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BOOK OF ABSTRACTS 2018

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19-21, September 2018
Lviv, Ukraine

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WELCOME TO ICATES 2018

On behalf of the organizing committee, we are pleased to announce that the International Conference on Agriculture, Technology, Engineering and Sciences (ICATES 2018) will be held from September 19 to 21, 2018 in Lviv, Ukraine.

ICATES 2018 provides an ideal academic platform for researchers to present the latest research findings and describe emerging technologies, and directions in Engineering and Natural Sciences issues. The conference seeks to contribute to presenting novel research results in all aspects of Engineering, Technology and Natural Sciences. The conference aims to bring together leading academic scientists, researchers and research scholars to exchange and share their experiences and research results about all aspects of Engineering and Natural Sciences. It also provides the premier interdisciplinary forum for scientists, engineers, and practitioners to present their latest research results, ideas, developments, and applications in all areas of Engineering and Natural Sciences. The conference will bring together leading academic scientists, researchers and scholars in the domain of interest from around the world.

The scientific program will focus on current advances in the research, production and use of Engineering and Natural Sciences with particular focus on their role in maintaining academic level in Engineering and Applied Sciences and elevating the science level. The conference's goal will to provide a scientific forum for all international prestige scholars around the world and enable the interactive exchange of state-of-the-art knowledge. The conference will focus on evidence-based benefits proven in clinical trials and scientific experiments.

Best regards,

Assoc. Prof. Dr. Mükrimin Ş. Güney
Chairman of the Conference

CONFERENCE STATISTICS

Statistics by Country and Author Numbers

Number	Country	Authors
1	United States	1
2	Germany	1
3	Mexico	5
4	Pakistan	7
5	Poland	17
6	Serbia	10
7	Turkey	84
8	Ukraine	7
9	United Kingdom	1

General Statistics

Submissions	80	Acceptance rate	0,85
Accepted	68	Reject rate	0,15

Selected Speakers List From Different Countries

Authors Name	Affiliation	Page Number
Osman Zenk	NYC Bike Rental Corp., New York City, **USA**	**15**
Stephan Kovalyshyn	Lviv National Agrarian University, Faculty of Mechanics and Power Engineering, Lviv, **Ukraine**	**58**
Ljiljana Radovanović	University of Novi Sad, Technical Faculty "Mihajlo Pupin", Đure Đakovica bb, Zrenjanin, **Serbia**	**65**
S. Cumhur Başaran	Akdeniz University, Electrical and Electronics Engineering Department, Antalya, **Turkey**	**39**
Beata Cieniawska	Wroclaw University of Environmental and Life Sciences, Institute of Agricultural Engineering, Wroclaw, **Republic of Poland**	**77**
Luis Guillermo Mendoza Luna	Departamento de Física, Universidad Autónoma Metropolitana Iztapalapa, Av. San Rafael Atlixco No. 186 Col. Vicentina, C.P. 09340 México D.F., **México**	**57**
Mümin Mehmet Koç	University of Portsmouth, School of Engineering, Portsmouth, **United Kingdom**	**27**
Muhammad Tauseef Qureshi	Department of Physics, Hazara University, Mansehra, **Pakistan**	**69**
Mustafa Erkovan	Freie University, Berlin, **Germany**	**35**

*Researchers from nine different countries which are the USA, the UK, Poland, Mexico, Pakistan, Serbia, Ukraine, Germany and Turkey, **made oral presentation** in the International Conference on Agriculture, Technology, Engineering and Sciences (ICATES 2018) held between 19-21 September 2018 in Lviv, Ukraine.*

Prof. Dr. Mükrimin Ş. Güney
Chairman of the Conference

CONTENTS

New York City Example for a Clean Transportation Model "Electric Pedicab Design"

Osman Zenk[1], Birol Ertuğral[2], Hilmi Zenk[3*]

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Abstract

In recent years, studies on electric vehicles have been very popular in academic fields. Because electric cars are environmentally friendly, they reduce air pollution to a minimum. These vehicles are used instead of the internal combustion engine electric motor. From the outside, it is not possible to understand whether it is an electric or a gasoline vehicle. The most important factor that determines the vehicle's range is the capacity of the vehicle's battery. Pedicab, a different type of electric vehicle, is a three-wheeled bicycle, which is a clean transport vehicle with no carbon dioxide emissions in the city, which has the capacity to transport three people. This type of transportation is a significant alternative to transportation vehicles, especially in crowded city centers. In this study, an efficient motor and power transmission system for three-wheeled electric bicycles, called pedicab, are proposed. For this purpose, DC drive motors with power pulse width modulation (PWM) transistors are used with a controller added to the system which changes the vehicle speed from zero to the nominal speed of the motor and can increase its speed from zero to about 50 km/h (30 mph). An electric bicycle has a conventional bicycle frame, pedals, cranks, chain, and freewheel assembly. Electric propulsion replaces or supplements muscle power. This adds to the bicycle an electric motor, gear reducer, battery, and power control.

Keywords: Clean Transportation Model, Electric Pedicab Design, Brushless DC Motor.

Modulus of Rupture of Recycled Aggregate Concrete

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Abstract

In this study, compressive strength and modulus of rupture of four different sustainable concrete series were investigated and compared in terms of the efficiency of different recycled aggregates. To produce the sustainable concrete mixtures, two different recycled aggregates were used as coarse aggregates in full replacement, by volume, of crushed limestone. Recycled aggregates were utilized as plain and surface treated by direct slurry with ground granulated blast furnace slag. Treating recycled aggregates improved the compressive strength and modulus of rupture of concrete series. Besides, it also increased statistical reliability in terms of mentioned mechanical properties. In addition, the experimentally obtained modulus of rupture values were compared with those calculated by using the estimating models given in different codes: TS500, EN 1992-1-1, ACI 363R-92, CSA A23.3-04 and NZS 3101-1. For control concrete produced with crushed stone coarse aggregates ACI 363R-92 was in good agreement with the relationship between compressive strength and modulus of rupture obtained from the experimental results, while it was NZS 3101-1 having the compliance with the test results for concrete series produced with recycled concrete and brick aggregates.

Keywords: Recycled aggregate concrete, Compressive strength, Modulus of rupture, Codes, Estimating models.

Frequency Reconfigurable Monopole Antenna Based on Concentric Ring Elements

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Abstract

A frequency-reconfigurable microstrip monopole antenna for WLAN and WiMAX applications is presented. Based on ring resonators as the primary radiator, the antenna exhibits single or dual frequency operation that is tunable using an integrated switch. The proposed antenna consists of two side-by-side four concentric ring elements fed by a coplanar waveguide (CPW). A conductive switch is integrated into the feed line and the ground plane is tailored for matching the feed line to the rings resonators. When the switch is in OFF state, a single band operation covering only the 5.3GHz band with 11% bandwidth is achieved. On the other hand, when the switch is the ON state, the antenna operates over both the 3.5GHz and 5.0GHz bands with 20% and 11% bandwidths, respectively.

Keywords: Frequency reconfigurable, Rings elements, WLAN.

Remote Tracking and Control of Greenhouse Temperature

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Abstract

Nowadays, with the rapid development of technology, control systems have turned into remote control systems and data collection from more than one point in one center has been achieved and control of systems has been realized. In this work, the temperature of the greenhouses is controlled by 433MHz RF modules. System control and serial communication of RF modules are provided by Microchip's PIC16F877A microcontroller. The temperature in the circulation is measured by the LM35 temperature sensor. In addition, the greenhouse temperature is monitored remotely and a scada system is designed. Thus, the greenhouse temperature can be monitored remotely and the desired temperature values can be entered and the greenhouse temperature can be adjusted.

Keywords: RF module, Radio frequency, Greenhouse control, Remote control.

Thermal Comfort Properties of Warp Knitted Cut-pile Upholstery Fabrics

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Abstract

Providing thermal comfort is considered as one of the most important requirement for our modern life which leads more stress to individuals. Thermal comfort is generally ensured by clothing systems regulating and balancing the heat and moisture transportation from body to the environment and vice versa. Nevertheless, the thermal comfort is one of the vital properties of upholstery fabrics since we spent more time on living room seating sets, furthermore sometimes they can be used as bed.

The aim of this study is to evaluate thermal comfort properties such as thermal conductivity and thermal absorptivity of warp knitted cut-pile upholstery fabrics. For this purpose eighteen different fabrics were produced with different course densities (slack, medium, tight), different pile lengths (long, short) with different polyester texturized yarns constituted by different number of filaments in cross section, but same yarn counts. The samples were manufactured 3 bar Karl Mayer warp knitting machine with 28 Fein, keeping wale density constant by changing the underlap of first bar. The underlap lengths were changed to provide different pile lengths after raising process. The areal weights and thicknesses of the samples were measured according to standard tests and porosity of the samples was calculated from these measured properties. The thermal comfort properties of samples were measured using Alambeta test device following test standards. The results derived from the tests were evaluated statistically using Design Expert software and suggestions were proposed for optimum thermal comfort properties.

Keywords: Warp knitted upholstery fabric, Thermal comfort, Thermal conductivity, Thermal absorptivity

Application Oriented Waste Walnut Shells Machinability and Recycling of Bio-Composite Materials

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Abstract

In this study, waste shell reinforced bio-composite materials were produced and its machinability behavior was examined to aim the recycle able of waste natural materials and to find new usage fields of waste of natural materials. Waste walnut shell used as reinforcement and epoxy resin were used as a matrix to produce the bio- composite materials. To determine machinability behavior; drilling, cutting and screwdriving tests were performed. Furthermore, the production of tea plates was carried out in order to prove the producibility of the product by the use of walnut shells. It is predicted from the results of these tests that produced bio-composite materials can be used in decoration and coating as an alternative to chipboard and wood. As a result, it has been found that it is possible to recycle wastes such as walnut shells in many areas where plastic or wood and wood products are used, and it is proposed as an alternative material.

Keywords: Walnut shell Reinforced composite, Recycling, Natural composite materials, Waste composite, Bio- composite.

Investigation and Modeling Thermo-physical Properties of Soil

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Abstract

Thermal properties of soil identify the storage capacity and the movement of heat in soil as of the influence of temperature and heat flux in soil as a function of time and depth. The ability to monitor of soil heat capacity is an important step in managing the soil temperature regime since it affects the seed germination and the crop growth. Good quality of physical data for soil is also needed in many laboratory experiments and field studies for developing, testing and applying soil heat, water and solute transport models.

In this study, thermal and other properties of soil have been evaluated. The effect of water content and bulk density on the specific heat, volumetric heat capacity, and thermal diffusivity of some sieved and repacked soils have also been investigated by related equations and laboratory studies.

Keywords: Thermo-physical properties of soil, Thermal modeling, Thermal modeling of soil.

Investigation of the Performance the Dynamically Loaded Connecting Rod Bearing at Different Engine Shaft Speeds

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Abstract

In this study, the performance of the connecting rod bearing of the J. Ruston and R. Hornsby's 6 VEB-X MK III 4-stroke diesel engine was investigated at different engine shaft speeds (1500 rpm, 3000 rpm, 4500 rpm). By examining the performance of the selected connecting rod bearing as an example; radial journal bearing users and bearing designers. With the increase of the shaft speeds at the dynamically loaded connecting rod bearing; how the minimum bearing clearance, the maximum oil film pressure, the friction torque, the oil flow, the orbit drawn by the shaft center in connecting rod bearing, and the hydrodynamic power losses that occur in the journal bearing have been theoretically investigated. Using the Ricardo ORBIT V1.2 software, analysis were performed using the Mobility Method, which provides a fast and accurate solution commonly used in the literature. At the different engine shaft speeds; how it affected the performance of the journal bearing under dynamic load was carefully examined. From the results of the research; as the shaft speeds increases at the same crank angle; it has been found that the minimum bearing clearance is increased, the maximum oil film pressure is decreased, the friction torque is increased, the oil flow is increased, the orbit drawn by the shaft center in connecting rod bearing is more stable and hydrodynamic power losses occurring in the journal bearing are generally increased.

Keywords: Ruston and Hornsby, shaft speeds, connecting rod bearing

Design and Simulation of Electric Vehicles

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Abstract

In this study, AVL Cruise program is used for electric vehicle simulation. The technical specifications of the Volkswagen Polo vehicle were entered into the modules in the program, the vehicle information was introduced to the system and the driving test was carried out. Nowaday, a solution to the improvement of the worse ecosystem, which is caused by the spread of electric cars, is considered by researchers. Therefore, the tendency for electric or hybrid vehicles to replace internal combustion motor vehicles has increased. The Volkswagen Polo vehicle model is turned into electric vehicle. Three different batteries were used to study the vehicle's performance. New European Driving Cycle Work has been done at the NEDC. Battery types used in electric vehicles are very important. Lithium- Ion, Nickel Metal Hydride and Nickel-Cadmium batteries are the most suitable from the developed batteries. Accurate battery charging rates and vehicle performance have been examined. An asynchronous motor type is used as the motor. At the end of the cycle, reviews and calculations were made to assess the benefits of the Volkswagen Polo vehicle to automotive manufacturers and buyers, when driven into the market as an electric vehicle.

Keywords: Electric vehicle, Battery, Motor

Stabilization and Experimental Study of Clay Soils with Nutshell Ash

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Abstract

This study seeks to investigate the behaviour of the material composed with addition of waste nutshell ash into the predetermined fine-grained soil in various amounts. For this purpose, a sample was prepared from 10 nutshell ash and soil mixtures at the rates of 3%, 5%, 10%, 15%, 20%, 25%, 30%, 35%, 40% and 20% ash plus coal by weight. The impact of Nutshell Ash clay sample on the cohesion and internal frictional angle (indirect bearing power) was experimentally examined. As a result of the experiments, it was found that c= 94,13 Kpa and <=10,97 degree was for clay additive of 3%, c=57,05 Mpa and =18,09 degree was for clay additive of 15%, c=76,37 Kpa and =12,99 degree was for clay additive of 20%. The results were in line with the results of studies conducted with lime and fly ashes. As the amount of additive of the nutshell ash increases, c (cohesion) decreases and (internal friction angle) increases. In other words, the bearing power increases. In general, the most appropriate results were found in use of 15% waste nutshell ash.

In conclusion, it was found that like cement, lime and fly ashes, waste ash of nut shell as well can be used in soil stabilization of road and airport runway.

Keywords: Clay, Ash, Waste, Fly ash, Soil stabilization, Nut shell, Road

Heat Insulation with Sheathing System in Constructions

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Abstract

Insulating materials, which have been professionally used in the world since the 1800s and whose conscious use has increased over the last five years with an unprofessional use in Turkey from the 1960s to nowadays, have diversified and increased time and changing conditions (e.g. weather conditions, research and development, economy, environmental pollution). As a result, distinctions have come out in preferred properties and strengths. To get the highest efficiency in construction, a quality philosophy should be established from the very first stage to the last stage. First of all, where and for what purposes the material will be used as well as the selection of most suitable materials are important issues. Besides, though it is believed that operation of these by qualified operators is as strong as the longevity of the building, maintenance should be carried out in time.

Keywords: Heat insulation, Structure, Insulation, Energy-saving, Environment

An Efficient Hazelnut Roasting Alternative: Microwave Roasting

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Abstract

Hazelnut is generally used roasted for industrial purposes. Roasting process is usually carried by means of jet heating furnaces. In individual usage, With the advantages of jet roasting by microwaves, 60-70% can be saved up in the name of time and energy. Researchers are still carring out investigations about the effects of different heat-treats on phenolic components known to be rich such as hazelnut. It is now clear that aroma richness is highly effected by kind and maturation of hazelnut those have different level of humidity and size. Hazelnut has 57-62 % of crude fat content. High amount of oil particles is a sign of convenience for vibratory heating. These highly oil content can cause perishable unwanted chemical ingredients begin to form due to increase of areas that are suitable for oxygen and enzymes, if a damage or particle erruption occur on the outer surface of hazelnut tissue. According to sensory evaluation results, rising up the roasting temperature and time are found to increase flavour-odour(taste) and change texture (providing crispiness).

Keywords: Hazelnut, Microwave, Roasting, Phenolic content

X-ray Microtomography Investigation of Skin

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Abstract

X-ray computed tomography (CT) find application in medical, biological and scientific implications. In all those applications, visualisation of materials in soft structure of in low density becomes problem due to low attenuation of X-rays in those materials. Therefore, thin or soft tissues like skin, muscles, arteries, cartilages etc. are not able to be visualised by using X ray tomography in details. To enhance the contrast and details of soft tissues certain protocols need to be followed like staining and stabilization of samples. In the first time in the literature, the structure of the mouse and chicken skins, which are very soft and thin structures, were investigated by using X-ray microtomography. We successfully obtain the three dimensional (3D) high contrast and high-quality images of the skins via applying certain stabilization and staining protocols. The results evaluate and discusses methods to obtain the data of the skin in 3D. The results may also help researchers in both engineering and biological sciences who try to understand the structure of the skin in detail or try to achieve the high contrast in soft tissues. The researcher also believes that detailed structure data of skin in 3D may find application in materials science, bioengineering, biomimetics, 3D, 4D printer applications and to develop more flexible and durable materials.

Keywords: X-Ray microtomography, Skin, Phase contrast imaging, Absorption imaging, Staining, Soft tissue, Computed tomography

The research was funded by 2219- 2016 Turkish Scientific and Technological Research council scholarship. The research was conducted in Portsmouth University Future Technology Centre and Zeiss Global Research Lab at University of Portsmouth. I am happy to acknowledge the support of Dr Alexander P. Kao and Prof Asa Barber.

An Implementation for Determination of the Importance of Green Logistics Applications in Manufacturing Enterprises: Eskişehir Case

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Abstract

Nowadays changing market conditions, green practices have gained importance in every sector to provide a sustainable environment for future generations. In fact, these practices have become a policy for governments. In this context, green logistics applications are undoubtedly one of these factors for manufacturing enterprises. The aim of this study is to determination of the importance of green logistics applications factors in manufacturing enterprises that have 50 or more employees in Eskişehir province by Dematel method. Within this scope, 9 expert opinions were taken in the field of manufacturing. A model for this purpose has been established and the factors to be used in green logistics applications have been prioritized by Dematel method. At the end of the study, it was determined that the most important factor in green logistics applications was "Green Production", and the least important factor was "Green Reverse Logistics".

Keywords: Logistics, Green logistics, Green logistics applications, Dematel method.

Determination of Criteria for Electrical Distribution: Case of Erzurum Province

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Abstract

Manufacturing businesses in the globalizing world are trying to keep their assets when very intense competition is happening, very fast technological developments, and massive, selective and informed customers that difficult to make satisfied. Businesses must make specific decisions in all their activities, and many of these decisions are strategic decisions that can affect the competitive position of the business. One of the most important of these decisions is the ability to develop strategies that will ideally meet customer needs. In this research, it was aimed to determine the criteria used for distribution in the electricity distribution companies that meet the energy requirement of both consumer and industrial markets. In this context, 9 expert opinions were taken. The aim of the study is to determine the delivery criteria used in supplier selection, suppliers' production competence and general situation, quality and price main criteria and their sub-criteria and the AHP method was used for this purpose. As a result of the AHP technique, it has been determined that the main criteria for the electrical distribution are "Delivery" and "Supplier Production sufficiency and General Situation". On the other hand, the main criterion of "Quality" has been determined to be the other main criterion affecting the distribution of electricity. The main criterion that has the least effect on the distribution of electricity has been "Price".

Keywords: AHP, Multi criteria decision making, Electricity distribution criteria

Etch Pit Studies in Cdte (211)B Films For Buffer Layer Applications

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Abstract

CdTe thin films were used for many electronic applications especially for infrared detectors as buffer layer for HgCdTe thin film [1]. The HgCdTe thin films are photo active part of infrared detectors and are often coated on the GaAs substrates. The lattice mismatches between the GaAs substrates and HgCdTe thin films result in decrease in performance of the detector and rapid temperature changes on substrate and HgCdTe film may cause deformations on thin films [2]. Here, we propose CdTe buffer layer to compensate lattice mismatches [3].

In our studies, we coated GaAs (211)B substrate with CdTe film using molecular beam epitaxy (MBE) method. The surface of the CdTe thin films were investigated by microscopic methods. Atomic force microscopy and scanning electron microscopy were used to surface roughness and the thin film thickness. Root mean square roughnesses of freshly prepared CdTe films were found as 1.18–3.89 nm. To obtain the dislocation distribution and to determine the densities of dislocations of the MBE grown CdTe/GaAs epitaxial films, Everson and Benson defect decoration methods were performed with varying volume ratios and implementation times at room temperature in class-100 cleanroom environment. Benson defect decoration method was not effective for (211)B oriented CdTe films. Triangular decorations with density changing between 1.7 × 108 and 9.2 × 108 cm^{-2} were observed after only Everson treatment. Pit widths were varying between 0.15 and 0.71 μm with depth varying between 2 and 80 nm were observed. Increased root mean square roughnesses were observed varying from 1.56 to 26 nm after Everson treatment.

Keywords: CdTe, Etch pit decoration, Dislocations, Etch pit density, Everson method, Benson method

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Priority of Solid Waste Selection Criteria: Case of Kars Province

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Abstract

In order to control environmental pollution caused by solid wastes needs to be stored properly. Among solid waste disposal methods, the most commonly used method is the regular storage method because it is safe and economical. The most important element of the landfill is the way to determine the most proper site to store the waste. Multi Criteria Decision Making (MCDM) methods play an important role as a decision support tool in the selection for solid waste disposal sites. The use of MCDM in site selection of storage areas allows for faster and more reliable results. In this study, SWARA which is a Multi Criteria Decision Making (ÇKKV) method was used to determine solid waste site selection criteria in Kars Province and criteria weights were determined by SWARA. As a result of this study, it has been determined that the importance of solid waste storage site selection criteria is "Natural Life Protection Areas", "Land Costs", "Population Density", "Soil and Geology Structure" and "Distance to Urban Areas". On the other hand, it has been determined that the least caretakers are "Slope", "River Network", "Road Network", "Underground Water Conservation Areas" and "Historical and Important Cultural Areas".

Keywords: Solid waste, Site selection, SWARA.

The Contributions of Using Ontology in Spatial Data

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Abstract

For a healthy and sustainable urban and rural development; collecting, processing, evaluating data and finally converting information to knowledge in a fast and accurate manner is important. Local and private administrations require data sets that contain spatial data in order to set up infrastructures for smart cities, sustainable agriculture and forestry, to solve city problems, to create healthy places and effective living areas. However, the spatial data sets that obtained from geographic information systems (GIS) and remote sensing, display a heterogeneous structure in terms of semantics concept due to containing data with different resolution and properties from different data sources. In order to use this data in operations regarding cities and to make it compatible with smart city infrastructure, various heterogeneity in the data should be solved. For that reason, a new, modern and solution focused model with a different perspective for spatial data domain was developed. The proposed model linked spatial data with ontology and semantic web. With the proposed model, the spatial data can be reusable, fully semantic and interoperable.

Keywords: Spatial data, Semantic web, Ontology, Data heterogeneity, Semantic interoperability, Linked data.

A Model Development for The Solution of The Problems in the Safe School Site Selection

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Abstract

School areas, which are the main elements of the education process, are the most common areas where children spend their time outside their homes. Schools contribute to the development of society by closely following social, cultural, technological and economic developments in our country and in the world and transferring them to younger generations. For this reason, the school grounds must be designed in a well-placed, systematic plan and operated in a robust and efficient manner. However, the choice of safe school site is a complex question that involves the assessment of multiple criteria (technical, political, social, environmental, economic) from different criteria. Geographical Information Systems (GIS) is emerging as the most appropriate tool that can interrogate many different disciplines at the same time by using multi-criteria decision analysis to solve such complex problems. In this study; the criteria to be considered in determining the location of safe school sites were researched, problems were identified, and a GIS-integrated model was developed.

Keywords: School site selection, Analytic hierarchy process (AHP), Multicriteria decision analysis (MCDA), Geographical information systems (GIS)

The Effect of Lubricant Viscosity Change on The Performance of The Dynamically Loaded Bearing

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Abstract

In this study, the dynamic load (polar load diagram) of the connecting rod bearing of J. Ruston and R. Hornsby's diesel engine was used. It has been researched how journal bearing performance will be improved when the viscosity values of 10W-40 oil used only in journal bearing, change at 0 ^{0}C, 40 ^{0}C and 100 ^{0}C, while the bearing load and other bearing parameters are constant. In dynamic load-bearing connecting bearing, with changes in viscosity values; how the minimum bearing clearance, the maximum oil film pressure, the friction torque, the oil flow, the orbit drawn by the shaft center, and the hydrodynamic power losses that occur in the journal bearing have been theoretically investigated. Using the Ricardo ORBIT V1.2 software, analyzes were performed using the Mobility method, which provides a fast and accurate solution commonly used in the literature. The results have been reviewed and practical information has been presented to bearing designers on the effect of lubricant viscosity change on the performance of the bearing.

Keywords: Dynamic load, lubricating viscosity, bearing performance

Steering of Magnetic Domain Walls by Single Ultrashort Laser Pulses

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Abstract

Text Steering magnetic domain walls by light is of high interest with respect to potential applications in computing technology and data storage. We present a magnetic domain-imaging study by x-ray magnetic circular dichroism photoelectron emission microscopy on a Co/Fe75Gd25 bilayer under exposure to single focused ultrashort (100 fs) infrared laser pulses. We find that magnetic domain walls experience a force in the gradient of the laser pulses away from the center of the pulse, which can be used to move domain walls optically into a certain direction. Maximum domain-wall displacements close to 1 μm per laser pulse in zero external field have been observed. Assuming realistic domain-wall velocities, these distances are too long to be traveled by the domain wall during the electronic excitation of the system, and are likely related to the transient lateral gradient in lattice temperature created by the laser pulse. While some theories predict domain-wall motion in the direction to the hotter side of a thermal gradient, a motion towards the colder side can be explained by the torque exerted by magnons that are reflected at the domain wall. We thus attribute the effect to long-wavelength magnons from the spin Seebeck effect reflected at the domain wall. This possibility to steer domain walls by ultrashort laser pulses might open new avenues for writing magnetic information.

Keywords: Magnetic domain, Single ultrashort laser pulses, Steering

Electrochemical Characterisation of Polypyrrole Modified Graphite Current Collector for Redox Supercapacitor

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Abstract

Conducting polymer-based thin films can have a large surface area than bulk electrodes. Therefore, conducting polymers are commonly used in electrochemical applications because they are considered as 3D electrodes. Energy storage devices formed from conducting polymers can have higher ion transport and higher electron transfer. Therefore, conducting polymer-based batteries and supercapacitors can have higher specific capacitance, power density and energy density. In this work; a conducting polymer (polypyrrole) coated graphite is used as an electrode for supercapacitor applications. Polypyrrole deposited on graphite can be used as an inexpensive, environmentally friendly electrode which has high energy and power density. This electrode could have a long service life in atmospheric conditions depending on the electrolyte.

In this study, polypyrrole based modified electrodes were electrodeposited from pyrrole monomer in an acidic bath onto the graphite current collector and then these modified electrodes were transferred into the different media in order to study their electrochemical properties depending on growth conditions. These electrodes were analyzed for use in a supercapacitor device.

As neat graphite used in this work has 2D structure, its capacitance is not high (around 1 F g^{-1}). However, graphite having polypyrrole thin film could have a specific capacitance of more than 70 F g^{-1}. When a polypyrrole film deposited on graphite could be electroinactive in some selected electrolytes, its capacitance is low as well (typically 1 F g^{-1}) because only graphite is active. Ion transfer mechanism depends on both surface coverage and growth conditions. Modified electrodes are evolved when its cycling electrolyte is different from the deposition electrolyte.

Keywords: Energy storage, polypyrrole, graphite, supercapacitor, electrodeposition

This work was supported by Scientific Research Projects Unit of Giresun University (FEN-BAP-A-160317-35).

Investigation of Surface and Electrochemical Properties of ZnNi Coatings on AISI 4140 Steel

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Abstract

The electrochemical corrosion behavior of coated and uncoated samples was investigated in 5% by weight NaCl solution at room temperature. Corrosion tests were performed using the Metrohm Autolab 128 potentiostat / galvonostat device with three electrodes (study, Ag / AgCl reference and platinum counter electrode) using Tafel Extrusion method. From the obtained curve, it was observed that the ZnNi coated sample had higher current density and corrosion potential values than uncoated sample. This shows that the ZnNi surface coating improves the corrosion properties of the AISI 4140 base material and increases the corrosion resistance.

Keywords: Corrosion, Steel, ZnNi coatings,

Investigation of Effects of Kinetic Energetic Ammunition on Boron Carbide Armor by Finite Elements Method

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Abstract

Nowadays wars still show the importance of armored vehicles in the battlefield. In order to form a defense system against armored vehicles, Kinetic Energetic Ammunition (KEA) stands out among the options produced. The penetrator has high kinetic energy due to its speed and mass. Weight and speed, as well as the fact that the shots are made from the ball barrel in the tank or artillery, change the amount of kinetic energy depending on whether there is a groove in the barrel. On the other hand, the armor has an important defense mechanism as its angle of attack changes the stress distribution. Another factor that changes the effect of KEA is geometric size and design. Tungsten alloy is used as penetrator material. In this study, a penetrator weighing 7,0453 kg an 1750 m/s velocitiy was investigated by using finite element method to evaluate the damage effects caused by impacting boron carbide armor which is supported by 4340 steel layer. A numerical model with a sensitive elements mesh was created, and the Johnson-Cook material model was utilized to analyze the finite elements. Maximum stress from the penetrator in the analysis results 1,8061GPa, boron carbide 7,161GPa in 4340 steel 1,2437GPa. After deformation occured the average speed of the penetrator decreases 1513 m/s.

Keywords: Penetrator, Kinetic energy ammunition, Armor, Finite elements method, Boron carbide, Tungsten alloy

Utilisation Potential of Steel Slag as Ballast Material in Railway Construction in Turkey

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Abstract

As have been in many developed countries; to reduce the environmental impact of raw material production and consumption of natural resources in Turkey, alternatives should be taken in to consideration. Construction is a leading sector in Turkey and requires the highest amount of raw materials. In this respect, steel sector as the producer and construction sector as the consumer stand out in scope of international researches and applications. Steel slag had been accepted as solid waste till May 2017 in Turkey. In May 2017 "Usability and Performance of Steel Slag in Highway Construction and Regulations Proposal" project has been completed. In consequence of this project, steel slag is accepted as artificial aggregate and utilization in base and subbase courses in highway construction is supported. However base and subbase courses are constructed only in new highway routes therefore new and dense utilization possibilities should be researched according to sustainable development criterions. Accordingly, new railway projects draw attention as a new alternative in Turkey.

Turkey is the 8th biggest steel producer in the world. Only 24% of steel producers in Turkey have treatment facilities. Treated slag particles are smaller than 40 mm because of crushing process. Though according to Turkish Railway Specifications 40 - 65 % of ballast particles must be greater than 40 mm. Therefore, untreated slag is taken into consideration. Moreover, metallic iron content of untreated slag makes it more durable. In this paper test results obtained from "Usability and Performance of Steel Slag in Highway Construction and Regulations Proposal" project are examined in scope of ballast material properties given in Turkish Railway Specifications. Aforementioned project includes 20 different samples from 34 different steel producers in Turkey. Moreover, main physical tests are similar. According to the sample size and the similarities in tests, "Usability and Performance of Steel Slag in Highway Construction and Regulations Proposal" project test results are used to determine the utilization potential of steel slag as ballast material in railway construction.

Keywords: Railway engineering, Ballast, Steel slag, Sustainability

Thermodynamic Optimization of Mechanical Systems

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Abstract

Energy consumption all over the world is on the rise, and therefore efficiency at every phase of processing energy, from harvesting energy sources to end-users is getting more important every day. Not only the rising energy demands, but also the limited energy reserves and environmental concerns make efficiency important in utilizing energy. In this study methods of thermodynamic optimizations are introduced and on a sample mechanical system is applied. The optimization is done by using the first and the second law of thermodynamics, and the exergy analysis method. It is found that the best thermodynamic optimization method is the iterative exergetic optimization method.

Keywords: Mechanical systems, Optimization, Exergy

Thermoeconomic Methods of Mechanical Systems

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Abstract

Thermoeconomic analyses are very important for understanding of the behavior of mechanical systems thermodynamically and economically. Thermoeconomic evaluation has two competing objectives which are maximizing efficiency and minimizing cost. Exergy destruction, and cost flow in in mechanical systems can be traced and understood by using thermoeconomic methods. Thermoeconomic methods of mechanical systems are introduced, and a sample mechanical system is thermoeconomicaly analyzed. Thermoeconomic methods are based on calculus and algebraic methods. By using the algebraic thermoeconomic methods that use cost equations for each component the average costs can be obtained. The calculus methods which use differential equations for each component, allows us to obtain exergetic costs and marginal costs. It is found that the best thermoeconomic method for mechanical systems is the non-linear simplex direct search method. This method uses the exergetic and economic method together.

Keywords: Mechanical systems, Exergy, Thermoeconomy

Cogeneration in Agriculture

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Abstract

In agriculture power and heat are very important. Cogeneration means producing power and heat at the same time, with higher efficiency and compactness, and lower emissions levels than conventional heating and power generation alternatives. Agriculture has the potential of producing renewable fuels and energy such as biogas, biodiesel, biomass, solar energy, etc. In this study, the application of cogeneration systems in agriculture is analyzed. Micro cogeneration systems and the technical and logistical problems associated with other cogeneration systems are also investigated. It is found that the energy efficiency and the exergy efficiency can reach about 90 % and 50 %, respectively.

Keywords: Cogeneration, Power and heat, Agriculture

A Dual Ultra-Wideband PIFA Design

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Abstract

A compact PIFA (Planar Inverted F Antenna) design ($40 \times 60 \times 10.71$ mm^3) based on Split-Ring Resonators (SRRs) with meandered slots is presented for dual and Ultra-Wideband (UWB) applications. The antenna includes WLAN, DCS 1800, PCS 1900, IMT-2000 and GPS bands with UWB and dual frequency characteristics between $1.72 - 2.43$ GHz and $3.46 - 9.73$ GHz frequencies. Two concentric SRRs with meandered slots are used as main radiator of the antenna to achieve miniature compact antenna configuration providing dual ultra-wideband performance. The location of the paths between SRRs are chosen to obtain fine frequency tuning. The feeding and shorting plate width optimizations are also utilized for UWB design. In addition, the meandered-shaped lines on SRRs ensure extra miniaturization by extending the current path. They can easily tune frequency response as well as help a small bandwidth enhancement. The maximum realized gains of the antenna are about 3 and 5 dB for the first band and UWB band, respectively. While the proposed antenna exhibits directional and uniform radiation pattern at the first band, the pattern is generally omnidirectional and non- uniform for the UWB band.

Keywords: Dual band, Meandered-shaped lines, PIFA, Split-ring resonators, UWB band.

An Effective Interleaved Model Flyback Converter Design for PMDC Motor Control

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Abstract

In this study, a low cost, small size and flexible DC converter is developed. The designed system has high power quality, superior dynamic performance, galvanic isolation and high yield. It has been decided to develop a flyback-based system as a converter that will drive a Permanent Magnet DC motor at high power and high efficiency. In order to achieve high power and low noise levels in the flyback architecture, a number of parallel-connected transducers working with the appropriate phase difference work together and use a method known as "interleaved operation" in the literature.

Keywords: Interleaved model flyback converter, PMDC motor, DC converter.

A Research on Cogeneration Systems in Energy Systems

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Abstract

Energy is such important factor of our lives. Cogeneration systems are one of the most efficient forms of energy source. Cogeneration systems are generally used in factories to generate electricity and thermal energy from an energy source. The fact that the factories themselves use their own electricity supply systems is a major contributor to the country's economy.

Cogeneration means that electricity and heat energy are produced together. These systems have two different applications, gas turbine and gas engine. Cogeneration systems are more efficient than traditional systems (systems where electricity and heat energy are generated separately). The efficiency of cogeneration systems is around 80-90%. Therefore, the use of Cogeneration Systems provides great advantages.

Keywords: Cogeneration, turbine, gas engine, yield.

Contemporary New Media Design

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Abstract

New media art; using developing media technologies, interested in the cultural, political and aesthetic possibilities of these tools; It is an art form that covers the whole of expressions such as "Digital Art", "Computer Art", "Multimedia Art" and "Interactive Art".

The roots of the new media art can be attributed to moving photo inventions such as Zoetrope (1834), Praxinoscope (1877) and Eadweard Muybridge's Zoopraxiscope (1879), which appeared towards the end of the 19th century. From 1920 to 1950 different forms of kinetic and light art, Thomas Wilfred's 'Lumia' (1919) and 'Clavilux' light organs, and Jean Tinguely's self-destructive 'Homage to New York' (1960) can be shown as pioneers of art (1). The newest forms of creativity and communication are reached by the new media programs, and what is new or not in certain technologies are being realized in these conditions, science and markets always create new platforms for designers.

In this research, it is aimed to understand the new communication environments by considering the human computer interaction field. For this, an exploratory study was done in the literature and the dimensions of the present development process were examined by reinforcing the emergence stages of the new media art with examples from the leading artists.

Keywords: New Media, Digital Media, Augmented Reality, Projection Mapping, Projection Sending, Synchronized Frame, Video Mapping, Zoetrope, Praxinoscope, Zoopraxiscope.

The Effect of Leonardite and Organic Marine Algae (Coralline) on the Grawing of Beans and Physico - Chemical Properties of the Soil

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Abstract

In this study, effects of activation of the liquid and solid compost from Leonardite and coralline, which grows up naturally in the coasts of Giresun, on the physico - chemical features of the soil and on the growth of bean plant (Phaseolus vulgaris) has been researched.

ICP-MS was used for analysis of metals. These compinations were applied to bean plants. The beans were planted with a depth of 5-6 cm, 30 seeds / m2 manually. Except the control group, in the other pots according to trial groups, 100 g leonardite, 100 g Ulva lactuca compost, 100 g Cytoseira barbata compost, 200 ml Ulva lactuca liquid and 200 ml Cytoseira barbata liquid fertilizer were added. During the first planting, half of liquid fertilizer was added, the other half being added after 45 days.

Soil samples were analyzed right after harvesting the final product, the highest values according to the final product, the highest values compared to the trial groups, were found as % nitrogen UKG and CKG: 0,033, Sodium LG: 63 ppm, potassium UKG: 357 ppm, magnesium LG: 1926 ppm, calcium LG: 1402 ppm as were found however LG was found highest in Mg, Ca, Fe, Cu, Zn periodic table. As a result of metal analyses in bean plant, Pb was found as the highest in USG group. A longer-term study will be more decisive in terms of yield.

Keywords: Leonardite, Beans (Phaseolus vulgaris), Compost, Ulva lactuca, Cystoseira barbata, ICP-MS, Fertilizer

Review of the Heavy Metal Accumulations in Marine Invertebrates from Turkey's Coastline

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Abstract

A lot of agricultural, shipping, industrial, and recreational practices have been carried out in countries the surrounding Turkey's seas. Therefore, Turkey's coastline has been exposed to the pollutants which are directly and indirectly affecting to marine organisms. The aim of this was to assessment the heavy metal accumulation levels of marine invertebrates by reviewing the studies conducted over the last two decades in Black, Marmara, Aegean and Mediterranean seas. For this purpose, 47 research articles and 5 theses performed on these seas related to marine invertebrates were reviewed. Thus, the time-dependent changes of heavy metal accumulation in marine invertebrates from these seas were assessed in view of environmental health.

Keywords: Invertebrates, Heavy Metal, Turkish Seas, Environmental Health, Review

Effects of Hazelnut Husk on the Quality of Eisenia foetida Fertilizer

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Abstract

An average of six hundred thousand tons of hazelnuts are harvesting every year in our country, therefore hundreds of thousands tons hazelnut containing a lot of nutrients are getting lost. The red worm fertilizers including vitamins, minerals, growth hormones, microorganism and enzymes are an important soil improver and nutrient material. The aim of this study is to investigate the effects of hazelnut husk on the quality of worm fertilizer. For this purpose, mixtures at different ratios of hazelnut husk and cattle manure compost were prepared and given as food to the red California worm (Eisenia foetida). After the urea removed, cattle manure and hazelnut husk were fermented separately and obtained five different diets. The experiment was set up in a randomized complete block design with five treatments that were replicated three times. Fifteen plastic containers were used in this experiment. Five hundred red worms were added in every plastic container. Total N, organic C, Ca, Mg, Fe, Cu, Zn, Pb, Se, Mn, Cd, Ni, As, Cr, organic matter, total P, pH, EC, Na, salt, soluble potassium oxide, total (humic + fulvic acid), lime and boron in red worm fertilizer and food groups were analyzed to determine the quality of the obtained fertilizer. Data were subjected to statistical analysis by SPSS packet program and the results were evaluated.

Keywords: Hazelnut husk, Eisenia foetida, Vermicompost, Fertilizer

Microwave Curing Process on Polymer Composites

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Abstract

Microwave rapid curing processing has great potential for improving composite manufacturing such as reduction of curing time, energy requirements and operational costs. In this study, pre-waiting time and curing time effects on epoxy based polymer composites with and without fillers were investigated during a microwave curing process. Quartz sand was used as filler material. After prefabrication of polymer samples with and without fillers, the samples were left waiting for pre-curing for 0-90 min. In addition, the power of microwave curing was altered to be either 100W-800W. Other polymer samples were cured at the laboratory for several days to comparison. Mechanical properties such as tensile strength, strain and hardness were determined on all polymeric samples. Results show that subjecting polymer materials to microwave treatment instead of keeping them at room temperature for 7 days yielded similar or higher tensile strength, hardness and impact toughness values in a shorter time.

Keywords: Microwave; curing; polymer; pre-waiting time

Investigation of the Reduction of Sulphate Content in Anhydrous Borax Production

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Abstract

Anhydrous borax is one of the best chemicals that hydrolyse hydrogen and release hydrogen is an important compound as raw material in the production of sodium borohydride. In this study, Eti Mine Operations General in Kırka District of Eskişehir Province Sulfate which is the end product energy parameter in Kırka Boron Operations Directorate Laboratory scale studies have been carried out to reduce the content. Chemical (SEM, EDX, XRD and XRF) analyzes were performed on the produced product. As a result, anhydrous borax as mass fractions containing the following components ($Na_2B_4O_7$) was obtained; 68.24% B_2O_3 and 30.38% Na_2O.

Keywords: Anhydrous Borax, Sodium borohydride, SEM, XRD

Behavior of Borided Reinforced Rebar Under Rapid Corrosion

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Abstract

The serviceability and ultimate strength of concrete elements within reinforced structures are affected negatively due to corrosion of steel bars. Many studies have been carried out on the different type of corrosion of steel bars. However, very few studies have investigated the effects of confinements on the degradation of coated steel with boron when exposed to corrosion. In the present paper, investigations were carried out to study the corrosion behaviour of protected low carbon ribbed reinforcing steel with boron in concrete. The ribbed steel bars were in constant size and they were coated with boron. They were embedded into the concrete and exposed to rapid corrosion test. Weight loss method was used for estimation the corrosion rate in the current study. The results show that the corrosion rate and cross section loss of protected steel bars decreases when compared to unprotected rebars.

Keywords: Rebar, corrosion, protection, boron.

The Effect of Torque Limiter Use on the Movement of the Drive Shaft in Hinged Steel Belt Conveyor

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Abstract

In this study, it was investigated how the torque limiter which is in the bearing system for hinged steel belt conveyor affects a shaft rotation motion. Torque limiter is consist of a bolt, a sprocket that is in contact with the chain, a nut socket which has the key lock relationship with the torque limit setting key, a shaft, two pieces disk brakes and disk springs. The system is powered by power motor. In this system, the torque limit nut is set to torque 75 Nm with the torque limit setting key. The system was observed to continue to work. If there was a jam in the system chain for any reason, the force in the system has exceeded 75 Nm. In that case, the disk springs in contact with the brake disk was getting flattened. Two brake disks squeezed the sprocket in the torque limiter system between them. The shaft and sprocket connection is cut off. The sprocket continued to rotate around itself and the shaft remained motionless. The following conclusion was drawn from this study; when the torque limiter is used in the system, the shaft was prevented from breaking due to excessive force.

Keywords: Torque limiter, hinged steel belt conveyor, shaft

Potential and Utilization of Woody Biomass in Turkey

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Abstract

Biomass is the major source of energy in rural Turkey. Among the biomass energy sources, woody biomass seems to be the most interesting because its share of the total energy production of Turkey is high at 11%. Turkey's annual biomass potential is about 120 million tons and the total biomass energy potential is about 36 Mtoe. The amount of usable biomass potential of Turkey is approximately 18 Mtoe. Turkey has the potential to produce 4.0 million tons of wood pellet has approximately 780 million dollars of market value by the help of existing woody biomass. Producible wood pellet could account to 1.4% of total primary energy consumption in 2014 and 1.38% of imported energy. If Turkey utilized existing woody biomass as wood pellet, this would represent a saving of 340 million dollars from energy imported in 2014. The capacity for wood pellet production in Turkey is quite low, due to its high cost. Therefore, relevant institutions should launch more projects to promote the production and consumption of wood pellet. International pellet standards should be adopted, and private sector should be encouraged by government.

Keywords: Biomass, Bioenergy, Energy forestry, Pellet production, Turkey

Characterisation of Copper Based Bioceramic Coatings on Titanium

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Abstract

In this study, at the first step, the commercial pure titanium (Grade-2) was coated by micro arc oxidation (MAO) in solution, consisting of sodium phosphate and potassium hydroxide. And then, at the second step, a copper (Cu) nano-thin film layer that had an average thickness of 1 nm was deposited on the MAO surface by thermal evaporation-physical vapor deposition (TE-PVD). The phase structure, surface morphology, elemental composition and wettability of the coatings were characterized by XRD, SEM, EDS and contact angle goniometer, respectively. The XRD results indicated that anatase and rutile were detected on the surface after MAO and MAO+TE-PVD. Both coatings' surfaces were rough and porous due to the existence of plasma chemical reactions on micro discharge channels. The Cu-based MAO coating exhibited much more hydrophilic character than the MAO coating. The Cu was homogeneously distributed through the surface.

Keywords: Bioceramic Coatings, Copper, Titanium

Investigation of Copper Incorporated Ceramic Coating on Titanium

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Abstract

In this study, a Cu (copper) thin film layer nano-layer that had an average thickness of 25 nm was deposited on cp-Ti (Grade-2) by physical vapor deposition - thermal evaporation (PVD). And then, Cu-incorporated titanium surface was coated by plasma electrolytic oxidation (PEO) in solution, consisting of sodium silicate and potassium hydroxide. The phase structure, surface morphology, elemental composition, wettability and surface topography of both coatings were characterized by XRD, SEM, EDS-mapping and contact angle goniometer respectively. The XRD results indicated that anatase and rutile were detected on the surface after PEO and TE+PEO. Both coatings' surfaces were rough and porous due to the existence of plasma chemical reactions on micro discharge channels. The Cu-incorporated PEO coating exhibited much more hydrophilic character than PEO coating. The Cu was homogeneously distributed through the surface.

Keywords: Copper Incorporated, Ceramic Coating, Titanium

Enhancement of Light Transmission through Random Metal Thin-films Near the Percolation Threshold

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Abstract

In this work, we report the absorption and transmission properties of thin copper and gold films deposited on glass produced by laser ablation; said films are analyzed as a function of the material deposited (measured by the number of pulses). Thin-films produced in this fashion are deposited in a random fashion and slightly below the percolation threshold.

It has been found experimentally that upon approaching the percolation threshold the light experiences an enhancement in transmission, and it is hypothesized that this is due to the surface plasmon polariton of the metal; this finding is at odds with the observed transmission of light in related $TiO_2/Cu/TiO_2$ multilayer systems, in which such enhancement does not happen, even though the same amount of copper has been deposited compared to the copper-only samples.

To better understand the observed phenomena, a host of numerical calculations with the open-source DDSCAT software have been carried out to simulate the optical behavior of the copper films: transmission simulations across a set of random islands show an enhancement in transmission consistent with the experiments (similarities and differences between experiment and numerical calculations are discussed); this enhancement is independent of the size of the unit cell; also, when the occupation rate of the islands is varied the qualitative behavior of the transmission is unchanged; simulations with different metals are also analyzed.

Finally, the potential of these films as sensors is explored.

Keywords: Thin copper films, Gold films, Sensors, Percolation threshold, Laser ablation

Renewable Technologies for Sustainable Energy Future

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Abstract

Renewable energy, together with energy efficiency, is essential to delivering the low-carbon energy future. At the Paris summit in December 2015, 196 countries will meet to sign a new climate change agreement. Despite low energy prices, 2015 was a year full of records for renewables. For example, cumulative installed renewable power capacity now exceeds that of coal. Deployment is driven by supportive policies that aim not just at decarbonisation, but also at improving energy security and reducing harmful local air pollution. Recent cost reductions for onshore wind and solar PV are impressive and were unthinkable just five years ago. This cost reduction trend, which is expected to continue, will be a key factor in driving renewable deployment. In order to reduce dependency on imported expensive fossil fuels, Turkey should be used the renewable energy sources, because they are domestic and abundant. However, considering the total cost of renewable energy production, these sources can be used not to replace the fossil fuels, but to supply energy requirement in the country. Renewable energy is being pointed as a potentially significant new source of jobs and climate change mitigation. This study presents the discussion of the renewable potential and utilization for sustainable energy development. The present study shows that there is enough renewable potential for meeting the global energy and electricity demand.

Keywords: Energy demand, Renewable sources; rural energy; sustainable development

Electric Energy Potential of Animal Wastes in Sivas Province

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Abstract

Along with the rapid growth of the countries in terms of industry and population, the energy demand in the countries is increasing day by day, especially in the world, with significant progress in the world. The increase in energy demand leads to the reduction of natural energy resources such as fossil fuels, coal, petroleum coke, lignite and natural gas. Therefore, it is necessary to increase the researches on energy production from renewable energy sources and to make efforts for energy production in the end. One of the varieties of renewable energy sources is biogas. Biogas is a gas that can be produced in an oxygen-free environment in organic wastes under certain temperature conditions. In this study, potential of electricity energy which is the counterpart of the biogas energy that can be produced from the fresh fertilizers of cattle and sheep animals of Sivas Province has been determined. Energy potential of 148,163 MWh/year, which can be produced from bovine waste, and 89,486 MWh/year, which can be produced from small cattle.

Keywords: Biogas, Electric Energy Potential, Animal manure.

Control of Inverter for Stand-Alone Wind Energy Systems

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Abstract

One of the important components of renewable energy sources is the inverters. They can be designed in different shapes and types according to the needs of both the structure and the changing needs. Wind energy systems are one of the renewable energy sources that have been used in recent years, with considerable improvements in their use. Wind energy systems can be installed in two different ways, depending on the grid (grid-connected) and independently of the grid (stand-alone). Stand-alone wind energy systems are more suitable for remote place where the grid cannot penetrate and where there is no other energy sources. In this study, the design and simulation of the inverter to be used in a stand-alone wind energy system is performed. The results obtained by properly controlling the semiconductor circuit elements constituting the inverter are discussed in detail.

Keywords: Inverter, Wind energy systems, Stand-alone, Control.

Choosing and Modelling of Chopper for Renewable Energy Sources

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Abstract

Different types of choppers can be used according to the needs of renewable energy sources. Renewable energy sources such as solar energy, wind energy and hydrogen energy are made up of different components. The structure of each installed system is different. Because of this, choosing the right chopper can significantly affect the performance of the system to be installed. For this reason, different chopping topologies are used for each. These choppers are aimed at increasing their activities at the same time as trying to reduce errors by controlling them with different control techniques. In this study, different chopper circuits have been designed and studied taking these situations into consideration. Simulations of the choppers are performed in the MATLAB / Simulink environment.

Keywords: Renewable energy sources, Choppers, Control techniques.

The Effects of Using Different Solar Cells in Solar Energy Systems

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Abstract

When they were first invented, many improvements were made to solar cells as much as the day-to-day. As a result, the efficiency of solar cells has reached much higher values, such as 33%, from very low values. This rate is rapidly increasing due to the many different chemical and surface coating technologies used. In this study, the effects of different types of solar cells on electrical energy generation systems are being investigated. A comparison of solar cells with respect to cost, ease of use, high efficiency and electrical effects has been made according to these criteria and the situation is presented in a table.

Keywords: Solar cell, Solar energy systems, Electrical energy generation.

Simulation and Control of Permanent Magnet DC Motors

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Abstract

Permanent Magnet Direct Current Motors (PMDCM) are advanced electric machines used in speed control applications and where position control is important. Therefore, there are many applications on the simulation and control of these machines. In this study, simulation is performed by using the detailed mathematical equations of PMDCM and control is performed by using fractional PID. Simulation studies were performed in MATLAB / Simulink environment.

Keywords: Permanent magnet DC motors, PID, Fractional PID.

Seasonal variations of Heavy Metal Accumulation in Brown Algae from Giresun Coasts

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Abstract

In this study, heavy metal accumulation in Brown Algae collected from Giresun Coasts, Black Sea was investigated. Levels of lead, chrome, manganese, iron, cobalt, nickel, copper, zinc and cadmium in Cystoseira barbata seasonally collected from three different stations were analyzed and compared with previous studies. Analysis were performed using microwave digestion and ICP-MS. Statistically significant differences were observed between seasons and stations ($p<0.05$). The results of this study were assessed in view of environmental pollution and health.

Keywords: Brown algae, Heavy metal, Black sea, Season

Using Mobile Applications for Learning Foreign Language

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Abstract

The development of smartphones has made it possible to access the Internet, as well as a multitude of applications that are oriented to a specific topic. The rapid development of modern mobile technology implies the creation of new mobile applications, better quality. A large number of applications that find wide application appear. The accent in this paper is precisely on applications that are applied for educational purposes. The paper describes the applications that help people to learn foreign languages. Many of them have found their place in educational institutions, while some are used for informal improvement of a particular foreign language.

Keywords: Mobile learning, Mobile technology, Foreign language learning, Mobile applications.

The Influence and Importance of Bitcoin Asdigital Currency

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Abstract

This paper analyzes the role of Bitcoin in the financial market, the cost-effectiveness of investing in Bitcoin and the future of this digital money. In order to understand the functioning of crypto-currencies and didgital money, certain IT knowledge is needed, but their use and use are relatively simple. This paper presents the functions of Bitcoin and its investment potential. By examining the relevant functions of the cryptographical elements and processes in this research, the overview and characteristics of digital currencies are presented, with a special emphasis on the explanation of Bitcoin as the most cost-effective crypto-currency of today.

Keywords: Electronic money, Crypto-currencies, Bitcoin, Mining.

Acquiring and Developing Musical Abilities Using by Mobile Technologies

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Abstract

Mobile devices have long been recognized as having the potential for musical expression. There have been a rapid development over the last few years and first performances using mobile phones as the main musical instruments have emerged. This paper introduces three mobile applications that allow users acquiring and developing the musical skills and provide a convenient means to learning and playing music through the mobile devices. Particular attention is paid to interactivity with users. Also, mobile applications presented in this work can be used in music teaching and learning from elementary to higher education. Students can learn music effectively through game-based musical quizzes and musical exercises. Mobile applications provide a few levels og e-learning platform for music learners.

Keywords: mobile learning, learning music, applications of mobile devices, musical abilities.

A Research on Improving the Performance of Electric Pedicab Using Brushless DC Motor

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Abstract

As is known, many scientists work to reduce the negative effects of fossil fuel-powered vehicles on the environment. These studies mostly focus on the dissemination of electric vehicles. Electric vehicle technology, which is used in some countries in urban transportation and is called pedicab, is renewing itself. At the beginning of these innovations, the efforts to increase the performance of Electric Pedicab by using Brushless DC Motor become important. This study is a research on performance analysis using Brushless DC Motor.

Keywords: Electric pedicab, Brushless DC motor, Li-Ion battery, Performance analysis.

Green Synthesis of FeO, ZnO and Cu doped ZnO Nanoparticles

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Abstract

Iron-oxide nanoparticles (NPs) are synthesized by the Green Chemistry method, using Goosberry leaves extract as reducing agent. Whereas pure and copper-doped zinc oxide NPs has been synthesized, hydrazine is used as reducing agent and aqueous extract of Euphorbia milii plant as capping agent. The characterization of nanoparticles was carried through UV-Vis, SEM, EDX, XRD, FTIR, CV, PL and DRS.

UV-Vis confirms the formation of iron oxide nanoparticles. SEM verifies the spherical morphology of the nanoparticles. Elemental composition was determined by the EDX. XRD peaks details the spinal state crystal structure of the as-synthesized iron-oxide nanoparticles. CV results confirm the electrochemical nature of the iron-oxide nanoparticles useful for biosensing. Finally, Bioassay tests reveal that iron-oxide nanoparticles can be potent candidate to be used as biosensors.

In ZnO main objective of the work is to investigate the effect of copper doping on crystal structure of ZnO nanoparticles; to study the effect of copper doping on optical band gap of ZnO nanoparticles and photoluminescence (PL) study of pure and copper-doped ZnO nanoparticles. To achieve the aforementioned objectives, XRD and SEM tests were performed for the identification and confirmation of crystal structure and morphology of the prepared samples. From XRD data the average grain size for pure ZnO was observed to be 24.62 nm which was first decreased to 18.95 nm for 5 wt% Cu-doped sample and then it was found to increase up to 37.80 nm as the Cu doping was increased to 7 wt%. Optical band gap of pure and Cu-doped ZnO nanoparticles was calculated from diffuse reflectance spectroscopy (DRS) spectra and was found to decrease from 3.13 eV to 2.94 eV as the amount of Cu increases up to 7 wt%. In photoluminescence study, PL technique was used and enhanced visible spectrum was observed. For further characterization FT-IR and EDX tests were also carried out.

Keywords: Green Synthesis, FeO NPs, ZnO NPs, Cu doped ZnO NPs

Agent Based Computational Models

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Abstract

Agent base modelling is (ABM) a popular computational model used in simulation of actions of individual or collective organisations of groups to assess their impact to the system. Therefore, ABM can find implication in many fields such as engineering, mathematics, physics, biology, ecology, medicine, game theory, complex systems, economic, social sciences etc. With the global financial crisis in 2008, mainstream approaches in the economy began to be questioned. The mainstream approach has become more open to debate, especially when this crisis cannot be predicted and rapid solutions for the exit from the crisis cannot be produced. In this context, in this study, the Dynamic Stochastic General Equilibrium Model (DSGE) which was used before the crisis in macroeconomics and the ACE (Agent Based Computational Economics) model, which was used after the crisis, were examined comparatively. The assumptions, practices and results of the models are discussed. The two models in question are compared, their advantages and disadvantages are addressed. Recent developments in the models have also been discussed, and the proposals and criticisms brought to the model are also included. There are also examples from the relevant literature in order to see their use in practice.

Keywords: Agent Based Models, Computational Economics and Dynamic Stochastic General Equilibrium Models

Models and Methods of Resource Management in Crop Production Portfolios

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Abstract

The purpose of the study is to increase the efficiency of management of portfolios of agricultural enterprises projects by developing methods and models of portfolio management by the industrial and technical resources that take into account the limited amount of these resources at enterprises, and also properties, production technologies and the risk of product losses in projects. To achieve this goal, we need to fulfill the following tasks: to analyse the peculiarities of agricultural production projects in Ukraine and in the world and valid methods of managing by production and technical resources in project portfolios; to substantiate the principles of a systematic approach to portfolio management by the industrial and technical resources in projects of agricultural enterprises; to develop a method of portfolio management by industrial and technical resources of agricultural enterprises taking into account the risk of product losses in these projects, to develop a model for forecasting of the product losses in agricultural production projects, to develop an information and analytical system of portfolio management of agricultural and industrial resources of an agricultural enterprise, to carry out its testing and to introduce it in the production . The main indicators and functions of project management systems are formulated in relation to projects for the production of agricultural products and the degree of its implementation. The production system is characterized by the following indicators: the quantity of product of each project (q), product loss (bz), production costs (s), performance indicators of the use of a plurality of industrial and technical resources ({ewt}). The method of selecting the rational composition of technical resources for each project work using a neural network is developed. A model of organized graphics calendar of projects portfolio is developed. Portfolio Management Resources Algorithm is developed. The model for defining product project losses due to untimely execution of works in the projects is constructed.

Keywords: Agricultural enterprises project, Production system, Portfolio management, Industrial and technical resources, Neural network

Substantiation of Parameters and Operational Modes of Air Solar Collector

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Abstract

The new design of an air solar collector for a fruit dryer including double glazing and a selective surface made of a thin metal substrate with inlet and outlet openings on its bottom was developed. We established that it is necessary to use a glass with a heat-reflecting coating of a solid K-glass type with a radiation coefficient ε=0.1...0.15 for a double-glazing substrate. This makes it possible to obtain the widest possible spectrum of direct sunlight rays that irradiate a surface of an absorbing plate and reduces a diffuse component of radiation, which ensures an increase in efficiency of a solar collector.

Regularities of the influence of a change in flow speed of a heat-transfer agent, a temperature drop, and radiation intensity on power of a solar collector were determined. We established that energy illumination E, which is from 377 to 1,223 W/m^2, affects heat output of an air collector Q=117...480 W significantly. Use of a non-selective absorbing surface in an air solar collector with a low insolation level E=377 W/m^2 makes it possible to increase efficiency by η=70.7 % more for selective, and at a large energy illumination of E=1,000 W/m^2, on the contrary small η=54.6 %. This makes it possible to explain how redistribution of the ratio of the maximum current thermal power (NSC=48.8...100 W) and efficiency of an air solar collector occurs.

One can use the obtained results in development and improvement of technical means for fruit drying to improve technological and energy efficiency of the process.

Keywords: Air solar collector, Double glazing, Metal substrate, Inlet and outlet openings, Component of radiation, Energy illumination.

Improvement of Additional Cleaning of Rapeseed and Perennial Grasses

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Abstract

The work deals with the separation of rapeseed in an electric frictional separator. It highlights the main problems of its post-harvest processing. The theoretical analysis of the process of separation and the main adjustable parameters that affect the movement trajectory and the descending coordinates of seed mixtures components with the working surface of electric frictional separator was conducted.

The results of theoretical researches of winter rape seed mixtures separation process on an inclined plane with electric field determine the effects of adjustable parameters - the angle of inclination of the plane α (degrees), its velocity VП (m/s) and the electric field E, (kV/cm) at the trajectory and the coordinates of components' descend of the seed mixtures. The most significant impact on the action of the seeds that are on separation plane has the value of the electric field in the working area of the separator. As the cultivated seed and weeds belong to different species, their electrical properties are different. It is due to this factor it is possible to change the value of the electric field in different ways to influence the interaction forces of the components of seed mixtures with electric separator's working body as a condition of their effective separation. Justificated geometrical parameters of the separating plane of electric frictional separator greatly affect the quality of separation efficiency of the process and can serve as a baseline for the development of design production samples of this type of separators.

Keywords: Additional cleaning, Rapeseed, Seed mixtures component, Perennial grass, Electric frictional separator.

Grounding of Tractor and Machine Unit Composition in Projects of Agrarian Production

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Abstract

Forming of machine-tractor units in the project development of agrarian production foresees taking into account many varies factors which influence on maintenance parameters of these units. To solve correctly such a practical task one had to develop or use appropriate informational technologies (algorithms, soft etc). To form correctly the machine-tractor unit using the neural network in the view of multilayer perceptron is proposed. The action of agro meteorological conditions predetermines the possible character of the majority of events and mechanized works in agricultural projects.

As the results of statistical and imitation modeling we can get some functional indexes for the realization of projects, programs and portfolios. There are: amounts of timely and untimely executed mechanized works, project lifetime cycles, operational expenses of human, energetic, material and technical resources, and a using coefficient for fund of time for machine units. Each of these indexes is characterized by some theoretical division and appropriate assessments of its parameters. The dependency assessments of these parameters and assessments of mathematical expectations from parameters of technical and technological equipment in agricultural projects is the main basis to substantiate management decisions for changing parameters of this equipment (Tractor and Machine Unit Composition). Opposing trends such functional indexes change of projects as amounts of untimely executed works, and a using coefficient for fund of time for machine units help to determine rational (optimal) parameters of this equipment.

Keywords: Machine-tractor units, Project development, Agrarian production, Neural network, Multilayer perceptron

Mathematical Models of Geometric Sizes of Seeds as Dependent Random Variables

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Abstract

Dimensions of 100 randomly selected wheat seeds of the Smuglyanka variety, rye seeds of the Puhovchanka variety and barley seeds of the Pejas variety were determined by measuring their length (l), width (b) and thickness (h). Results of the measurements were processed by the methods of mathematical statistics; parameters of distributions of individual sizes as random variables were calculated. On the basis of values of variation coefficient, the density function of normal distribution (Gaussian distribution) was taken as a model of individual sizes of seeds. Models of two-dimensional distributions of seed sizes as independent random variables were presented. Correlation coefficients between geometric sizes of seeds were calculated. Obtained values of the correlation coefficients indicate that the geometric sizes of seeds should be considered as dependent random variables. Mathematical models of geometric sizes of studied cereal crops' seeds as dependent random variables in the form of density functions of their normal distribution were proposed. By values of the sums of squared deviations as a fitting criterion, it was established that the mathematical models of geometric sizes of seeds as dependent random variables in the form of density functions of their normal distribution provide better data approximation than the mathematical models of geometric sizes of some cereal crops' seeds as independent random variables.

Keywords: Mathematical model, Seed size, Dependent random variable, Density function, Normal distribution

The Method of Coordination of Start Time of Sugar Beet Harvesting with the Production Area of Sugar Beet Harvester

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Abstract

The questions of production and technological risks management in projects of sugar beet harvesting are considered on the basis of research of the regularities and risk of the integrated functional indices of these projects due to coordination of the harvesting work start time and the stochastic development of the meteorology and substantive components of the project environment. The new methods, models and procedures are developed that considered following peculiarities of probable features of the meteorology and substantive components of the project environment, risk of basic events as to qualitative and quantitative changes in substantive terms, their causal effect and the total influence of effectiveness factors in the sugar beets harvesting project. The results of production observation and computer experiments are obtained, analyzed and summarized. The influence of the starting time of beet harvesting on the functional changes and risk of integrated functional indices of sugar beets harvesting projects are determined and the possibility of production-technological risk management on the base of optimum value grounding are proved. The information-analytical system algorithm of production-technological risk management is created. The risk of optimal work start time of beet harvesting are quantified as well the integrated functional effectiveness indices of sugar beet harvesting projects for agro-climatic conditions of the region is proposed.

Keywords: Technological process, Sugar beet, Harvesting, Simulation, Model, Technical support.

Mathematical Models of the Distribution of Liquid Spray

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Abstract

The subject of the research was the influence of parameters of the spraying process on its quality. The impact of the following parameters: type of nozzle and pressure (present as droplet size) [μm], air flow speed vw [m·s-1], set nozzle in a longitudinal plane, perpendicular to the ground γ [°], spray boom height [m] on longitudinal precipitation of liquid indicator [ml] were studied. The following parameters of nozzles' work were used for the research: nozzle: IDKT12003. DF 12004, pressure: 0.2; 0.3; 0.4 MPa, height of boom: 0.5; 0.6 m, set nozzle in a longitudinal plane. perpendicular to the ground: 0°, 5°, 15°, 25°, air flow speed: 0; 1.5; 3.0; 4.5; 6.0 $m \cdot s^{-1}$. For each combination the type of spray and the pressure of the spray liquid were measured by the droplet size by diffraction. The data set was divided into two subsets: 80% dataset (192 vectors) for learning and 20% (48 vectors) for monitoring. Two neural models were used: Multilayer perceptron MLP trained by a backpropagation algorithm combined with genetic algorithm; Adaptive network-fuzzy inference system ANFIS. Input model parameters: droplet size [μm], air flow speed vw [$m \cdot s^{-1}$], set nozzle in a longitudinal plane. perpendicular to the ground [°], spray boom height [m]. Output model parameter: longitudinal precipitation of liquid indicator [%]. Two mathematical models based on artificial neural networks were developed: ANFIS and MLP, and one mathematical equation. Presented models were of high accuracy and can be used in real world applications. However, a little higher R2 values and lower RMSE values were calculated for MLP neural model.

Keywords: Spraying process, Type of nozzle, Pressure, Droplet size, Air flow speed, Mathematical model.

Deposition of Liquid and Degree of Coverage of Sprayed Objects for Selected Double-stream Nozzles

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Abstract

The situation with pesticides using will not change in the near future as there is no method which would substitute the present one, and without the use of pesticides the value of crops will drop dramatically (even 70%). Today the pesticides must be used where necessary, in such amount, which is necessary, without harming the environment and consumers. General requirements for pesticides: high toxicity to other pests, low toxicity to other living organisms, adequate durability, high susceptibility to degradation. Aim of the study – the impact of the nozzles used on the deposition of liquid and degree of coverage of sprayed objects.

The quantitative analysis of the fluorescent label extracted from the probes (Briliant Sulfo Flavine) was conducted using the luminescence spectrometer (Perkin Elmer LS55) in the Institute of Horticulture in Skierniewice. Parameters and conditions of are next: spray speed – 8 km/h, nozzles – double stream CVI TWIN 11002, DG TJ 60 11002, pressure liquid – 0.2 MPa, height of the nozzles – 0.5 m, spraying objects - upper level (Apog), lower level (Apod), vertical transverse leaving (Aoj), vertical transverse approach (Anj), vertical longitudinal right (Abp), vertical longitudinal left.

Analysis of the obtained results showed that the coverage depends on the type of nozzle used. Higher values of coverage and deposition of horizontal objects were noted using standard double flat fan nozzles. Evaluation of the correlation of dependence the degree of coverage and deposition of liquid with linear regression showed very strong correlation between these qualitative indicators of the procedure.

Keywords: Nozzle, Coverage, Deposition of liquid, Sprayed object

Crusher with a Cross-cut Disk

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Abstract

The goal was to develop a structure model, i.e. the form, dimensions and tolerances of the geometrical, material and dynamic elements and the mill assembly of the mill without and with a fixed plate. The process characteristics were verified for the purposes of intelligent development of an innovative roller mill with a slab between grinding bars in the grinding of grained biomass. Mathematical functions of efficiency, power demand and unit energy consumption were determined as knowledge resources supporting intelligent development of innovative grinding of seeded biomaterials: ideas, design, process parameters and, above all, product quality, process efficiency and innocuousness of the product and the process of roller grinding with a solid plate.
The engineering of intelligent development of the idea, structure and parameters of the process of cylindrical grinding of grained biomass is a vast issue that arises on the basis of the fragmented experience of technical sciences and the achievements of cognitive science. Approximately, in the conditions of cylindrical milling with the slab separating plate, the indications and possibilities of solving some of these problems, and especially the improvement of the construction and operational characteristics of the process are proposed. The aspect of cooperation between the makers and producers of shredders, measuring devices in the standardization of databases, consistent methodology / measurement techniques and research can be developed for the food, feed and energy industries.
When designing future intelligent grinding systems, one cannot forget about the classic theory of construction, control or systems engineering, which are irreplaceable in issues related to stability and resilience - that is, the safety of processing energy carriers. Developed mathematical apparatus, methods of analysis and synthesis of control structures, working in the feedback loop, modelling and identification algorithms, stability theory, optimality theory - all these issues are constitute knowledge for intelligent development.

Keywords: Structure model, Grain, biomass, Grinding, Cylindrical milling with the slab separating plate.

Study of Strength and Energy of Rice Grains Grinding

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Abstract

The aim of the research is to experimentally determine the strength properties of granular biomass (rice) accepted for research in the research project "Intelligent monitoring of the characteristics of grinding of grained biomass". Determining the forces needed to break grains is of key importance when developing energy and environmental efficiency indicators for the shredding process.
The following tests were carried out: determining of minimum force causing cracking, determining of maximum force during crack growth, N, determining of stress induced by Fmin force (in fact, compression strength Rc), MPa, determining of stresses caused by force Fmax, MPa, the work performed over the grain until the first crack, J. Mean values and ranges of variability for the studied values are presented. The correction factor kv of the grain volumes was formulated and determined experimentally.
Strength properties of grains have a significant impact on the energy demand of grinding mills. The paper presents the results of tests of strength and energy needed for destruction of rice grains. The research aim was to experimentally determine the strength properties and energy of grinding the rice grains. On the basis of the experiment, the forces and energy needed to break the grain were determined and the ranges of variation of these parameters were obtained.

Keywords: Rice grain grinding, Strength, Energy, Cracking force, Stress.

The new idea of grain biomass multidisc grinding

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Abstract

In multi-sided multi-disc grinders the quasi-shear effects are used at the edges of holes placed in working discs, rotating at different speeds, being in a relative motion mode. From own research and the experience of other researchers, it is known that a significant impact on effective energy consumption has the loading material properties, the dynamic parameters of the process and construction of the working unit of the analyzed shredder.
The aim of the work was achieved by eliminating disturbances at the output of the working unit while minimizing the power demand (PPRW) in the process of grinding of cereals grains. The results of the research indicate that in the multi-disc multi-hole disintegrating unit there is a dependence of the adjustment of utility characteristics (mass, efficiency), material and technological-dynamic parameters. The results obtained confirm the validity of the adopted assumptions. A necessary condition for increasing the energy efficiency of multi-disc crumbling of rice grains is the development of functional output couplings (efficiency and λ) with input power supply and grain parameters and process parameters. The proposed methodology for researching the grinding of rice grains meets expectations in terms of reducing the power demand in the process. Obtaining a fully-fledged product of strictly defined and reproducible dimensions from the grated batch (raw material) is a useful and forward-looking activity for the development of the multi-crushing process.

Keywords: Grain, Biomass, Multidisc, Grinding, Shredder, Power, Multi-crushing process.

Selected Biometrical Features of Soybean Seed and the Mechanical Properties

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Abstract

Soya is considered one of the most valuable crops in the world, in particular due to its nutritional properties, as well as medicinal ones. Soybean seeds contain valuable, high-quality protein, oil, minerals, biologically active substances, vitamins and fiber. Knowledge of the properties of soybean seeds, its endurance to mechanical damage, as well as factors affecting the properties of seeds are important for the development of technology for the preparation of sowing, sowing and harvesting, storage, transportation and subsequent processing.

Seeds of common soybean varieties (Aldana, Aligator, Augusta, Mavka and Petrin) are selected for research. The research has been processed using Statistics 10, which allows to analyze the required parameters with the correct accuracy. Studies have shown different values for different varieties.

For the soybean seeds (variety of Aldana, Aligator, Augusta, Mavka and Petrin) the destructive forces, absolute strain energy were determined. Relative stress, sphericity coefficient and density were calculated. The soybeans tested differed in the biometric features of seeds and their susceptibility to mechanical damage. The most resistant to cracking were seeds of the Aligator variety, which were the longest and had the lowest coefficient of sphericity, while the least resistant were Petrina seeds, which were thickest and widest, and the most close to the sphere.

Keywords: Soybean seed, Relative stress, Sphericity coefficient, Density, Biometrical feature.

Sustainability Reporting in Turkish Companies Listed on BIST Sustainable Index

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Abstract

The fact that sustainability is particularly on the agenda in recent times, and the pressure from interest groups on this issue has made sustainability reporting inevitable for companies. In this context, companies collect their environmental, social and economic performances under "Sustainability Report" and share them with the public and interest groups in certain periods all over the world. Sustainability reporting is the practice of measuring, explaining and responding to internal and external interest groups towards corporate performance toward sustainable development. Sustainability reports cover the results of the companies' commitment, strategy and management approach during the reporting period. In this research, studies on sustainability reporting of companies in BIST Sustainable Index in November 2017 - October 2018 period were examined. In the survey, a statistical analysis of the environmental, economic and social activities included in the sustainability reports prepared in accordance with the Global Reporting Initiative-GRI reporting standard as well as the United Nations Global Compact and the United Nations Sustainable Development Targets was conducted.

Keywords: Sustainability Report, BIST, United Nations Global Compact.

DC Motor Torque Control with Fuzzy Logic Controlled Push-Pull Converter

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Abstract

In this study, In this study, a fuzzy logic controlled Push-Pull DC converter with highly flexible input-output parameter range has been developed. With the designed system, a DC motor has been shown to have torque control, a variable control reference with high power quality, superior dynamic performance and high efficiency. In addition, the electrical responses of the DC motor, fuzzy logic controller (FLC), push pull converter system were investigated in case of constant and variable moment demands under the variable control reference. The system was designed according to the parameters of a selected DC motor, and the converter was simulated by modeling the whole system in the Matlab / Simulink environment.

Keywords: Push-Pull Converter, DC Motor, Fuzzy Logic Controller.

Comparison of the Electrical Performance of NiCd, NiMH and Li-Ion Batteries by Simulation

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Abstract

Research and development activities on rechargeable batteries are increasing day by day due to the increasing demand for portable electrical and electronic devices as well as the advantages of electric vehicles in particular. Undoubtedly, developments in battery technology have a large share in the development of electric vehicles. The most common of these batteries are NiCd, NiMH and Li-Ion. In particular, lithium ion batteries are preferred by environmentally conscious designers and consumers due to their high energy density and non-toxicity in mobile phones, laptops and small household appliances and due to the low level of CO2 emissions they emit. Ni-Cd and Ni-MH batteries are the most commonly used batteries due to their superior properties both during charge and discharge. In this study, the electrical performance of these most widely used NiCd, NiMH and Li-Ion batteries in Matlab / Simulink environment were investigated under variable load conditions.

Keywords: Battery technology, NiCd, NiMH, Li-Ion

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