 95 % theoretical density was verified with FESEM micrograph and there is almost no grain growth on specimen except very good grain boundary generation. The sintered PZT specimen showed appreciable dielectric permittivity (εr =273) on 1 kHz at room temperature comparing with other studies. Total power absorption of 5.27 watt/mm3 in 180 seconds decreased sintering temperature from 1200 oC to 500 oC. Such an effect cannot be explained with joule heating in a short period of time with very low power supply. Therefore, we ascribe this behavior to electric field related polarization of atoms rested in lattice which increases mass transport triggered with impulse electron flux thorough electric field. Thermodiffusion (Soret effect) and electromigration are few theories could explain this phenomena. With this low temperature sintering techniques, lead emission could also be restricted during manufacturing process.

KEYWORDS - Electric Field Assisted, Sintering, PZT Ceramics, Dielectric Permittivity

EFFECT OF MILLING TIME ON MORPHOLOGY AND STRUCTURAL DEVELOPMENT OF CU CR COMPOSITE POWDERS

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ABSTRACT

In this study Cu-Cr powders produced with ball milling process via high energy planetary ball milling. The planetary ball milling was chosen as being a unique tecnique for powder processing to be mechanochemical activation and mixing of powders. The ball milling jar was WC and ball to powder raito was 10/1. The ball milling time was chosen three different time (15 min., 2h, 4h). In order to determine the effects of the different milling times on the morphology of powders were utilized by particle size analysis. In addition, deformation behavior of composite powders was analyzed. The structural evolution of Cu-Cr powders produced at different milling times were evaluated from X-ray diffractometry. It was found that the milling time was powerfully effective on the particle size and its distribution. The results indicated that increasing ball milling time showed that XRD peaks were shifted to higher degrees for (111) peaks of Cu which was attributed to Cr addition

KEYWORDS - Mechanical Alloying, Particle Size, Cu, Cr, X-Ray Diffractometry

INVESTIGATION OF THE EFFECT OF DIFFERENT MILLING TIMES ON THE CHARACTERIZATION OF MECHANICALLY ALLOYED CU Y2O3 COMPOSITES

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ABSTRACT

In this study Cu-Y2O3 (ODS Copper) powders produced by mechanical alloying in planetary ball mill. The planetary ball milling was chosen as being a unique technique for powder processing to be mechanochemical activation and mixing of powders. The ball milling jar was WC and ball to powder ratio was 10/1. The ball milling time was chosen three different time (15 min., 2h, 4h). In order to determine the effects of the different milling times on the morphology of powders were utilized by particle size analysis. The crystal sizes of Cu-Y2O3 powders produced at different milling times were calculated from XRD results and the effect of different milling times on the structure of mechanically alloyed Cu- Y2O3 powders was investigated. The increasing ball milling time showed that XRD peaks were shifted to higher degrees for (111) peaks of Cu which was attributed to Cr addition. In addition, it was observed that lattice strain and dislocation density of Cu- Y2O3 powders increased as a function of prolonged milling time.

KEYWORDS - Mechanical Alloying, Particle Size, Cu, Y2O3, Dislocation Density, Lattice Strain

PRODUCTION OF B4C REINFORCED ALUMINUM MATRIX COMPOSITE BY SQUEEZE CASTING METHOD AND DETERMINATION OF WEAR RESISTANCE

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ABSTRACT

The expected performance values of engineering materials are increasing progressively. Today, it is becoming increasingly difficult to meet these expectations with monolithic materials. For this reason, studies in the field of composite materials are continuing intensively. Composites, which can be designed for special purposes, such as wear resistance and provide significant weight and performance gains where they are used. It is observed that the use of aluminum matrix composites is increasing gradually especially in automotive and aerospace sectors where weight reduction studies are intensified. Aluminum matrix composites which can be reinforced with various particles such as Al2O3, SiC and B4C provide superiority to monolithic materials in mechanical properties such as wear resistance, tensile strength and hardness. In this study, aluminum matrix composite reinforced with B4C is produced by squeeze casting method. The microstructural examination was made with the scanning electron microscope (SEM). The wear resistance of the composite material was evaluated with weight loss, volume loss and wear rate values. In the SEM examination, it was found that the reinforcing particles were successfully embedded in the matrix and did not cause any porosity. Results of the wear test showed that the volume loss of composite material was 1,44%, whereas the weight loss was 1,44%. Also the wear rate was 1,43x10-5 cm3/m.

KEYWORDS - AMMC, B4C, Squeeze Casting, Wear Resistance, Wear

ONE STEP ELECTROSPINNING OF GRAPHENE OXIDE SILVER NANOPARTICLE FUNCTIONALIZED POLY E CAPROLACTONE BIOCOMPOSITE NANOFIBERS AS AN ADVANCED ANTIMICROBIAL APPLICATIONS

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ABSTRACT

In this work, Poly (ε-caprolactone) (PCL) biopolymer nanofiber functionalized with graphene oxide-silver nanoparticles (GO-AgNPs) was successfully prepared by one-step electrospinning for antimicrobial wound dressing applications. PCL is a well-known material for biomedical applications including wound dressings. To enhance bactericidal performances of PCL, graphene oxide (GO), and silver nanoparticle (AgNP) are incorporated into the PCL matrix. For comparison, the functionalized-GO-AgNP PCL nanofibers with different AgNP content and bare PCL nanofibers were prepared and fully characterized using Scanning Electron Microscopy (SEM), Fourier Transform Infrared spectrometer (FT-IR) and Contact Angle measurements. The obtained biocomposite nanofibers showed good bactericidal activity against both of Gram-positive and Gram-negative bacteria. Therefore, the GO-AgNP functionalized-PCL biocomposite nanofibers are promising for wound dressing applications.

KEYWORDS - Biocomposite Nanofibers, PCL, GO-Ag Nanoparticles, Antibacterial Actiivity

A NOVEL PHOSPHOR MATERIAL FOR WHITE LIGHT EMITTING DIODES WLEDS EU2 DOPED SI2N2O

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ABSTRACT

White light emitting diodes (WLEDs) have nowadays attracted more interest in solid state lighting technology. Silicon oxynitride (Si2N2O) which mineralogical name is 'Sinoite' has excellent physical, mechanical and thermal properties. Also, the orthorhombic crystal structure of Si2N2O has large interstitial sites that can accommodate the rare earth (RE) elements' atoms along the 'c' axis. In this study, 0.02 to 0.12 wt. % Eu2+ doped Si2N2O was produced by spark plasma sintering (SPS) method from high purity starting powders at 30MPa pressure and 1650°C temperature. Herein, Li2O was also used as sintering additive to obtain the low eutectic point. Moreover, sintered specimens were characterized by scanning electron microscopy (SEM) equipped with energy dispersive X-ray (EDX) and cathodoluminescence (CL) spectroscopies, transmission electron microscopy (TEM), X-ray diffraction (XRD) and photoluminescence (PL) spectroscopy. Results showed that above 90% Si2N2O phase was successfully obtained by SPS route. Eu2+ doped Si2N2O samples exhibited the broad intense emission peak at 470-510 nm which corresponds to bluish green color. This study was supported by TUBITAK under the project number 217M667.

KEYWORDS - WLED, Phosphor, Luminescence, Si2N2O, Eu

EFFECT OF INOCULANT TYPE ON MICROSTRUCTURE OF A206 AI ALLOY

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ABSTRACT

In this study, AlSr10, Al-3Ti-1B and Al-5Ti-1B grain refiner master alloys have been entered into A206.0 aluminum copper casting alloy and casting has been made to the gravity mold. Thus, the effects of different grain refiners on the microstructures of aluminum copper alloys were investigated. Grain refining alloys were added to aluminum copper alloy in 0.20%, 0.40%, 0.60% and 0.80% by weight. Optimum results were achieved when the grain refiner master alloys were entered at 0.60% by weight. The microstructures of the samples were examined by optical microscope and scanning electron microscope. The results were compared. AlSr10 added alloys were found to be finer grained than aluminum copper alloys without grain refiner. However, it has been found that AlSr10 grain refiners are not as effective as titanium and boron. In terms of grain size thinning effect, Al-5Ti-1B and Al-3Ti-1B grain refiners were compared; Al-5Ti-1B was found to be more effective than Al-3Ti-1B. As the boron ratios of these two master alloys were equal, titanium was found to be more effective in grain thinning.

KEYWORDS - A206 Al-Cu Alloys, Master Alloys, Al-5Ti-1B Alloy, Grain Refinement, Microstructure.

PULSED LASER DEPOSITION SYSTEM FOR A TIN OXIDES THIN FILMS DEPOSITION

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ABSTRACT

One of the most known transparent metal oxides is Tin oxide. It has a wide range of applications in different fields that makes it to gain a lot of interests. In this study, we present the composition of a mixt matrix thin films of tin oxides grown by Pulsed Laser Deposition (PLD) technique. These thin films were produced at room temperature and with the utilization of a pure metallic tin targets. The structural and optical properties were investigated using X-ray diffraction and absorption spectroscopy. Crystal structure and phase transformation during the deposition and annealing treatments were also explained in details in this work.

KEYWORDS - Pulsed Laser Deposition, Thin Films, Tin Oxide

FPL ETCHING PARAMETER OPTIMIZATION FOR ADHESION PERFORMANCE OF AL CFRP ADHESIVE JOINTS

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ABSTRACT

Chemical pretreatments are often used to improve adhesion of aviation structural joints. The FPL (Forest Products Laboratories) process for preparing aluminum for structural adhesive bonding has been used in the aerospace industry since the early 1950's. However for a novel Al/CFRP adhesive bonding, an optimization should be done with FPL etching parameters which were applied to 2024-T3 aluminum alloy. In this study, FPL etching parameters such as etching temperature and immersion time were investigated with single lap shear tests according to ASTM D5868-1. Additionally failure analyses of aluminum surfaces after mechanical tests are performed by using optical microscope to discuss the FPL etching parameter optimization. All results show that for a new dissimilar material adhesive bonding with aluminum, it is suggested to optimize the chemical pretreatment parameters according to the adhesion performance.

KEYWORDS - Aluminum Alloy, CFRP, FPL Etching, Adhesive Bonding, Shear Strength

INVESTIGATION OF THE USE OF FLY ASH ADDITIVE IN AERATED CONCRETE PRODUCTION AND ITS EFFECTS

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ABSTRACT

Aerated concrete, which high thermal insulation properties, is a lightweight construction material that is resistant to fire, earthquake and does not harm the environment at the same time. Nowadays, the rapid increase in demand for raw material resources and the limited natural resources make it necessary to investigate the reusability of industrial wastes. In this study, the possibility of using fly ash wastes, which cause environmental pollution in aerated concrete production as an additive was investigated. For this purpose, the fly ash taken from Kütahya Cement Plant was added to the standard aerated concrete recipe, used by AKG aerated concrete company, at the proportions 3, 5, and 7 wt.%. The effects of fly ash addition on compressive strength and density in the prepared samples were investigated and microstructures of the samples were characterized by XRD and SEM analyses. The results indicate that the production of higher strength and lower density aerated concrete is possible with the addition of 3 wt% fly ash.

KEYWORDS - Fly Ash, Aerated Concrete, Strength, Density, Characterization.

DENSITY FUNCTIONAL THEORY STUDY ON THE STRUCTURAL AND VIBRATIONAL PROPERTIES OF 1 5 DIAMINOPENTANE

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ABSTRACT

In this work, we calculated the molecular structure parameters such as bond angles, bond lengths and vibrational frequencies of 1,5-diaminopentane by density functional theory with the Becke 3-term correlation functional; Lee, Yang, and Parr exchange functional method. The vibrational frequencies of this molecule were figured out with scaled quantum mechanical calculations. All the parameters of this molecule were compared with theoretical and experimental values.

KEYWORDS - 1,5-Diaminopentane, Density Functional Theory, Vibrational Frequency, Molecular Structure Parameter

SHEAR STRENGTH PERFORMANCE EVALUATION OF AL CFRP ADHESIVE BONDED JOINTS WITH VARIOUS SILANE TREATMENTS AT ALUMINUM SURFACES

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ABSTRACT

Adhesive bonding offers light-weighted structures with respect to other assembly technologies such as bolted and riveted joints, particularly in aviation industries. In addition, stress concentration becomes less significant without the requirement of bolt or rivet holes, thus avoiding structure decay. The adhesive types and adherend surfaces as the main elements in adhesive bonding should have good wettability with respect to joining components, such as aluminum alloys and CFRPs (carbon fiber reinforced plastics). Surface preparation of adherends is an important prerequisite for adhesive bonding. The purpose of surface preparation is either or a combination of cleaning the surface from contamination, roughening the surface, raising the surface free energy and changing surface chemical composition in order to facilitate the chemical attachment of adhesive to the adherend surfaces. The objective of this study is to investigate the effect of silane treatment on the shear strength and failure type characteristic of Al/CFRP bonded joints using three different silane concentrations (1, 3 and 5 wt.%) on AA2024-T3 aluminum plates. Shear strength values of the Al/CFRP bonded joints were determined by using single lap shear tests according to ASTM D5868-01. From the test results, the silane concentration of 3 wt.% on AA2024-T3 aluminum plates has a significant effect on shear strength of Al/CFRP bonded joints. After mechanical tests, damage mechanisms were also observed by using the digital camera.

KEYWORDS - Adhesive Bonding, Surface Treatment, Silane Concentration, Shear Strength

EVALUATION OF DIFFERENT SURFACE TREATMENT METHODS APPLIED TO IMPROVE THE CHEMICAL ADHESION MECHANISM OF AL CFRP ADHESIVE BONDING

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ABSTRACT

Adhesive bonding has appeared to a promising technique for joining dissimilar materials. Because modification to metal surface is successfully applied to enhance material surface adhesive bonding. Many chemical (etching, anodizing, etc.) and mechanical (grinding, sand blasting, etc.) surface treatment processes are used to improve the adhesion strength of aluminum surfaces to carbon fiber reinforced plastics (CFRP). In this study, the effect of various physical and chemical treatments on the chemical composition and wetting properties of AA2024-T3 aluminum alloy surfaces was examined according to the values of untreated aluminum surfaces. Grinding process, FPL-etching and silanization methods were performed to the aluminum alloy surfaces separately. The wettability and chemical composition of the untreated, grinded, FPL-etched and silane coupled aluminum alloy surfaces were evaluated by using contact-angle goniometry and FTIR-ATR spectroscopy, respectively to compare their effects on adhesion performance of Al/CFRP adhesive bonded joints. The results show that chemical composition and wetting properties of modified aluminum adherends should be evaluated to understand the adhesion performance difference obtained for the adhesive bonded Al/CFRP joints.

KEYWORDS - Adhesive Bonding, Surface Treatment, Grinding FPL Etching Silane Coupling, Aluminum/CFRP Adhesion

SURFACE PREPARATION OF THE AL 2024 ALLOY FOR ADHESIVE BONDING OF AL CFRP USING FIBER LASER TREATMENT

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ABSTRACT

Adhesive bonding is an alternative method for bonding dissimilar materials to traditional mechanical joining techniques such as rivet or bolted joints, widely used in structural applications of aviation industries. In adhesive bonding, surface preparation is one of the most important pre-treatments that need to be studied to improve the adhesion quality. In this study, the surface of the Al 2024 sample has been prepared using fiber laser to obtain the maximum single lap shear strength at Al/ CFRP adhesive joints. It is necessary to determine the optimum laser parameters such as laser power, frequency and scanning speed for obtaining the better surface quality of aluminium surfaces in order to bond to the CFRP. By this way, L9 orthogonal array Taguchi method (3 variables and 3 levels) was used to determine the significance of variables and to reduce the number of experiments. Furthermore, a statistical analysis of variance (ANOVA) was performed to determine which process parameter is statistically significant for each laser parameter.

KEYWORDS - Adhesive Bonding, Laser Surface Treatment, Shear Strength, Taguchi Analysis

INVESTIGATION OF TOXIC METAL ADSORPTION PROPERTIES SILICA GEL SUPPORTED CALIX 4 ARENE DINITRO DERIVATIVE

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ABSTRACT

Given the technological importance of toxic metals, their impact on environmental pollution and all creatures, it is necessary to remove or recycle them from wastewaters. Therefore, in recent years, interest in chemical separation techniques, synthesis and design of new chemicals for metal ions has increased greatly. To date, various methods have been developed on the removal of toxic metals from their environment. Among many methods, the adsorption process is widely used due to economical and easy. It is known that many natural and synthetic materials are used as adsorbents. One of the advantages of the technology is the widespread production of synthetic adsorbents used for toxic metal removal. As a synthetic adsorbent, supramolecular compounds are widely used for the removal of toxic substances from the aqueous medium due to their adsorption abilities. Among these studies, "calixarene" compounds, which have attracted the attention of many researchers and are regarded as the third generation in supramolecular chemistry after cyclodextrins and crown ethers, have been widely used as adsorbents or ligands in recent years. In this study, first the p-tert-butylcalix[4]arene dinitro derivative was synthesized and then this compound was immobilized on silica gel to obtain polymeric material and the polymeric material (DNC[4]GBS) was used as an adsorbent for the removal of toxic metals such as lead, copper, iron, and aluminum from the aqueous medium. Their % adsorption values were found 99%, 65%, 83% and 95% respectively.

KEYWORDS - Adsorption, Calix[4]arene, Toxic Metals.

PT DOPED 8 0 CNT A DFT STUDY OF FURAN DETECTION

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ABSTRACT

In this study, it has been investigated the use of the furan sensor at room temperature. WB97XD method with 6-31G(d,p)/LanL2DZ basis sets have been used. The charge distributions obtained for structures show that charge transfer has occurred from the adsorbed furan molecule to the Pt atom of carbon nanotube structure as an electron acceptor. The HOMO–LUMO gap of the Pt doped SWCNT decreased with adsorbing of furan molecule. As a conclusion, the electrical conductivity of Pt doped (8,0) SWCNT cluster increased after a furan molecule adsorption. Accordingly, Pt doped (8,0) SWCNT has potential for sensing of furan molecule at room temperature.

KEYWORDS - DFT, CNT, Furan, Pt, Detection, Sensor

PRODUCTION OF CORK POLYMER COMPOSITES

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ABSTRACT

- The automotive industry, which became one of the world's largest industries in the 1920s; has increased the investments about mass production and service parts procurement. Increasing customer demands with the development of technology has caused to opening of new search areas in the automotive industry. In these days, cork composites are one of the main topics of conversation in automotive industry because of promising outcomes such as lightness, cost reduction and fuel saving. Cork is a natural material with low density, good abrasion resistance, good electrical and thermal insulating properties. Because it is easily processability, cork has been used in different industries such as construction, aerospace, food, and etc. In this study, fabrication of cork-polymer composites is given.

KEYWORDS - Cork, Polymer, Polymer Composites, Automotive Industry, Composite Production

MACHINABILITY CHARACTERISTICS OF MECHANICALLY ALLOYED BRONZE MATRIX COMPOSITES DURING TURNING

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ABSTRACT

In this study, the mechanically alloyed bronze (CuSn10) matrix composite materials reinforced with 10 wt. % and 20 wt. % spheroidal cast iron (GGG-40) were produced by hot press. The turning experiments were conducted on universal turning lathe without cutting fluid. The effects of the different reinforcement ratios on the cutting force and the surface roughness of bronze matrix composites were investigated, and their effects were presented. The test results revealed that the reinforcement ratio was the highly effective on the cutting forces and surface roughness of the mechanically alloyed bronze metal matrix composites. In microstructure analyses, it was observed that mechanical alloying occurred effectively, and the reinforcement material was homogeneously distributed into matrix. It was found that as the reinforcement ratio increase cutting forces and surface roughness increase. Since GGG-40 is a harder material than CuSn10, the power consumption required for material removal increases because of increment GGG-40 amount in the structure. Considering effect of reinforcement ratio, higher proportion of GGG-40 in the composite led to increase in surface roughness because GGG-40 particles were relatively retained their form during the mechanical alloying and production process. The GGG-40 chips were broken and ruptured from the surface rather than cutting during turning and it led to rougher surface

KEYWORDS - Mechanical Alloying, Bronze Matrix Composites, Reinforcement Ratio, Surface Roughness, Cutting Forces

THE EFFECT OF MECHANICAL ALLOYING PROCESS ON MICROSTRUCTURAL EVOLUTION AND MECHANICAL PROPERTIES OF BRONZE MATRIX COMPOSITES

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ABSTRACT

In this study, the difference of mechanical alloying process compared to traditional production methods was investigated. In this context, 10% spheroidal cast iron (GGG-40) reinforced bronze (CuSn10) matrix composite materials were produced by two different methods and experimental studies were carried out on these specimens. Firstly, metallic chips with a particle size of 1-2 mm were hot pressed under a pressure of 700 MPa and 500 oC without the need for a second treatment. After, these metallic chips were subjected to mechanical alloying process and hot pressed in the same production parameters. Microstructural evolution, porosity and hardness values of the specimens produced by two different methods were compared. It was found that particle sizes decreased from 1-2 mm to 200 µm in the sample subjected to mechanical alloying process. According to optical microscope images, it was observed that the broken relatively brittle particles (GGG-40) were homogenously embedded in the ductile (CuSn10) matrix. This is due to the fact that ductile metal particles become flattened by ball--powder-jar collisions and fracture of relatively brittle powders as a result of the severe plastic deformation which occurred during mechanical alloying. It was found that there was a 29,9 % increment in hardness value and a 18,5 % decrement in porosity of the mechanically alloyed sample compared to the directly pressed sample.

KEYWORDS - Mechanical Alloying, Bronze Matrix Composites, Mechanical Properties, Microstructural Evolution

A SHADOW MASK IMPLEMENTATION FOR MEMS SENSORS REQUIRING FORMATION OF A SENSING LAYER

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ABSTRACT

This paper introduces fabrication of a shadow mask wafer. The formed shadow mask is a standard silicon wafer having <100> crystal orientation, and its thickness approximately 300 µm-thick after fabrication process completed. The formed aperture on the shadow mask as small as 37 µm, which can probably allow deposition of different sensing layers on sensors.

KEYWORDS - MEMS, Silicon Based Shadow-Mask, KOH Etch, Sensing Layer Formation, DRIE

DESIGN AND ANALYSIS OF PI CONTROLLER BASED FOUR QUADRANT DC MOTOR DRIVE WITH BIPOLAR AND UNIPOLAR SWITCHING METHODS

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ABSTRACT

In this study, the closed loop speed control of the separately excited Direct Current (DC) motor controlled by a four-quadrant DC motor drive circuit was performed in MATLAB / SIMULINK software. For this purpose, two control circuits were designed using PI controller. The first one is the bipolar switching circuit and the second one is the unipolar switching circuit. The control signals obtained from these circuits were applied to the single-phase four-quadrant DC chopper power circuit to drive the separately excited DC motor at reference speed. Comparison of the both switching methods has been implemented based on the data obtained from the simulation results of four-quadrant operation of the DC motor. As a result of the comparison, it has been seen that output voltage and frequency responses were better than the bipolar switching method (BSM) due to doubling of switching frequency of output voltage of the unipolar switching method (USM).

KEYWORDS - DC Motor Drive, PI Control, Four-Quadrant Operation, Bipolar Switching, Unipolar Switching

DESIGN MANUFACTURING AND CONTROL OF MINI SIZE ROTARY SWING COMPRESSOR

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ABSTRACT

Today, it is possible to find many types of compressors according to the manufacturing capacity and size. However, the diversity for mini-size compressors is drastically reduced. It causes serious problems for small systems where compressed air is needed. In this study, design and manufacturing of a mini-size rotary swing type compressor were carried out in order to contribute to the solution of the related problem. In the phase of design, the value of pressure to be created by the compressor and the energy to be consumed by it were calculated. After the manufacturing was carried out by using industrial counters, various pressure experiments were performed on the compressor. As a result of the experiments carried out by using brushless DC motor and semi-hermetic tank at 4000 rpm, the compressor operating with 23,7% efficiency created 6 bar pressure by consuming 120 W power. The compressor manufactured for small systems will be able to be used easily in various sectors that can work up to 6 bar pressure. By changing the piston size without changing the compressor size, high pressures such as 12-13 bar will be obtained and it will be possible to be used in many sectors including cooling systems.

KEYWORDS **-** Compressor, Rotary, Swing, Power, Cooling, Efficiency

SEGMENTATION OF CAPILLAROSCOPIC IMAGES

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ABSTRACT

Capillaroscopy device shoot videos of capillaries of oral mucosa and nailfold of patient over the related skin without any pain. The image frames of videos are used by experts for early detection or treatment of some diseases such as diabetics, rheumatism and etc. Since this process is implemented in manually, decision support systems that helps the experts for diagnosis have been subjects of studies of biomedical researches. First step of these systems is the successful segmentation process on these images that will be used for classification of disease depending on 8 parameters such as the number of capillaries in a certain area, the distance between the two vessels, the size of the capillaries and etc. This study aims to contribute decision support system for experts by presenting a successful segmentation. In this study Otsu, Fuzzy C-mean, Fast Marching, Region Growing and H-Minima methods have been used for segmentation of capillarocopic images. The segmentation accuracy ratios of upper mentioned methods were obtainedas %80,47, %67,44, %63,23, %44,11 and 96.76%, respectively. When the results were examined, it was observed that the H-Minima method, which had not previously been applied in capillary images, reached the highest accuracy parameter value.

KEYWORDS - Image Processing, Capillaroscopy, Capillary Video, Capillary, Segmentation, H-Minima Method.

INVESTIGATION ON EMISSION CHARACTERISTICS OF A COMMON RAIL DIESEL ENGINE FUELED WITH JP8 DIESEL FUEL BLENDS

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ABSTRACT

JP-8, which is an aviation fuel, was accepted as a common military fuel towards the end of 1980s by NATO countries. JP-8 containig 99.8% kerosene is blended with various additives to make it suitable for military applications. As the basic substance of JP-8 fuel, kerosene flares at high temperatures directly increases aircraft safety and freezing point is around -49 ° C. In this study, the effects of jp-8 and diesel fuel mixtures on engine emissions were investigated experimentally. A 4-cylinder, four-stroke, turbocharged diesel engine with common rail fuel system was used for this purpose. 5% JP8 was added to diesel fuel. It was used as a fuel in the engine and the obtained values were analyzed according to the diesel fuel. According to the test exhaust emission characteristics were investigated and compared with the reference diesel fuel. While CO and smoke emissions increased, NOx emissions decreased with JP-8 blends when compared with diesel fuel.

KEYWORDS - JP8, Engine Emissions, Diesel Fuel, Common rail fuel system

VIBRATION FATIGUE ANALYSES OF A CANTILEVER BEAM IN TRANSPORTATION BASED ON MILITARY STANDARD

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ABSTRACT

This study includes the vibration fatigue analyses of a cantilever beam exposed random vibration while transporting based on the specified military standard using Miner's Cumulative Damage technique. The theory of Miner is introduced in detail. Finite element model is used to obtain the stresses on the designed cantilever beam under random vibration. Response Power Spectral Density is presented in graphical form at critical points. The fatigue life of the cantilever beam is calculated by using the stresses obtained by random vibration analysis.

KEYWORDS - Miner's Cumulative Damage, Vibration Fatigue, Military Standard, Power Spectral Density

PARALLEL DISASSEMBLY LINES WITH SOME CONSIDERATIONS

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ABSTRACT

Disassembly is the crucial process of the product recovery operations and it can be defined as removing the parts of the discarded products through a series of operations. A disassembly line contains sequential workstations with a material handling system. Disassembly line balancig problem (DLBP) is defined as assigning the tasks to the workstations to minimize the number of workstations and to utilize the available resources as efficiently as possible while meeting the demand for recovered parts. More than one parallel disassembly lines are balanced simultanously to increase the efficiency and effectiveness. Balancing problem of these lines is called Parallel Disassembly Line Balancing Problem. There are some considerations which complicate the disassembly. Negative effects of these considerations can be reduced by considering parallel disassembly lines. In this study, these considerations and PDLBP is simply defined and discussed and future directions are proposed.

KEYWORDS - Disassembly, Disassembly Line Balancing Problem, Disassembly Actions, Parallel Disassembly Line Balancing Problem

INVESTIGATION OF EXERGY PERFORMANCE OF FLUIDS USED IN ORC FOR WASTE HEAT RECOVERY FROM ALUMINUM PRODUCTION PLANTS

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ABSTRACT

In this study, exergy analysis of Organic Rankine Cycle (ORC) technology applied in waste heat recovery from aluminum production plants was carried out. Exergy performance of 20 organic fluids of different structure used in high temperature applications of ORC was determined. Performance parameters were determined as recovered exergy, total irreversibility and exergy efficiency of the system. n-hexane, n-octane, n-decane, n-dodecane, n-nonane, n-heptane, isohexane, cyclohexane from the group of alkanes; benzene, ethylbenzene, toluene, m-xylene, P-xylene, o-xylene from the aromatic hydrocarbons; D4, D5, MM, MDM, MD4M and HFE7500 fluids were selected from the siloxanes group. With EES (Engineering Equation Solver) software, different models of turbine inlet temperature ranging from 160 °C to 200 °C have been created. The waste heat source temperature of ORC is 240 oC. The effect of the turbine inlet temperature change on the exergy performance of the ORC was determined. The recovered exergy values were determined for each fluid. The irreversibility values of the pump, evaporator, turbine and condenser were determined, and the total irreversibility value was calculated. Then, exergy efficiency of the system was determined according to the recovered and expended exergy values. Fluids that achieve the best exergy efficiency were determined in each fluid group. In this study, it is determined how the waste heat at different temperatures in aluminum production plants can be evaluated in best conditions by using which fluid with ORC. Therefore, it is aimed to determine the optimum fluids that the system will work under different waste heat temperatures.

KEYWORDS - Organic Rankine Cycle (ORC), Aluminum Plants, Waste Heat, High Temperature, Exergy Performance

HYDROGEOCHEMICAL PROPERTIES AND POLLUTABILITY OF NATURAL WATER RESOURCES IN WEST OF KONYA

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ABSTRACT

Freshwater resources are located in the west of Konya and about 6 km away (Figure 1). Beypınarı and Mukbil resources were closed during AlaaddinKeykubat period. Dutlu spring catchment was built by Yavuz Sultan Selim in the 16th century, and Çayırbağı spring catchment was built in 1902 by Konya Governor FeritPaşa. Spring water has been transported to the city center by pipes in order to meet the water needs of the city. Since 1990, the water of the spring has been given to 1000 fresh water fountains. In recent years, the structure of the resources within the feeding area, social areas, ring road works and unimposed settlements affect the resources and cause water pollution. Spring water temperatures 14-16 oC, flow rates 1.5l / s-51,l / s, pH 7.72-8.67 hardness 16-19 Fs, Total dissolved matter amount is between 188-324 mg / l. The aquifer of the waters is Upper Cretaceous Çayırbağı ophiolite and Hatip ophiolite complex and Lorasdağılimestones. Water is rich in Ca, Mg and HCO3 ions. In the hydrochemical analyzes, Nitrate is between 3.52-10.44 mg / l, boron 25-66.5 mg / l, chromium is between 2.91-3.55 mg / l and is above the limit values.. Due to the high permeability of the units around the springs and the absence of a protective covering layer on the aquifer layer, all kinds of pollutants reach the source waters directly and cause the water pollution. Protected areas around the welds and the precautions to be taken should be followed and construction within the feeding area of the welds should not be allowed.

KEYWORDS - Konya, Source, Pollution, Catchment, Aquifer.

EVALUATION OF WIND SOLAR HYBRID RENEWABLE ENERGY SYSTEMS USING LOSS OF POWER SUPPLY PROBABILITY

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ABSTRACT

Renewable energy sources are one of the most popular and strong alternative to conventional energy generation systems due to their availability at many locations, clean and cheap energy production capability, and relatively lower operating costs. Although renewable energy systems are more preferable than conventional ones, they have several weaknesses. One of the main weaknesses of renewable energy systems is that they could produce energy when the renewable source is present, i.e. wind speed or solar irradiation. In the literature, hybrid renewable energy systems are proposed to handle this weakness. In this study, we propose a method to determine hybrid potential of candidate locations in terms of hybrid energy generation capacity. Wind and solar energy systems are used as renewable energy sources, and several combinations of these systems are selected. The experimental evaluation of the selected systems are performed on two selected locations in Turkey with two different load demands. The experimental results show that one of the locations has better hybrid potential than other one in terms of wind-solar renewable energy system.

KEYWORDS - Renewable Energy, Hybrid Energy Systems, Wind-PV Hybrid System

COOLING TOWERS DESIGNS AND APPLICATIONS

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ABSTRACT

Cooling towers are one of the most important industrial equipment used in industrial facilities to discharge unwanted process heat from heat exchangers to the atmosphere through cooling water. The phenomenon of heat exchange in the cooling tower has a complex structure involving simultaneous heat and mass transfer. Reuse and for environment, cooling of hot waste water and process water is important. There are many factors affecting cooling tower performance. The main factors affecting cooling tower performance are air flow, water flow, cooling load, incoming air conditions, water temperature and tower design. The aim of the study supported by the BAP department of Van Yuzuncu Yil University with FAP-2019-8610 project name aims to examine the studies and researches about cooling tower in order to make cooling towers used in industrial facilities more economical and efficient and to increase efficiency and power saving.

KEYWORDS - Cooing Towers, Heat Rejection, Evaporation, Tower Design

AN INVESTIGATION ON ROLL IN FORMATION IN HEMMING OPERATION

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ABSTRACT

Roll-in formation, which is an inward motion of hemming line, is an inevitable phenomenon in roller hemming operations. Therefore, it results in a visual defect along the closures on the products. However, it can be controlled by tuning the process parameters such roller diameter, flange height, hembed overhang and bending angles. Tailoring the bending angles in roller hemming process is one of the most important method to overcome excessive roll-in formations. Restricting the roll-in formation in curved regions is highly tedious in comparison to straight edge parts. For this reason, a curved edge model was built and roll-in formation in this geometry was investigated in the presented study. A bake hardening steel, BH220, was selected for the hemming components and the material data was taken from the software library. BH220 is extensively used in automotive industry especially in the automobile skins. Three different bending angle pairs were selected to close the flange angle of 100° in a two-stage roller hemming process. A 15 mm diameter cylindrical roller was utilized in the designed operation. Based on the results, it is better to divide the flange angle into equal amounts to complete the hemming process because this lowers the accumulated strains in the hemming zone and thereby avoiding sudden fracture due to excessive plastic deformation. For this reason, the bending angle pair of (50º/50º) yields the minimum roll-in values since the flange angle was 100º in our numerical work. For the (50º/50º) process, the roll-in values were found as 0.254 mm and 0.284 mm after the pre-hemming and final hemming respectively.

KEYWORDS - Hemming, Roll-In, Metal Forming

SPALL LINER COMPOSITES FOR ARMORED VEHICLES

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ABSTRACT

Spall liner is an essential protective structure in armored vehicles. This structure is designed for interior usage in the vehicles and protects the crew from spalling in case of penetrating threats. Spall liner systems use soft composites which are made from various kinds of high performance fibers. Soft composites also serve as interior lining for the vehicle as well as providing flexibility during an impact and thereby stopping the spalling from emission to the crew cabin. This study gives an overview of spall liner and utilized materials in this structure.

KEYWORDS - Spall Liner, High Performance Textiles

DESIGN OF SMALL SCALE FIRE EXTINGUISHING ROBOTS FOR EDUCATIONAL PURPOSES

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ABSTRACT

The security of houses, laboratories, offices, factories and buildings in every area where people live their lives is at the forefront. Due to the silent occurrence of the fire and the flammability of the goods used in the places where people live, the fire starts and spreads rapidly. It is quite difficult and time consuming to extinguish and cool the environment after fires that have not been intervened in time. The first precautions to be taken in the fight against fire are taking measures to prevent the occurrence of the fire and extinguishing by intervening in the shortest time and time as soon as the fire event starts. Today, firefighters, which are fire extinguishing units, are often notified after the fire is seen, and the time taken for them to come to the scene often leads to the loss of property, serious injuries, and death or serious injuries to people throughout their lives. In order to avoid these irreparable disasters, technology offers innovations to people. Fire extinguishing systems that are used in public places today are both costly and can spread water to large areas rather than the place where the fire spreads, causing damage without the need to be affected by the surrounding water. For this reason, in our study, a prototype fire extinguishing robot was designed in order to intervene in the place where the fire spread with minimum damage and as soon as possible. The robot is approximately 15 * 25 * 15 cm in size. There is progression, drive system, software development system and fire detection system with sensor on it, avoiding obstacles with distance sensor. We design the fire detection system using two flame sensors in the fire fighting robot. Thus, 180º angle fire screening can be done. We design the fire detection system in the fire fighting robot and program the fire detection and combat procedure using a sensor-based method. The robot overcomes the obstacles and detects the fire with the flame sensor and can approach the fire with the driver system. Two methods are used for intervention. In the first method, the water in the water tank squeezes water from the hard hose and pump motor on fire. In the second intervention method, it tries to extinguish by reducing the effect of fire by providing air flow over the fire with the motor and propeller connected to the front of the robot. A modular low-cost fire prevention design is designed using the IR sensor and ultrasonic sensor in the robot. In the future studies, when the robot detects the fire, it is thought that it can be made more useful by adding the design to the building authority and fire crews while informing the building authority and firefighters on the other hand by means of communication modules.

DETERMINATION OF SOME PARAMETERS FOR INFRARED FREE ELECTRON LASER

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ABSTRACT

In this study, the peak magnetic field (Bo) and the force parameter (K) have been calculated based on the gap between poles of U90 undulator to be used for IR-FEL intended to be produced in Turkish Accelerator Center. It has been shown that the gap between the poles of the undulator increases and the Bo and K values decrease. The wavelength range of the radiation produced in U90 undulator and U30 undulator with a shorter period length which were calculated, and the graphs of the wavelength range vs the gap of the undulator were obtained and interpreted for the electron beam with energy of 20 MeV and 40 MeV. The radiation with shorter wavelength is produced by decreasing the energy of the electron beam, the period length, and the gap of the undulator. In the this study, by the energy of the electron beam entering in to the undulator, the undulator gap and the period length which are adjusted at appropriate values, it has been shown that the radiation can be produced in the wavelength range of 2.45μm-344μm by U90 an U30 undulators.

KEYWORDS - FEL, Undulator, IR, Radiation, Wavelength

IMPROVING THE TRIBOLOGICAL RESISTANCE OF INCONEL 600 ALLOY BY ELECTRODEPOSITION

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ABSTRACT

An electrodeposition process was performed to improve the tribological resistance of Inconel 600 alloy. Nickel (Ni) coating was electrodeposited on Inconel 600 alloy from a Watts electrolyte. The microstructure of the coating was investigated using SEM and XRD. The mechanical property of Ni coating was studied by microhardness tester. The tribological behavior of Inconel 600 alloy and pure Ni coating was revealed, using a reciprocating ball-on-plate tribometer. Pure Ni coating exhibited a distinctly low friction coefficient and a small wear rate as contrasted with Inconel 600 alloy.

KEYWORDS - Coating, Electrodeposition, Inconel 600 Alloy, Nickel, Tribology

THE CONTROLLING PARAMETERS EFFICIENCY TO QUALITY IN BISCUIT PRODUCT PROCESS

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ABSTRACT

In this study biscuit process, cooking or oven temperature is controlled by PID controller. Because in the biscuit production process, the cooking temperature directly affects the quality of the biscuit. The PID controller is designed to monitor the effects of Kp, Ki, Kd coefficients on the system response and the most suitable PID controller for the system. The effect of each coefficient on the response of the given unit was observed. Simulation is modeled using MATLAB Simulink software. For each simulation, the input and output signals are compared and time graphs of the control signal are generated. Graphs are also interpreted.

KEYWORDS - Biscuit, Quality, Process, PID Control

DESIGN AND CONSTRUCTION OF COMPACT CNC ROUTER

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ABSTRACT

3 axes CNC milling machine design and produce is important for creating advanced parts in industry. Designed and builded CNC router machine has single rotational speed and 3 axes movement ability. For motion on three axes to cutting operation it can be used three stepper motors. For providing machine rigidity has been used grinding bars and its suitable accuracy bedding. The generation of G codes has been made using Grbl Controller. The interaction with computer has been operated via Arduino. Motion capacity of head for X, Y and Z are 300x350x140 mm. Also there is no tool magazine so change of the tools can be performed by hand, easily. The construction of main body material is aluminum sigma profile with cross section of 20x20 mm. This machine can be used for cutting operation of polyamide, electrical circuit card and wooden materials to confidence.

KEYWORDS - Arduino, CNC, Milling Machine, Router, Stepper Motor

INVESTIGATION OF EXHAUST EMISSIONS FROM A DIESEL ENGINE FUELLED WITH BIODIESEL DIESEL BLENDS

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ABSTRACT

Energy production is heavily dependent on fossil fuels that are not only diminishing, but also are considered the main cause of harmful emissions and global warming. Therefore using vegetable oils as alternative fuels in diesel engines has drawn a great attention. Trans-esterified vegetable oil derivatives also called 'biodiesel' appear to be the most convenient method of utilizing bio-origin vegetable oils as replacement fuels in diesel engines. In the present study, biodiesel was prepared from 60% canola, 20% sunflower, 20% safflower through the trans-esterification process. The emission characteristics were compared in an unmodified diesel engine.

KEYWORDS - Biodiesel, Engine Emission, Diesel Fuel

INVESTIGATION OF VIBRATION EFFECT OF VEHICLE ENGINE ON CHASSIS

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ABSTRACT

In vehicles, the oscillating motion of the engine affects the chassis. In order to prevent the vibration transmitted by the engine to the chassis of the vehicle, it is aimed to reduce the vibration to the chassis by using vibration wedges in the connection between them. In this study, the displacement and acceleration values of the engine and chassis were measured simultaneously with the help of a four channel Datalogger. According to the graphs obtained, the engine speed is directly proportional to the amount of vibration produced. This causes serious discomfort to the driver and passengers in the vehicle. In order to prevent this, the vibration between the engine and the chassis is tried to be prevented by using damping elastic material. Thanks to the damping wedge used, it has been observed that the transmission of the engine vibration to the chassis is reduced by approximately 50%. It is seen that the spring coefficients are proportional to the engine speed due to the liquid in the structure of the hydraulic wedges. It is observed that the spring coefficient decreases at low speeds. In addition, it was observed that vibration amplitude increases at low engine speeds and vibration amplitude decreases at high engine speeds. When the numerical values of the new and used vibration wedges used in the study were taken into consideration, it was found that the new vibration wedge was a better insulating material than the used wedges.

KEYWORDS - Vibration, Engine Vibration, Engine Vibration Damping, Engine Vibration Wedges

EFFECT OF VEHICLE SPEED AND MASS ON VIBRATION DAMPING

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ABSTRACT

Vibrations to the driver and passenger have been a problem in vehicles due to road roughness. Driver and passengers are adversely affected by these vibrations. The vibration forces that the vehicles take from the ground while traveling are damped with the suspension system in the vehicle and the remaining part is transmitted to the driver and passengers. In this study, one and two degree of freedom car model is studied. Calculations were made in Matlab and LMS Amesim and the results were shown on the graph. Displacement and frequency values of the behavior at two different masses and four different speeds were found in a single degree of freedom car model. Two degree of freedom car models are given and motion differential equations are formed and state variables are defined. Matlab program was prepared according to the state variables. In the LMS Amesim software, two degree of freedom quarter car system is modeled. In addition, parameters have been assigned and graphs have been taken on a single degree of freedom model. The effect of vehicle speed on displacement is seen in the graphs. As a result of the analysis of the graphs, it is seen that there is an important link between mass and natural frequency. It was found that there was an inverse ratio between mass and natural frequency. However, the natural frequency varies with the broadcast constant used in the suspension system. It has been observed that the natural frequency increases with increasing spring constant. According to the values found, the suspension system plays a very important role in controlling the vehicle mass. It has been concluded that the mass, spring and damping element on the suspension system must consist of appropriate values to achieve the desired movement.

KEYWORDS - LMS Amesim Sofware, Vehicle Vibrations, Road Roughness, Acceleration and Speed Chart, Vibrations Analysis, Matlab

SELECTION OF A THIRD PARTY REVERSE LOGISTICS PROVIDER BASED ON VIKOR

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ABSTRACT

Return of used products is becoming an important logistics activity to protect the environment and reduce waste products. For companies, the management of return flow often requires a special infrastructure. Since this infrastructure is an extra cost for the company, they are turning to third-party reverse logistics providers (3PRLP). However, the availability of more 3PRLPs makes it difficult to evaluating and selecting the most efficient 3PRLPs. The problem of 3PRLP selection is considered a multi-criteria decision making (MCDM) problem because the problem involves a number of difficulties, such as uncertainty and complexity. In this study, the VIKOR method, which is one of the MCDM methods, is used for the selection of the best 3PRLP. Finally, the application of the VIKOR method with a numerical example is performed.

KEYWORDS - Third-Party Reverse Logistics, Reverse Logistics, Multi-Criteria Decision Making, VIKOR.

COMPUTATIONAL INVESTIGATION OF TURBULENT FLOW IN SINGLE SIDED BACKWARD FACING STEPS

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ABSTRACT

The present original paper deals with computational investigation of steady, incompressible, two-dimensional, separating and reattaching turbulent flow in single-sided backward-facing steps at three different Reynolds numbers. Employing the finite-volume method with a hybrid scheme, a computer program based on the SIMPLE (Semi-Implicit Method for Pressure Linked Equations) algorithm has been developed. Numerical solution of the conservation equations of mass and momentum, together with the standard k-epsilon turbulence model, are obtained using an iterative numerical solution technique. Near the solid boundaries, wall-functions are employed. Numerical predictions for local streamwise velocity, turbulence kinetic energy, turbulence kinetic energy dissipation rate, effective viscosity profiles, locus of flow reversal, bottom wall static-pressure coefficient, wall-shear stress and friction coefficient distributions along top and bottom walls of the single-sided backward-facing step flow configurations are presented and compared with experimental measurements. The results of computational investigation are in generally good agreement with experimental data.

KEYWORDS - Turbulent Backstep Flow, k-e Turbulence Model, Predictions

EFFECTS OF SURFACE ROUGHNESS ON STRENGTH OF ADHESIVE JOINTS

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ABSTRACT

Adhesives are often used both in the production of composite materials and as joint element. Adhesives can be used in order to adhere different materials such as steel-aluminum, aluminum-composites, metal-woods…etc. Although there are a lot of parameters which can affects the bond quality, one of the most important parameters is surface roughness. Surface roughness values may vary according to the type of surface to be bonded. There are a lot of surface preparation techniques which can be used in adhesive joints. In this study, surface roughness values of adhesive surfaces were determined and optimized in aluminum-aluminum joints. Etching method was used as surface preparation techniques. After the surfaces were prepared, surface roughness measurements were occurred. In addition, micro structure views were taken from the surfaces by the help of optical microscope. It is said that optimal surface roughness values (Ra) were determined as approximately Ra=2.91 µm for aluminum-aluminum joints. Similarly, Rz µm values were measured as 12.1 The highest strength was obtained via etching method.

KEYWORDS - Adhesives, Adhesive Joints, Surface Roughness, Surface Treatments

TAGUCHI BASED OPTIMIZATION IN HIGH SPEED TURNING

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ABSTRACT

Turning is one of the most widespread and basic machining method. There are a number of expectations from the turning process such as, high efficiency, low cutting forces, low tool wear, long-term tool life …etc. However, one of the most significant machining output is quality of machined surface. The machined surface quality can be evaluated by means of surface roughness parameters such as Ra and Rz. Surface roughness parameters not only gives information about the workpiece but also about the tool. Therefore, if the machining parameters can be optimized sensitively, both effective tool condition monitoring and workpiece with desired surface quality can be obtained. In this work, optimization of the surface roughness has been realized during the turning of 5140 steel material under dry cutting conditions. Taguchi L8 orthogonal array design based 8 experiments were performed with 2-level parameters (cutting speed, feed rate, depth of cut and approaching angle) and statistical analysis was carried out with ANOVA. 3 different measurements were taken from the beginning, middle and at the end of the workpiece in order to provide measurement reliability. Detailed investigation of results showed that both Ra and Rz are affected from depth of cut mostly (25% and 27%). After that, the cutting speed (21%), feed rate (16% and 17%) and approaching angle (25% and 27%) have significant contribution on surface parameters Ra and Rz respectively.

KEYWORDS - Surface Roughness, Taguchi design, AISI 5140, Turning

A GROUP DECISION MAKING APPROACH UNDER FUZZY ENVIRONMENT FOR MACHINE TOOL SELECTION

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ABSTRACT

Determination of appropriate machine tools in a manufacturing company is an important and complex decision-making problem since the problem inherent quantitative and qualitative attributes besides diverse conflicting selection criteria. In the multi-dimensional and ambiguous structure, fuzzy multi-criteria decision-making methods provide flexibility and easiness to obtain an ideal ranking of the alternatives. In this study, classical group decision-making methods (GDMM) and fuzzy GDMMs are applied to select and rank the machine tools under different factors. Then the obtained results are compared to each other to show the methods' advantages and weaknesses.

KEYWORDS - Group Decision Making, Fuzzy Sets, Machine Tool Selection

SURVEY OF ENGINEERING STUDENTS COGNITIVE LEVEL OF INDUSTRY 4 0

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ABSTRACT

Growth on the world is slowing down and this is emerging as a very important issue. The growth of the global economy stops. In fact, this is not a new situation. The growth of the economy has been decreasing for 50 years. Growth matter a lot. As a result, a new industrial revolution began in 2011. This new production revolution is called Industry 4.0. Industry 4.0 is known as the interaction between the physical and cyber worlds. In other words, mechanical systems and cyber systems can work together and communicate within themselves to produce flexible production at optimum level. This allows us to produce economical, quality and flexible production in less time. The greatest need for countries to move their production systems to the Industry 4.0 platform is the need for trained personnel, especially in engineering fields. Students must be trained in the fields of engineering in accordance with the new industrial revolution. In this study, a questionnaire was applied to measure the cognitive level of engineering students about Industry 4.0. The target engineering areas of the survey are Mechanical, Electrical-Electronics, Mechatronics and Computer engineering.

KEYWORDS - Industrial Revolutions, Industry 4.0, Survey, Engineering Studenst, Cognitive Level, Cyber and Physical Worlds

TOOL CONDITION MONITORING WITH SENSOR FUSION IN TURNING AISI 5140

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ABSTRACT

The existence of high temperature and pressure make cutting area highly hard-to-access in machining operations. The changes occurring at workpiece-cutting tool contact should be monitored in turning operations. A tool condition monitoring system (TCMS) embodies sensors, data acquisition unit and data processing software. Also, sensors providing consistent information with each other generate sensor fusion. This paper aims to investigate surface roughness parameters (Ra and Rz) via resultant cutting force and vibration during dry turning of AISI 5140 material. Experimental data and statistical analysis outcomes demonstrated that to achieve the optimum Ra and Rz, higher cutting speeds and lower feed rates should be selected. Cutting speed is the most effective about 49% and 61% while feed rate have influence about 36% and 28% on Ra and Rz respectively. Newly produced surface reflects directly the condition of cutting tool and indirectly cutting forces, tool tip temperature, chatter vibration etc. As a result, the findings for optimizing surface roughness were verified with vibration and resultant cutting force analysis impressed mostly from cutting speed (66%) and feed rate (61%) respectively. Finally, vibration and resultant cutting force data comprises reliable and robust sensor fusion according to regression analysis result (90,8% for Ra and 89,1% for Rz).

KEYWORDS - Tool Condition Monitoring, Sensor Fusion, Vibration, Cutting Force, Surface Roughness

A COMBINED FUZZY LOGIC AND OPTIMIZATION APPROACH FOR TOOL WEAR IN SURFACE MILLING

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ABSTRACT

It is important to monitoring of on-line tool condition to determine optimized machining parameters and obtain reduced costs in industrial applications. Tool wear affects surface quality and accuracy of workpiece which stands ultimate aim of a production line. Artificial intelligence methods provide prediction of machining performance with reduced experiments and contribute to enhancing of productivity. In this work, a combined statistical analysis (ANOVA) and fuzzy logic approach is implemented into surface milling operation to obtain minimum tool wear state with minimum experiment. Experiments were performed in dry cutting conditions and cutting speed, feed and depth of cut were chosen as input parameters. A Mamdani-Type fuzzy logic based model was developed and compare with the experimental results. The results showed that the developed model is reliable (R2=0.9) and successfully implemented to similar applications. Finally, the most effective machining parameter (feed rate with 50%) on tool flank wear and optimal milling parameters (v1=113 m/min, f2=250 mm/min, d3=2.5 mm) were determined with statistical analysis using data obtained from experiments. The aim of the study is obtaining of high quality materials with high efficiency and low costs.

KEYWORDS - Tool Wear, Tool Condition Monitoring, Analysis of Variance, Fuzzy Logic, Taguchi Method

INVESTIGATION OF THE COMBINED TLC ORC AND THE COMBINED ORC ORC POWER SYSTEMS

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ABSTRACT

Abstract - One of the best performances in waste heat and power generation systems is the organic Rankine cycle. The difference of the Organic Rankine Cycle from the basic Steam Rankine Cycle is the use of organic fluids as the working fluid. Power generation can be achieved from low temperature heat sources (80-90oC) with organic fluids. In this study, studies on dual loop combined power systems and system structures were investigated. As a result of the investigations, it was concluded that higher thermal efficiency and lower exergy destruction were obtained from combined Trilateral Cycle-Organic Rankine Cycle power system.

KEYWORDS - Organic Fluids, Organik Rankine Cycle, Trilateral Cycle, Combined Power Systems.

INVESTIGATION OF VELOCITY MEASUREMENTS ON SPILLWAY BY CFD MODELING

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ABSTRACT

In recent years, the versatility, reliability and practicality offered by CFD have led to intensive use by the water engineering community. The reliability of the simulations created by the blending of advanced digital techniques with the great advances in computer technology has increased considerably. CFD models can be programmed using many different programs. Especially in recent years, open source programs are preferred by the users due to the fact that the desired library add-ons can be made easily and unlike commercial package programs, they are free. With the Openfoam open source numerical model program, the surface profile and velocity of the hydraulic jump in the spillway and the other three points were investigated numerically for different current conditions. Based on the results of the research, CFD techniques have proven to be highly reliable in measurements.

KEYWORDS - Computational Fluid Dynamics, Numerical Analysis, OpenFoam

EFFECT OF GLASS FIBER ADDITIVE ON SOIL STRENGTH PROPERTIES OF HIGH PLASTICITY CLAY SOILS

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ABSTRACT

High plasticity clay soils swell when contact with water and shrink when dry. Due to this swelling and shrinkage behavior of soil, damage occurs to structures. Therefore, stabilization is very important for high plasticity clay soils. Soil problems are solved using different stabilization methods. These methods are soil improvement methods with and without additives (cement, lime, fly ash etc.). However, these methods usually require long curing time and excess material for large scale improvement. Therefore, researchers have turned to new alternative materials to be used in soil stabilization. One of these materials is glass fiber. Glass fibers; hardness, corrosion resistance, and not to react with chemicals. In this study, the effect of glass fiber additive on the strength of high plasticity clay soils were investigated. Thus, soil classification tests were performed and compaction test was performed to determine optimum water contents of the soil. Test samples were prepared at optimum water content and as saturated soil in two different parameters of with and without additives. Samples with additives were prepared by adding Glass fiber in ratio of (0.25%, 0.5%, 0.75%, 1%, 1.25%, and 1.5%) to the amount of clay. Unconfined compression tests were performed on the samples prepared at optimum water content and as saturated samples. Consequently, the strength of the samples with glass fiber additives were compared to the samples without additives. As a result, the use of glass fiber for improving soil properties was investigated and the optimum mixing ratios were determined.

KEYWORDS - High Plasticity Clay Soil, Soil Stabilization, Glass Fiber, Optimum Water Content, Unconfined Compression Test.

INVESTIGATION OF STRENGTH PROPERTIES OF DIFFERENT CEMENT TYPES ON SANDY SOIL

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ABSTRACT

In this study, strength performance of DMFC-800 fine-grained cement, CEM I Portland cement, CEM II composite cement and CEM III slag admixtured cement on sandy soil were investigated. Cement mortars in different W/C ratios were prepared and mixed with sandy ground. Unconfined compressive strength (UCS) tests were performed at the end of curing periods of 7,28 and 56 days. Fine-grained cement showed early strength and was the best tolerant cement type for excess water. Admixtured cements gave better results than CEM I cement in the long term.

KEYWORDS - Cement Grout, Soil Stabilization, Blast Furnace Slag, Pozzolanic Additives, Microfine Cement.

PERMEABILITY AND COMPACTION PROPERTIES OF RECYCLED CONCRETE AGGREGATES AS GRANULAR ROAD BASE AND SUB BASE

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ABSTRACT

Recycled concrete aggregates (RCA) can be used as granular road base (GRB) and granular road sub-base (GRSB) in highway constructions. Thus, the use of RCAs which are waste materials contributes to sustainable economy. But RCAs must meet certain requirements for use in GRB and GRSB. Adequate drainage capability, which is one of these conditions, is important for draining surface water. In this study, drainage capabilities of RCAs produced from concrete from 3 different buildings were compared with crushed aggregate (CA) and natural aggregate (NA). In order to carry out the tests, 23 different designs consisting of mixture and pure forms of the materials were established. The permeability tests were carried out with falling head and constant head permeability equipment to evaluate permeability coefficients. The samples were prepared in the permeability molds by compression at maximum dry unit weight (ɣkmax) and optimum moisture content (wopt), which are the compaction parameters obtained from modified Proctor test. For this reason, wopt and ɣkmax were determined by modified Proctor test before conducting the permeability tests. As a result, it was observed that RCAs had higher wopt values and lower ɣkmax values than the NA and CA. It was determined that the permeability coefficients obtained by the permeability tests of the NA were very low and the permeability coefficients of the CA and RCAs were close to each other and higher than the NA. The fact that the RCAs had a permeability coefficient close to the CA indicates that drainage capability can be sufficient if RCAs are used in GRB and GRSB.

KEYWORDS - Recycled Concrete Aggregate, Granular Road Base, Granular Road Sub-Base, Permeability Coefficient, Compaction

PHYSICAL PROPERTIES OF RECYCLED CONCRETE AGGREGATES AS GRANULAR ROAD BASE AND SUB BASE MATERIAL

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ABSTRACT

Recycled concrete aggregates (RCA) are obtained from waste concretes which are emerged as one of the construction and demolition wastes. As in many fields of civil engineering, the use of RCAs as granular road base (GRB) and granular road sub-base (GRSB) material eliminates their adverse effects such as big landfill area needs and environmental pollution and contributes greatly to economic sustainability. However, in order for these materials to become GRB and GRSB material, they must comply with the technical specifications. In this study, the suitability of RCAs to the conditions of GRB and GRSB was investigated by flakiness index, particle density and water absorption, Los Angeles (LA) abrasion and magnesium sulfate soundness tests. 3 different RCAs were obtained by crushing the concrete blocks of the debris of the demolished buildings. Natural aggregates (NA) and crushed aggregates (CA) were used to compare the RCAs with conventional aggregates. Tests were carried out for 23 different designs, which were formed with pure forms of these 5 different materials and their mixtures in certain proportions. As a result of the tests, it was found that the RCAs had very good properties in terms of flakiness index. It was found that the RCAs had lower particle density and higher water absorption values than the conventional aggregates. For LA abrasion and magnesium sulfate soundness tests, too much material loss was observed for the RCAs, which shows that the RCAs are in some cases disadvantageous. However, the poor properties of the RCAs largely eliminated by mixing them with the CA and NA.

KEYWORDS - Recycled Concrete Aggregate, Granular Road Base, Granular Road Sub-Base, Physical Properties

STABILITY OF LAYERED CYLINDRICAL SHELLS WITH FGM INTERLAYER SUBJECTED TO COMBINED LOAD UNDER MIXED BOUNDARY CONDITIONS

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ABSTRACT

In this study, the stability of functionally graded (FG) layered cylindrical shells (LCYLSs) with mixed boundary conditions under the combined load (combination of lateral and axial loads) is investigated. The fundamental relations and governing equations of functionally graded three-layered cylindrical shells consisting of an FGM interlayer between ceramic and metal layers (MFGC-CYLS) are derived in the framework of Donnell-type shell theory and solved using by Galerkin's method. The expression for the critical combined load of MFGC-CYLSs within the classical shell theory (CST) is found. Finally, the influence of the FGM interlayer on the values of the critical combined load for MFGC-CYLSs is investigated numerically.

KEYWORDS - Layered Cylindrical Shells, FGM Interlayer, Stability, Combined Load, Critical Loads

EXPERIMENT INVESTIGATION OF INTERNET USE OF OBJECTS IN FIRE DETECTION AND EXTINGUISHING SYSTEMS

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ABSTRACT

Fire, one of the greatest inventions in the history of humanity, on the other hand, fire can lead to major disasters. The human know that he was the only organism capable of controlling fire and was also aware of the magnitude of disasters when he is unable to control it so he work to solve it by harnessing engineering information and modern technologies. The fire explodes very quickly in very short periods so it was found that the fire detection and rapid intervention to solve the problem before the exacerbation is critical. This project was practically tested in a specially prepared room to measure the success rate and efficiency. The completed construction, fire alarm and fire monitoring systems will be integrated into the Internet of Things (IoT) platform and necessary instructions will be created by means of smoke, flame, visual motion and temperature sensors, and when the system reaches that the result is fire, then, extinguishing systems will be started before the fire starts. The system will fire the fire alarm with the sound and light in the right place during the first response to the fire and thus will save time to evacuate people and save what they can from the important things they can in the building where they are located. The system also sends a fire notification via the Internet to the emergency department by calling their numbers or sending a notice on the location. The design here aims to determine the exact location of the fire starting point through the sensors and aims to conduct the initial intervention in the target point to reduce its spread. Since this system adopts wireless communication, it will be an important economic system that can be used in industrial plants.

KEYWORDS - Fire, IOT, Internet of things, Wireless, Connection systems.

INVESTIGATION OF FLUID STRUCTURE INTERACTION WITH THE COUPLING OF SPH AND FEM

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ABSTRACT

A coupling method between fluid and structure is proposed in this paper. There are two different domains are solved with different methods. Fluid part is solved by Smoothed Particle Hydrodynamics (SPH) and structure part is solved by Finite Element Method (FEM). Coupling between these domains is satisfied with and effective method called Attachment. SPH particles are attached to finite element nodes on structure and forces applied to the attached SPH particles by fluid domain is applied to the structure. Displacement on finite element nodes are applied to the attached SPH particles. Thus, a two way coupling mechanism is achieved. This method is used for investigations on a dam break problem. Capabilities of method is test via well-known dam break problem.

KEYWORDS - Smoothed Particle Hydrodynamics, Fluid-Structure Interaction, Finite Element Method, Coupling

DECISION PARAMETERS SUPPLIED BY MINING ENGINEERING STUDENTS ARE THEY CREATIVE

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ABSTRACT

What is creative thinking and how it influence mining engineering students? This question needs to be answered to analyze educational improvements in mining engineering departments. What can be reasonable answers if we ask basic mining questions to the students who are not graduated yet. In order to determine students' creative thinking a survey study was performed. Total number of students who attended this study was 54. They were students at different Grades of Selcuk University, Mining Engineering Department, Konya, Turkey. The survey included one question and it was about the decision parameters for common mining engineering design. Students' answers were filed according to their Grade and decision parameters. Their survey papers were evaluated in seven different categories including one category for "creative ideas". It was resolved that students had been influenced by mining engineering lectures as it was expected. However, it was also concluded that, maximum influences of mining related knowledge and information on these students had been realized at Grade 2 and Grade 3 levels of the department. Parameters selected as the product of original thinking, creative brainstorming, of students were also determined. It was determined that creative thinking in students had been decreased as their Grades in the department are increased.

KEYWORDS - Education, Engineering Education, Creative Engineers, Real-World Engineering Applications.

ASSESSING THE SHEAR STRENGTH REDUCTION FACTOR IN GEOPOLYMER CONCRETE BEAMS WITHOUT STIRRUPS

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ABSTRACT

In the design of strength, the strength reduction factor decreases from ductile to brittle to increase safety with decreasing ductility. In the codes, it is intended to provide the target failure probability by means of safety factors that are load factors and strength reduction factors. But, the literature related to the safety factor of geopolymer concrete materials has not been observed. This paper presents how to determine the reduction factor for shear strength of reinforced geopolymer concrete beams according to ACI318 code. In the reliability-based design, the reliable prediction of the shear strength of reinforced geopolymer concrete beam is assured by the use of reduction factors corresponding to different target reliability index. In this study, for different variation coefficients of the concrete strength, the shear strength reduction factor has been investigated by using experimental studies available in the literature. In the reliability analysis part of the study, the first-order second moment approach has been used to determine the reduction factor. ACI 318 [1] code suggests a strength reduction factor value of 0.85 for shear. However, in ACI 318 [2], the strength reduction factor value for shear is decreased to 0.75. It is found that a strength reduction factor of 0.75 for shear is valid in design according to ACI318 for a coefficient of variation of concrete compressive strength of 0.12 and a failure probability of 10-7.

KEYWORDS - Keywords – Geopolymer Concrete, Shear Strength, Failure, Probability, Reduction Factor.

EVALUATION OF THE F2 PEAK PARAMETER HMF2 PREDICTION PERFORMANCE OF IRI 2016 MODEL

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ABSTRACT

This study aims to validate the height of F2 peak (hmF2) prediction performance of IRI-2016 model using AMTB2013 and SHU-2015 options over San Vito station, Italy, (Lat:40.6, Long: 17.8). The analysis covers a period of one month (April 2019), which includes quiet days. The results of the comparison of observed hmF2 with IRI2016 (AMTB2013) and IRI2016 (SHU-2015) options based hmF2 estimates indicate that the predicted values of hmF2 overestimate the observed ones. In addition, it is found that SHU-2015 option produces monthly averages of the hourly data in better agreement with observed data.

KEYWORDS - AMTB2013, hmF2, IRI-2016, SHU-2015

BENEFITS OF MICRO SCALE DEFORMATION DETECTION

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ABSTRACT

Deformation measurements are important for rock strength tests. There are mechanic and electronic methods to measure micro scale rock strain related displacements. Moreover, deformations which can not be measured through electro-mechanical or optical apparatus are also valuable assets in engineering decisions. Digital image correlation (DIC) method is one of the methods used to realize and calculate very fine (micro) scale deformation in engineering applications. Compressive strength tests and indirect tension (Brazilian) strength tests were performed in this study to visualize vertical and horizontal micro displacements of tested specimen surfaces to evaluate behavior of the sample (breakages) during these tests.

KEYWORDS - Digital Image Correlation, Rock Strength Tests, Micro Scale Rock Deformation, Rock Mechanics.

INVESTIGATION OF THE STABILITY EFFECT OF TIME INTEGRATION METHODS IN FLUID STRUCTURE INTERACTION PROBLEMS

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ABSTRACT

In the present study, a gridless technique called smoothed particle hydrodynamics (SPH) is coupled with finite element method (FEM). SPH-FEM coupling method has advantages in the problems with extreme deformations within a Lagrangian framework. On the fluid side, SPH is prefferred due to its advantages on modelling of complex flows. On the solid side, well-known FEM is used. This papers deals with the application of different time integration methods to fluid-structure interaction (FSI) problems. The stability analysis and the computational efficiency of the time integration methods are presented. The numerical results are compared with the experimental data.

KEYWORDS - Smoothed Particle Hydrodynamics, Finite Element Method, Fluid Structure Interaction, Time Integration Methods

LANDSAT IMAGERY AND GIS BASED EVALUATION AND MONITORING DESERTIFICATION PROCESS SURROUNDING KIRKUK CITY IRAQ

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ABSTRACT

Desertification implies land degradation in areas arising from different variables, including climatic variations and human operations. Controlling and monitoring the phenomena and calculating the regions that have been transformed to desert required adequate management. Likes another hazard, the desertification phenomena can be modeled and identified. Kirkuk City located in north of Iraq. A town situated at longitude 44˚ 00′E to 44˚ 50′ E and latitude 35 ˚ 13′N to 36 ˚ 29′ N with a total area of 96.79 km2 .it is 236 kilometers north of the capital, Baghdad. Kirkuk's average elevation is 346 m. This area lies in the North Temperate Zone which the weather in this region characterizes by very low humidity and low clouds in the most days of the year. For this study, three set of Landsat image which are Landsat-5 TM, Landsat-7 ETM+, and Landsat-8 OLI for 1987, 2002, and 2017 were used. To classify images, the Maximum Likelihood algorithm was used. Change detection analysis makes possible monitoring and detecting the environmental changes among different times. The result of change detection discussed to; short term (1987-2002) and (2002-2017) and long term (1987-2017) change detection. The amount of desertification has decreased during the period 1987 to 2002 and has increased significantly during the period 2002 to 2014. The main reasons of the changes that happened in land cover from 1987 to 2002 due to the changes in climate conditions faced by the potential of government by supporting the farmers and provide them the necessary materials and machines to develop the agriculture in Iraq. On the other hand, the period from 2002 to 2017; the region suffered from the military operations and carelessness of the government about farmers as well as the rising of fuel cost prevents them from farms product.

KEYWORDS - Classification, Change detection, GIS, Land cover, land degradation, Remote sensing.

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