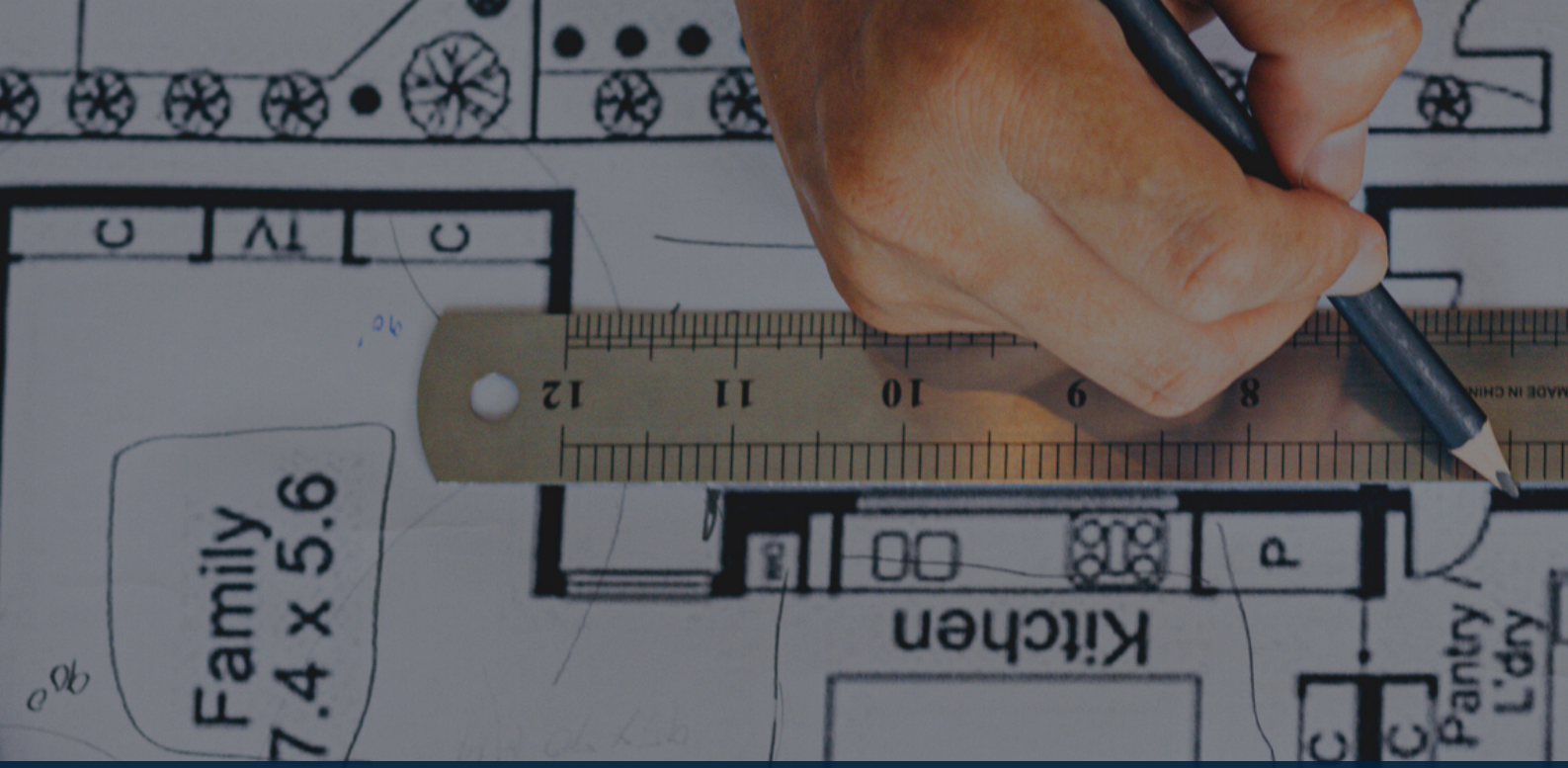

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8TH INTERNATIONAL CONFERENCE ON ENGINEERING AND NATURAL SCIENCES

BOOK OF ABSTRACTS

May 18-22, 2022

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WELCOME TO ICENS 2022

On behalf of the organizing committee, we are pleased to announce that the 8th International Conference on Engineering and Natural Sciences (ICENS 2022) held from May 18 to 22, 2022 in Istanbul, Turkey. ICENS 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 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,
Prof. Dr.Özer ÇINAR

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"A STUDY OF A BLASTING OPERATION IN A OPEN PIT MINE WITH GPSS/H SIMULATION PROGRAM"

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Abstract:

The economic analysis of the use of explosives is an important part of blasting operations in open pit mining. Explosives are energy, and the efficient use of this energy is a major factor in keeping rock blasting costs under control. High-energy explosives enhance fragmentation, which ultimately produces a positive effect on total operating costs. The degree of fragmentation or movement obtained is directly related to the amount of explosives used in operation and the delay and sequencing of firing blastholes. For economic reasons, the blast must be both well planned and be accurately executed using the minimum amount of explosives. If the blast sequence is correct, less explosives will be required at a single time.It is of concern both the holes are fired in proper sequence and thatthey do not fire too close in sequnce. If the holes fire out of sequence, this is known as " Out-of Sequence firing", (OOSF), if they fire too close together, this is known as "Crowding". In this study, a GPSS/H simulation program is developed for a small open pit mine with 11 blasthole operation drilled out at a given pattern to determine the OOSF and Crowding by varying the scatter in mean delay times in milli-second (ms) while assuming a predefined value for crowding as ms delay. The simulation results and their interpretations for a given mine site provides the optimal sequencing and the scatter of the selected blasting agent.

Keywords: Open Pit Mining, Blasting Patterns, Discrete-Event Systems Simulation, Gpss/H Software

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PALYNOTAXONOMICAL SURVEY OF THE SECTION MULTICAULIA OF THE GENUS HEDYSARUM (FABACEAE) IN TURKEY

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Abstract:

The current study was planned to evaluate pollen morphological characters of Hedysarum species distributed in Turkey using scanning electron microscopy (SEM) and light microscopy (LM) techniques for their systematic and taxonomic importance for correct identification. Pollen grains from seven different species belonging to Multicaulia section from various distributional localities were collected, nonacetolyzed, and measured. Pollen shape was observed prolate in all species while sculpturing pattern of exine were microechinate-perforate. Exine thickness was noted minimum in H. varium subsp. varium (0.96 µm) and; H. nitidum exine measurement was 1.38 µm. Herein, nine quantitative and qualitative characteristics were examined using multivariate analysis. Cluster analysis of the data showed that the pollen characters were important for the separation of the species from one another. The results showed that section Multicaulia of the genus Hedysarum was separated into 2 main groups with different pollen dimensions. The congruency of the palynomorphological studies was discussed and the utility of some of the pollen morphological traits were evaluated. The results showed that pollen micromorphology has important role to accurately identify and classify Multicaulia section.

Keywords: Hedysarum, Leguminosae, Palynology, Taxonomy, Sweet Vetch, Systematic

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EFFECTS ON GERMINATION AND TOXICITY INDEX OF OCIMUM BASILICUM L. UNDER HEAVY METALS STRESS

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Abstract:

Ocimum basilicum L. (basil) is a special plant used in food industry, but is also recognized as a very special ingredient in cosmetic, pharmaceutical or perfumery industries. Due to this quality, in this study, we analysed the germination degree and the toxicity index of O. basilicum L., under stress condition caused by different concentration of Pb(II) and Ni(II) (2.5-500mg/L) as single metal and combination of these two (Pb(II) 50 mg/L and Ni(II) 70 mg/L). At the same value of concentration, 100 mg/L, in the case of Ni (II) the germination degree has a value of 50%, and for Pb (II) G% has a value of 83.33%. According to the results obtained, the following degrees of toxicity can be established for seed germination: Ni (II)> Pb (II), for all concentration. Regarding the toxicity index of O. basilicum L. and its components, radicle, hypocotyl and leaves, in the presence of the combination of heavy metals at concentrations of 50 mg/L Pb (II) and 70 mg/L Ni (II), the hierarchy of the toxicity index is represented by the radicle> hypocotyl> leaves. As a conclusion the presence of Ni(II) in the environment has a negative impact on germination degree and also influence the toxicity index of O. basilicum L.

Keywords: Germination, Heavy Metals, Ocimum Basilicum, Toxicity

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LATERAL STRENGTH-BASED SEISMIC EVALUATION OF AN UNREINFORCED MASONRY BUILDING

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Abstract:

Unreinforced concrete masonry (URM) buildings located in seismic areas still constitute an important portion of the residential building stock of Turkey. A significant amount of these buildings is designed according to allowable stress criteria of 2007 version of Turkish Earthquake Code. However, seismic design philosophy, as well as seismic performance assessment, of URM buildings tends to focus on lateral strength of URM walls and it is also adopted to the current version of Turkish Earthquake Code. Accordingly, the seismic performance of a URM building designed based on the theory of allowable stress is a significant concern. In this study, the seismic performance of a two-storey URM building is investigated based on the ultimate strength method. The case study building is primarily designed in accordance with seismic requirements of 2007 version of Turkish Earthquake Code. Subsequently, lateral strength-based seismic performance assessment of the same building is performed. The earthquake demand is represented by a 5%-damped elastic acceleration design spectrum and the lateral strengths of URM walls are calculated in accordance with provisions of the current Turkish Earthquake Code. All analyses are conducted on a very detailed three-dimensional finite element model (FEM) of the building. The results have shown that lateral strength capacities of some URM walls located on the ground floor are exceeded, whereas none of the URM walls on the upper floor reach their capacities. As a result, life safety performance level is achieved.

Keywords: URM Building, Seismic Evaluation, FEM, Allowable Stress, Lateral Strength.

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AN INVESTIGATION ON PLAN AND FACADE CHARACTERISTICS OF HIGH-RISE BUILDINGS

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Abstract:

High-rise buildings are an increasingly common type of commercial and residential buildings because of their large capacity on small lands. These buildings appear with different architectural features with the development of new building materials and technologies. In this study, plan shapes and facade forms used in high-rise buildings are investigated considering the ten tallest buildings in the world. Architectural characteristics of the considered high-rise buildings are briefly summarized based on the results of detailed investigations. Structural systems of the buildings are analyzed, particularly in plan shapes. As a result, it has been observed that different plan shapes and facade forms are determined based on building-specific reasons. High-rise buildings are designed with different architectural plan forms in accordance with the functional requirements. These plan forms are also created with various common areas to strengthen the relations of building users with each other. On the other hand, the most important factor in the current design practice of these forms is the wind load and the forms are generally designed considering the results obtained from wind tunnel analysis. The use of rounded lines in plan and facade forms allows the wind load affecting the building to decrease and the user's comfort to increase. Another important factor in the design is the creation of an aesthetic appearance on the exterior of the high-rise building. In particular, the facade forms of such buildings are designed in accordance with the design principles for increasing the aesthetic perception of the building, as well as the image of the city.

Keywords: High-Rise Buildings, Aesthetic Perception, Wind Load, Plan Shape, Facade Form.

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THE FORECAST OF VALUE OF LOST LOAD IN SLOVENIA

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Abstract:

In modern society, we are increasingly dependent on electricity, which makes interruptions in supply affect us even more and also causes both direct and indirect costs. Various indexes are available to evaluate the costs associated with interruptions in supply. Recently, the Value of Lost Load (VOLL) has been the most commonly used index to evaluate costs. Moreover, a determination of this index is mandatory in the EU and ENTSO-E countries, as a measure of the Reliability Standard.

Since the determination of the VOLL based on surveys is time-consuming and estimates based on macroeconomic indicators do not provide realistic values, a regression method with the gross domestic product (GDP) as the impact factor is used to forecast the value of the VOLL for Slovenia until the year 2030. The estimated value of the VOLL for Slovenia in 2022 is 10.0€/kWh, which is in line with the value of 10.6€/kWh used to measure the Reliability Standard in Slovenian electric power system.

Furthermore, the obtained results are compared with the results for Italy, which has carried out a survey-based analysis in 2021 and has a GDP in 2021 slightly higher than projected for Slovenia in 2030. Based on the regression method, the value of the VOLL for Slovenia for 2030 is estimated at 26.0€/kWh, while the value of the VOLL for Italy in 2021 based on survey is 28.4€/kWh.

The results show that the application of the regression method to predict the value of the VOLL using the GDP as impact parameter is reasonable and appropriate.

Keywords: Gross Domestic Product (GDP), Regression, Reliability Standard, Slovenian Power System, Value Of Lost Load (VOLL)

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REVIEW OF THE RELIABILITY STANDARDS IN EU ELECTRIC POWER SYSTEM

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Abstract:

Security of supply is one of the main objectives of a comprehensive package of EU legislative acts called Clean Energy for All Europeans. Through these legislative acts, the EU aims to accelerate the deployment of clean technologies, increase market competitiveness and energy efficiency, outline the design of the electricity market and security of supply, and create new rules for the governance of the Energy Union, making the European electricity market more interconnected, flexible and consumer-oriented.

One of the main objectives is to determine the most efficient and effective way to ensure appropriate adequacy of generation units in the EU. In October 2020, European Union Agency for the Cooperation of Energy Regulators (ACER) presented the Methodology for calculating the value of lost load, the cost of new entry, and the reliability standard, which specifies the security of supply indexes and define the methodology for their calculation.

Therefore, each EU Member State has to determine the value of lost load (VOLL), the cost of new entry (CONE) for different candidate technologies that are able to provide resource adequacy benefits (generation, storage and demand side response), and the reliability standard that consists of expected energy not served and loss of load expectation.

The paper provides an overview of the methodology and results for countries that have already defined reliability standards according to the new methodology.

Keywords: Cost Of New Entry For Generation Or Demand Response (CONE), Expected Energy Not Served (EENS), Loss Of Load Expectation (LOLE)

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TOXIC EFFECTS OF NI(II) AND PB(II) TO ORIGANUM VULGARE L. SEEDS AND EARLY STAGE SEEDLINGS

Laura Hagiu Zaleschi[a*], Isabela-Maria Simion[a], Maria Apostol[a], Raluca-Maria Hlihor[a]

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Abstract:

Nowadays, there is a strong interest in the heavy metals environmental pollution because they cannot be easily removed or biodegraded. They tend to accumulate and have negative effects on any living cell. In this paper, the toxic influence of heavy metals, lead and nickel, on oregano (Origanum vulgare L.) seeds was studied. Oregano is an aromatic plant used in gastronomy, alternative medicine but also for ornamental purposes. In order to highlight the toxic effects of heavy metals to oregano early-growth stages from seeds to seedlings, the following parameters were taken into account: degree of germination; length measurements of radicle, hypocotyl and leaves; and toxicity, tolerance and vigor indices. The practical part of the study was carried out under laboratory conditions. 10 oregano seeds were sterilized, placed in Petri plates (in triplicate) with filter paper to maintain the humidity, and then watered with 3 mL of pollutant solutions previously prepared from a stock solution of 1000 mg/L (PbCl2 and NiCl2). Treatments were made considering 11 variants for Pb(II) (5-500 mg/L) and 8 variants for Ni(II) (2.5 -100 mg/L). Subsequently, the plates were placed in a plant growth chamber at a temperature of 22±2oC, with light for 16 h and 8 h darkness. The obtained results were compared with those of control tests which were simultaneously made. The results indicate that nickel is the most toxic pollutant for oregano with a germination degree dropping to 57% when using 100 mg/L Ni(II) compared with a 35% decrease of the germination degree when 100 mg/L Pb(II) was used. The toxicity index is higher for the radicle in the presence of Ni(II) starting with 5 mg/L (43%) than for the other seedling components (8% for hypocotyl and 6 % for leaves).

Keywords: Heavy Metals, Oregano, Toxicity

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A NOVEL DATASET ON THIN SECTION OF LOFTUSIA GENUS FOR ARTIFICIAL INTELLIGENCE AND IMAGE PROCESSING STUDIES

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Abstract:

Micropaleontology studies are very important for revealing the rock sequence story. The age of the rocks and their formation environments are explained in detail with fossil studies. Foraminifers are among the most preferred microfossils to study. For the identification of benthic foraminiferas, it is generally preferred to examine thin sections under a microscope. Thus, internal morphological features that allow to identify many genera and species such as the shell structures of fossils, the dimensions and features of chamber and septa, mouth openings can be seen.

In recent years, studies have started on the arduous and tiring processes of paleontological identification studies using artificial intelligence image processing technology. When the literature is examined, it is seen that these studies are limited to grain fossil images. An identification study on thin-section images has not been found in the literature. In order to make progress in this regard, a data set was prepared consisting of thin-sectional images of Loftusia which is a microforaminiferous genus. The image set consists of thin section photographs of 17 species belonging to the genus Loftusia. In this dataset 95 axial and 72 equatorial thin-sectional images was prepared from Loftusia species which are Loftusia accidentalis, L. anatolica, L. cf. anatolica, L. arabica, L. barrisoni, L. baykali, L. coxi, L. elongata, L. harrisoni, L. kahtaensis, L. ketini, L. matsumorui, L. minor, L. morgani, L. oktayi, L. sp.

With this data set, a unique study opportunity is presented as open source in order to accelerate the identification process. With the data set in this resource, it is aimed to make a great contribution to the field of micropaleontology by performing image processing and artificial intelligence studies such as 3D Reconstruction, image fusion, classification, segmentation, generation.

https://drive.google.com/drive/folders/1wGhsjXtw0u-HA63JLDcQBrvJBZH25ae0?usp=sharing

Keywords: Paleontology, Microfossil, Foraminifera, Dataset, Loftusia, Artificial Intelligence, Image Processing

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THE INFLUENCE OF MELT MIXING TIME ON THE PROPERTIES OF MULTIWALLED CARBON NANOTUBE/POLYAMIDE 11/POLY(LACTIC ACID) NANOCOMPOSITES

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Abstract:

Recent developments in nanotechnology have increased the interest in polymer nanocomposites. Thanks to the superior properties of nanofillers, polymer nanocomposites can offer different properties like high mechanical properties, electrical-thermal conductivity, high thermal stability and non-flammability at low loading rates compared to conventional composites. Among the various nanofillers, multiwalled carbon nanotubes (MWCNT) are one of the potential fillers used to improve the properties of polymers. The high aspect ratios and good mechanical thermal properties, thermal and electrical conductivities of MWCNTs, make them ideal reinforcing filler for the production of high-performance polymeric materials. It is known that the blend of polyamide 11 and poly(lactic acid) (PA11/PLA), which is prepared to be an environmentally friendly alternative to traditional commercial polymers, exhibits acceptable mechanical and thermal properties. The properties of the fully bio-based and partially biodegradable PA11/PLA blend need to be further improved for use in high-performance engineering applications. Therefore, it was thought that reinforcing the PA11/PLA blend with MWCNT would be appropriate to improve the properties. On the other hand, dispersion of MWCNTs in a polymer matrix by melt mixing is difficult due to the aggregation tendency of the nanotubes and their incompatibility with most polymer matrices. Therefore, this study focused on the effects of melt mixing time on the properties of MWCNT reinforced PA11/PLA nanocomposites. PA11/PLA nanocomposites containing 0.5-1-3-5 wt.% MWCNT were prepared by extrusion and injection molding method. While the temperature and screw speed were kept constant during extrusion, the mixing time was changed to 3 min and 8 min. The MWCNT dispersion level in the PA11/PLA matrix improved by increasing mixing time. In this way, it has been observed that nanocomposites mixed for a longer time have higher tensile strength and elongation. Also, the long mixing time increased the degree of crystallinity more than the short mixing time.

Keywords: Nanocomposites, Melt Mixing, Processing Conditions, Carbon Nanotube

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INVESTIGATION OF EFFECTS OF GRAPHENE NANOPLATELETS ON THE PROPERTIES OF CARBON FIBER REINFORCED POLYAMIDE 11/POLY (LACTIC ACID) COMPOSITES

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Abstract:

Short carbon fiber (SCF) reinforced polymer composites have widespread use in various industries due to their superior properties such as lightness and good mechanical, and thermal strength. CF reinforced polyamide 11 (PA11)/poly (lactic acid) (PLA) composites prepared by us also have high mechanical and thermal properties. On the other hand, the final properties of CF reinforced composites can be further improved, and their usage areas can be expanded. At this point, it is possible to obtain hybrid composites with a wide range of properties by using fiber and nano fillers together. In this regard, graphene nanoplatelets (GNP) can be used as an effective and inexpensive nano filler. Therefore, GNP has been used to improve the features of PA11/PLA/CF composites. 0.5-1-3-5 wt.% GNP nano powder was added to the PA11/PLA composite containing 20 wt.% CF by melt blending technique. The effects of GNP amount on the fiber length distribution, electrical volume resistivity, morphological, rheological, and thermo-mechanical properties of the PA11/PLA/CF composites have been investigated. The volume resistivity measurements revealed the synergistic effect of CF and GNP. Also, the addition of GNP significantly increased the storage and loss modulus of the PA11/PLA/CF composite. However, while the sample containing 1wt.% GNP exhibited the highest storage modulus, the storage modulus decreased due to aggregation with the increasing amount of GNP.

Keywords: Hybrid Structure, Carbon Fiber, Graphene Nanoplatelet, Fiber Length Distribution

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NUMERICAL STUDY OF THE HEAT TRANSFER OF A BATTERY PACK CONSISTING OF CYLINDRICAL AND PLATE-SHAPED LITHIUM-ION BATTERIES CONNECTED TO A SOLAR SYSTEM IN AN AIR DUCT

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Abstract:

In this paper, heat transfer in a battery pack located in an air duct is studied numerically. Lithium-ion batteries are widely used in electronic devices, and various companies are trying to improve their capacity. One of the problems is their heating during operation. Therefore, in this work, a lithium-ion battery pack in a rectangular case filled with a phase change material (PCM) is numerically investigated. The battery and the PCM enclosure are located in a duct with laminar air flow. This study is performed for Reynolds numbers (Re) of 50 and 250 for one hour. COMSOL Multiphysics software and finite element method are used to solve the governing equations. The results of this study show that as the time increases, the amount of melt PCM around the battery decreases continuously. Re = 250 results in more solid PCM at different times than Re = 50. Also, at Re = 250, the molten PCM is converted to solid PCM in a shorter time. The average temperature of the battery is increased and then decreased over time. In addition, the battery temperature and the trend of increasing the battery temperature decrease with Re. By increasing Re, the temperature of the exhaust air decreases.

Keywords: Solar System, Lithium-Ion Battery, Air-Cooled Method, Plate, Cylindrical.

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EFFECT OF NOZZLE TIP GEOMETRY ON DROPLET DIAMETER FALLING DOWN STRING

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Abstract:

The creation of sequential droplets that fall through a vertical string at a specific period without any clash and maintaining the same pace is an ideal condition for any heat/mass transfer calculation as the entire system can be deemed stagnant. The available investigations to create those sequential droplets on vertical string mainly focus on flow rate and nozzle diameter. Contrary to prior studies, this investigation focuses on the effect of the nozzle tip geometry on droplet generation along vertical string while keeping constant flow rate and nozzle diameter. The nozzle tip geometry has been modified to form different droplet diameters while considering the fundamentals of droplet generation. The changes in droplet diameters, which flow down the vertical string for each specific nozzle tip geometry, were investigated experimentally. All results and findings have been presented in this paper.

Keywords: Droplet Generation, Nozzle Tip Geometry, Flow Down String, Film Flows

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CYTOTOXIC EFFECT OF PUNICA GRANATUM L. EXTRACT ON HEP3B (LIVER) CANCER CELL LINE

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Abstract:

The edible and inedible part of Punica granatum L. has a rich content of bioactive compounds. Consumption of pomegranate, which is rich in polyphenolic compounds, is known to reduce the risk of cancer. There are a several studies about effect of the pomegranate peel, fruit and juice on different cancer. In the present study we aimed to investigate the protective and cytotoxic effect of Punica granatum L. peel extract on AML12 (liver) and Hep3B (liver cancer) cell lines, respectively, which has not been studied before.

The MTT (3-(4, 5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide) assay was used to determine the protective and cytotoxic effects of Punica granatum L. peel extract.

The results showed that Punica granatum L. peel extract had a concentration- and time-dependent cytotoxic effect on Hep3B cell line. It was observed protective and proliferative effect compared to the control on AML12 cell line, and this effect did not decrease even at low concentrations by 24 h. However, the cytotoxic effect was very high in each concentration compared to the control, and the cytotoxic effect increased with the increase of the concentration by 48 h on Hep3B cell line. The pomegranate peel, which is a waste product, contains a larger amount of the polyphenol, especially punicalagin and ellagic acid. Therefore, Punica granatum peel could be an effective therapeutic candidate against liver cancer. Also, this bioactive waste product can be evaluated in pharmaceutical, cosmetic or food industries after further studies.

Keywords: Pomegranate Peel; Cytotoxic Effect; Hep3B Cell Line

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OPTIMIZATION OF THE COOLING PARAMETERS OF A 250 KW PMSM BY TAGUCHI METHOD

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Abstract:

In this study, a nine phase, 250 kW Permanent Magnet Synchronous Motor (PMSM) was considered, and both the magnetic and thermal model of this motor with heat losses are studied. The motor is cooled by the refrigerant fluid over the parallel fixed channels on the fixed stator. The mass flow rate of the coolant, the pipe diameter of the coolant pipe, number of turns of this pipe, the type of the refrigerant, and the change of the torque value are analyzed by using the Taguchi Method in order to optimize the motor thermal system. After Taguchi analysis of these parameters, the results showed that by increasing the mass flow rate of the refrigerant has significant effect on the winding temperature. By increasing the torque of the motor, the winding temperature increases. The results showed that A4B1C3D3E4 (mass flow rate (A)=50 l/min pipe diameter (B)=17.7 mm, number of turns (C)=20, type of fluid (D)= EGW50/50, torque (E)=2000 Nm) is the best cooling design parameters for the cooling strategy of the PMSM.

Keywords: Pmsm, Thermal Model, Magnetic Model, Efficiency, 3d Parametric Design, Cooling Methodology

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INTERRAMP SLOPE DESIGN OF AN OPEN PIT MINE RESTING ON HANGING WALL

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Abstract:

A rock mass movement has been detected on the five benches of an open pit albite mine. This slope movement would have threatened future mining operations in the open pit. The back scarp of the landslides leans on the steeply dipping normal fault located at the backside of the open pit. The rupture surface starts from this fault and follows the foliation planes dipping out of the slope. The displaced material moving towards NW involves extremely weathered gneiss. This material behaves like a soil and rock fragments mixture. Stereographic projections revealed that the planar rock side may occur on several benches however the material lying over the rupture surface shows soil-like properties. Hence, the slope stability analyses were performed using numerical analyses based on the continuum code. The behavior of the geological units in the numerical models was represented by the Generalized Hoek-Brown and Mohr-Coulomb failure criteria. In addition, it was determined from the finite element seepage analyses that the fault zone promotes water flow into the pit base along its zone. Consequently, optimum overall and inter-ramp slope angles were recommended as 24° and 31° for disturbed zone and relatively stronger units, respectively. Furthermore, dewatering planning was suggested as a remedial measure and the crack propagation induced by blasting on the crown of the slope should be avoided.

Keywords: Finite Element Method, Gneiss, Hanging Wall, Interramp Angle, Open Pit Mine

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COMPARATIVE LIFE CYCLE ASSESSMENT OF METALWORKING IN SHIPYARDS

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Abstract:

The metalworking process is one of the main processes in a ship's life cycle. Shipyard managers and operators are making a global effort to meet the material processing demands required in shipbuilding while ensuring the sustainability of the system. As a method, LCA was applied, which was modeled using SimoPro software and the effects of the system were examined based on the CML-IA evaluation method. This method allows for the systematic and scientific calculation of environmental impacts, taking into account all of a system's inputs and outputs, and thus aiding in the comparison of options on an environmental basis. LCA is widely used in shipyard management based on the entire maritime system or just a part of it (for example, operation, construction, or recycling). In this study, after briefly mentioning the global examples of LCA, the focus will be on determining the options for improving the sustainability of this system, together with evaluating the environmental impacts of the processing of steel and aluminum materials in the chosen shipyard as an example.

Keywords: Metalworking, LCA, Sustainability,

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EVALUATION OF THE CYTOTOXIC AND ANTI-INFLAMMATORY EFFECTS OF MELANOMA-TARGETED NANOSTRUCTURED LIPID CARRIERS ON MELANOCYTES, MACROPHAGES, AND 3D-CANCER CELL SPHEROIDS

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Abstract:
Melanoma is a type of skin cancer that occurs due to the uncontrolled division of melanocyte cells. According to 2020 data, skin cancer cases have reached a 15% ratio in all types of cancer. With the increase in melanoma cases, new strategies and targeted-drug systems have been researched for the treatment. One of the promising anti-tumor drugs, Doxorubicin binds to the DNA molecule and inhibits topoisomerase II activity. Trabectedin is also an anti-tumor drug, and it has the capability of covalently binding to guanine residues in the DNA groove. To construct a controlled and/or targeted-drug delivery system, nanostructured lipid carriers (NLC), which can be easily obtained from different lipid forms, are frequently used. In this study, Doxorubicin and Trabectedin-loaded L-amino acid transporter 1 targeted NLC (DTP-NLC) which were previously synthesized as a drug carrier were tested with HeMA (primary epidermal melanocytes), murine-derived macrophage cells (Raw 264.7), and B16F10 and 451Lu melanoma cells to understand the cell survival and levels of interleukins (ILs) such as TNF-α and IL-1β. In the cell culture studies, to better mimic the cancer cell micro-environment, B16F10 and 451Lu cancer cells were converted to 3D spheroid forms. While the cellular survival was determined with an XTT assay, the IL levels were analyzed with an ELISA kit. As a result, DTP-NLC led to low-level cytokine production of Raw 264.7 and had a lower toxic effect on Raw 264.7 and HeMA. The IC_{50} values of DTP-NLC for 72h were calculated to be 18.81 and 44.82 µg/mL for 451Lu and B16F10 cell lines in 3D culture, respectively. In addition, the anti-tumor activity of DTP-NLC on 451Lu was higher compared to B16F10 cells, meaning targeted drug delivery. The data from the in vitro studies have shown that the newly designed DTP-NLC platform could have the potential for the treatment of melanoma.

Keywords: Doxorubicin, Trabectedin, Nanostructured lipid carriers, Melanoma, 3D spheroid.

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