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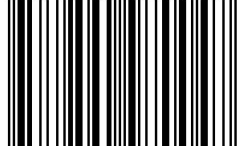EDUCATION AND RESEARCH

ICEF IV

4th International Conference on Engineering
and Formal Sciences

Amsterdam, 14-15 December 2018

Venue

Amsterdam Science Park

Conference Proceedings

Abstract Book

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Publishing steps of the Proceedings and Organization of ICEF IV

The first meeting has been held on 2 August 2018 concerning the announcement of the 4th edition of the ICEF series by the executive members of the committee. The first call for participation for submission of abstracts and full papers in engineering and formal sciences, was announced to the registered subscribers of ICEF email database as well as through conference alerts services on 10 September 2018. The submitted abstracts and papers have been reviewed in terms of eligibility of the titles as well as their contents and the authors whose works were accepted were called to submit their final version of the papers until 31 October 2018. The peer reviewers who are also the registered authors of ICEF did a voluntary work, exchanged review notes with the authors. The final papers were accepted until 7 December 2018. What follows is the result of these academic efforts.

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Effectiveness of Active Confinement Techniques with Steel Ribbons: Masonry Buildings

Elena Ferretti

DICAM – Department of Civil, Chemical, Environmental, and Materials Engineering, Alma Mater Studiorum, Università di Bologna, Italy

Abstract

In the present paper, we analyzed the main advantages of the active confinement techniques with a particular focus on the CAM system, which is an Italian reinforcement technique with pre-tensioned stainless steel ribbons. Italian seismic codes classify the CAM system as belonging to the strengthening category of "horizontal and vertical ties". Therefore, we compared the CAM system to the reinforcement techniques with horizontal and vertical ties in order to understand the actual similarities and possible differences between them. Moreover, we offered a deep analysis of the main critical issues of the CAM system, distinguishing between geometrical and mechanical weak-points. In particular, we analyzed the strengthening mechanism of the CAM system, still poorly understood, by performing a static analysis in the Mohr/Coulomb plane. Finally, we provided suggestions for future developments.

Keywords: CAM system, masonry walls, in-plane loading, out-of-plane loading

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Analysis of Dimensional Variations of Precision Gear Forging Die Geometry Due to Shrink Fit

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Abstract

The usual way to shrink fit design for precision forging dies are made by thick wall cylinder approach; i.e., taking the pitch diameter of the gear as bore diameter of the die insert without considering gear tooth shape. However, the compressive pre-stress due to the shrink fitting causes dimensional variations on the gear profile of the die insert. The dimensional accuracy of the final product is dependent on the accuracy of the gear die. Therefore, the dimensional variations due to shrink fit must be pre-determined and the gear tooth profile on the die insert modified accordingly. In this study, the dimensional variations of the precision spur gear forging die because of shrink fitting are analyzed by finite element method and the results are compared with the experimental ones. The results show that the FE model is successful to simulate the cylindrical die and agree well with thick wall cylinder approach and the experimental measurements. However, both the experimental measurements and the finite element results of gear die predict much higher radial displacements than the results of cylindrical die. Therefore, the determination of shape change of the gear die profile is beyond the capability of the thick wall cylindrical approach.

Keywords: Precision Gear Forging, Die Design, Shrink Fit, Finite Element

Attaining a Beam-Like Behavior with FRP Strips and CAM Ribbons

Elena Ferretti

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Abstract

One of the major concerns in the seismic retrofitting of masonry walls is that of increasing the ultimate load for out-of-plane forces. In multi-story buildings, these forces may originate from the hammering actions of floors, when the earthquake direction is orthogonal to the wall. A possibility for counteracting the out-of-plane displacements is retaining the wall by building some buttresses, that is, some beams lean against the wall and disposed vertically. Another possibility is to make the buttress in the thickness of the wall. In this second case, we must cut the wall for its entire height, realize the buttress, and restore the masonry wall around it. In both cases, the interventions are highly invasive. The first intervention also leads to increments of mass that enhance the attraction of seismic forces. The aim of this paper is to find a less invasive and lighter alternative for realizing buttresses. We proposed to use FRP strips and steel ribbons in a combined fashion, so as to realize an ideal vertical I-beam embedded into the wall, without requiring to cut the masonry. We also provided some experimental results for verifying the effectiveness of the model.

Keywords: CAM system, masonry walls, seismic retrofitting, out-of-plane loading, hammering action.

Integrated biostratigraphy of the Tarasci Formation of the Central Taurides (Turkey) and its implication for the regional correlation of Sultan Mts time-equivalent deposits

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Abstract

Nearly four decades having passed, it was imperative to launch a new campaign to study the Tarasci Formation. In the scope of this project, well dated conodont elements are the object of a systematic paleontologic and phylogenic study. Members of the subfamily Marquezellinae found in of the Central Taurus may contribute to the understanding of the Geology of Turkey. The subfamily Marquezellinae originated in the Family Gondolellidae during the Pelsonian (late Anisian) and was extinct during the early Julian (early Carnian), at the time that the "Sephardic Province" is replaced by dominantly evaporitic facies. Marquezellinae faunal elements spread during Late Ladinian–Early Carnian to the Southern Alps, Dinarids, Taurides and the Cimmerian terranes (Malayan Peninsula and SW China). The facies of the "Sephardic Province" represented here in Southern Turkey (WNW of Seydişehir, Konya) has been recognised in South-Eastern Spain, North Africa (Algeria, Tunisia and Egypt) and the Near East (Israel, Jordan). To date, specimens of the conodont subfamily Marquezellinae were recovered Early and Late Ladinian sediments of Spain, Tunisia, Egypt and Israel, Jordan, Slovenia, Croatia, Serbia, Turkey, and Sicily. Late Ladinian to early Carnian occurrences of the subfamily are known from the Southern Alps of Italy, Dinarides as well as displaced terranes in Hungary and the Cimmerian terrane of Sibumasu in South-West China and the Malayan Peninsula. It is of special significance that the key index fossil of the basal Ladinian GSSP (Curionii Zone) in the Southern Alps has been found in SE Spain as well as Israel. This ammonoid zone also includes the Fassanian (Lower Ladinian) FO (first occurrence) of *Pseudofurnishius murcianus* [1], [2], [3]. The area of Seydisehir (Konya) is considered as a fragment of the African - Arabian plate below the Taurus Nappes. Its Triassic sequence yields fauna's characteristic for the "Sephardic Province" that is restricted to the Southern Tethys. A number of alpinotype Tethyan faunal elements provide clues as to their age, including Late Anisian, Fassanian, Longobardian and Julian. When examining Triassic sections in Turkey, Assereto and Monod collected a few samples for conodonts from the Middle and Upper Triassic Taraşçı Limestone [4], [5]. The Tarasci Limestone consists of dark well bedded protected-bay limestones with intercalated lenses of white massive biogenic Emir Kaya Limestone (Ladinian). The Toptaş Limestone, the uppermost Ladinian white biogenic massive reefoidal top of the Tarasci Limestone, is directly overlain by the Sarpyar Dere Formation of Carnian age that consists of turbiditic marls, sandstones and microbreccias. The samples yielded only few conodonts except for one from the upper Tarasci Limestone in the Tepearasi Valley, Osmanin Dag. This sample with abundant *Pseudofurnishius murcianus* was not in place, but contains the ammonoid *Protrachyceras* sp. of Longobardian age. Out of the four superposed fossiliferous horizons distinguished in the Tarasci Limestone, the three lower are of Early Ladinian age, while the Upper Ladinian age of the upper fauna was determined but Assereto and Monod (1974), following Tozer [6]. [a]

Keywords: Triassic, Conodonts, *Pseudofurnishius*, Taurus, Turkey

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A Backstepping Approach for of longitudinal Aircraft

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Abstract

For transportation aircraft, the primary control objective for an autopilot system engaged during approach and landing is relative to the flight longitudinal tracking on the basis of highly simplified linear models of flight dynamics. The dynamics governing the flight longitudinal of an aircraft are in general highly nonlinear and involve complex physics for which no accurate models are available. In this paper a nonlinear model describing the longitudinal equations of motion in strick feedback form is derived. Backstepping is utilized for the construction of a globally stabilizing controller with a number of free parameters. It is implemented a controller with an internal loop controls involving the pitch rate of the aircraft and an external loop which includes angle of attack, path angle and pitch angle. Finally, nonlinear simulation results for a longitudinal model of a transportation aircraft are displayed and discussed.

Keywords: backstepping, approach, longitudinal, aircraft

Inverse Brillouin Function and Demonstration of Its Application

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Abstract

The Brillouin function arises in the quantum theory of paramagnetic materials, where it describes the dependence of the magnetization on the externally applied magnetic field and on the temperature of the system. There is no closed form exact analytical expression for the inverse Brillouin function, however, there have been several approximations proposed. In this work, we first compare relative errors and simplicity of several approximations for the inverse Brillouin function. Next, we demonstrate the application of the inverse Brillouin function by determining the Hamiltonian of the system using the simulation data of the magnetization dependence on the temperature. Then we compare the Hamiltonian that was used to set up the simulation with the Hamiltonian determined from the magnetization temperature dependence and an approximation to the inverse Brillouin function. We found that some of the approximations for the inverse Brillouin function can be used to accurately predict the Hamiltonian of the system given the magnetization dependence on temperature.

Keywords: inverse, brillouin function, demonstration, application

Assessment of Alternative Policy Strategies towards a Decarbonised Energy System: A Fuzzy - Promethee Approach

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Abstract

Recent political discussions and research interest focus on ways to accelerate the development and deployment of low-carbon technologies with respect to the targets set for 2030 and 2050. Although targets are well defined, extensive uncertainties exist in the European energy future necessitating the identification and analysis the parameters affecting several decarbonization options. In this framework, a set of alternative strategies were designed by identifying outcomes that conform to the objectives of European energy and climate policy. These strategies are positioned under two key uncertainties; the level of cooperation (i.e. cooperation versus entrenchment) and the level of decentralisation (i.e. decentralisation versus path dependency). This study presents a multi-criteria approach in order to assess alternative decarbonization strategies for achieving a sustainable energy system in EU. To cope with the disparate preferences of decision-makers, as well as to manage the uncertainty that arises when solving decision problems, a methodological assessment framework is developed based on an extension of the Preference Ranking Organization METHod for Enrichment of Evaluations (PROMETHEE) for group decision-making. Making use of the popularity and suitability of Fuzzy PROMETHEE in managing energy sector problems, this study offers an original work able to shed light in the policy-making problem related to sustainable energy transition.

Keywords: Energy and Climate Policy; Low-carbon Transition; Group Decision Making; Fuzzy PROMETHEE; Europe; Policy Recommendations

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Experimental Study on Influence of Pressure Holding Time on Strain Generation in the Hydraulic Autofrettage Process

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Abstract

In this study, the effect of pressure holding time on strain generation in hydraulic autofrettage process is investigated. Experiments are performed in a hydraulic autofrettage test stand available in Delphi Automotive Systems. AISI 4140 steel is used as the test material which exhibits similar mechanical properties with common rails. The test samples are held on 8 different autofrettage pressures varying between 530 and 666 MPa for 180 seconds. During the experiments 90° rosette gauges are mounted on the surface of the cylinders and both axial and tangential strains are recorded in 100Hz frequency. It is found that, there is an increase in the tangential strain with respect to holding time until few seconds and then it stays constant. The time period increases for higher pressures and there is no significant effect of time on axial strain.

Keywords: Hydraulic autofrettage, common rail, pressure holding time, strain gauge measurement.

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Determination of Grave Locations in War Cemeteries with High Resolution GPR (Ground Penetrating Radar)

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Abstract

As in the whole world, in Turkey the burial and later determination of the grave locations of soldiers who lost their lives during war involves many deficiencies in terms of the historical record. Though there is very valuable information like maps and writings from the time of war, due to the intense and violent passage of war, much important information is not directly communicated to the present day. The most controversial of this information is probably the locations of war graves. The main reason can be considered the excessive numbers of the dead and the excessive loss of soldiers in very short periods. In spite of these problems, the locations of many war cemeteries have been determined due to detailed research by historians and maps drawn during the war. However, the locations of graves within the war cemeteries are only roughly determined and in line with this, areas were fenced off as cemeteries. The high-resolution, non-destructive shallow geophysical method of ground penetrating radar (GPR) has been used for many years with the aim of identifying structural elements that are buried (graves, tunnels, archeological remains, etc.). In this context, its use in studies to research the locations of graves in areas known to be war cemeteries will illuminate the past and re-organization of war cemeteries according to the locations of the graves will contribute to the importance and respect that should be shown to the soldiers or martyrs who died. This work was supported by Çanakkale Onsekiz Mart University The Scientific Research Coordination Unit, Project number: FBA-2018-2485

Key words: war cemeteries, grave locations, ground penetrating radar (GPR).

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The Effects of Toxic Element Pollutions on Benthic Foraminifers in the Eastern Mediterranean

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Abstract

In study, foraminiferal assemblages and the pollution results of heavy metal concentrations obtained from drilling samples in the Eastern Mediterranean have been examined. In this way, three sea drilling works have been carried out in the study area and Quaternary sediments taken as the core from the driling. Benthic foraminifers have been identified from all three samples. In addition, horizontal and vertical distributions of toxic element concentrations of the same samples determined. In thise study, a large foraminiferal assemblages "Adelosina duthiersi, Adelosina mediterranensis, Ammonia compacta, Ammonia tepida, Cibicidoides cicatricocus, Elphidium charlottense, Elphidium complanatum, Elphidium crispum, Eponides concameratus, Lachlanella carinata, Massilina secans, Quinqueloculina seminula, Planorbulina mediterranensis, Rosalina brody, Spiroloculina angulosa, Spiroloculina antillarum, Spiroloculina dilatata, Spiroloculina ornata, Triloculina bermudezi" have been defined. Concentrations of 28 toksic elements (Fe, Zn, Al, Mn, As, B, Co, Cr, Cu, Ni, Sb, Na, Mg, K, Ca, P, Pb, Hg, Cd, Ag, Bi, Cd, Mo, Pb, Pt, Sn, Se, Hg) have been determined but the concentrations of 9 toxic elements (Cu, Zn, Pb, Ni, Cr, Fe, As, Se, and Mn) evaluated. In addition, surface element analyzes have been carried out to reveal the causes of color changes in the shell structure of Ammonia compacta. Surface element analysis was performed with Scanning Electron Microscope, it was determined that the color change in the Ammonia compacta tests originated from Mn and Fe elements. in some of the foraminifera shells which morphological changes observed in, Color changes also have been observed. Especially at the upper levels of the drilling samples the concentration values of the elements are higher. These top levels, where the elements are intensive, represent the current environment, and the foraminifers identified at these levels were more discolored. It is thought that the main cause of the polluting element densities in the upper levels representing the current environment is agricultural activities and geological formations (Upper Meastrihtian Ophiolitic Rocks) located neighbor area.

Keywords: Eastern Mediterranean, Foraminifera, toxic elements, heavy metals, bio-ecology

An Empirical Investigation into the Notes of Financial Reporting - Case of Albania

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Abstract

The year 2008 determined the transition from *Plan Comptable Général* (known as French accounting model) based on accounting rules, fiscal – oriented system, to the IFRS system (the Anglo-Saxon accounting model) which is known as investor-oriented system. The implementation of the IFRS brought a qualitative improvement in the Albanian financial reporting of bank and insurance companies, and some other large companies. The purpose of this paper is to verify the level of compliance with the mandatory disclosures requirements of financial statements (hereinafter FS) made in accordance with IAS 1. Since IAS 1 includes the general disclosure requirements in the FS, the paper aims to provide empirical evidence for this specific area of financial reporting, too. In order to fulfil the aim of this study 41 large companies, non-listed, that meet the criteria for applying IFRSs according to the Accounting Law of Albania are considered. The paper finds out through empirical studies that only one of the entities taken into consideration don't present the bases of preparation and don't make a summary of significant accounting policies applied. All the entities give supporting information for the items presented in the FS. 26% don't present information related to commitments and contingent liabilities. 6 out 41 don't present information about risk management. 5 out 41 don't cross-reference the notes with the respective items presented in FS. The terminology used in the preparation of the notes is updated for more than 70% of the entities studied. To measure the level of compliance with mandatory disclosure requirements we have constructed an unweight index (DI). The average overall compliance is 92%, which is a satisfactory level for our country.

Keywords: financial reporting, IAS 1, mandatory disclosures.

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Synthesis of ZnO Nanorods by Chemical Bath Deposition Route: The Seed Layer Effects on Photovoltaic Performance

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Abstract:

ZnO has been considered as one of the most proposed photo-anode materials [1] with wide bandgap (3.37 eV) and high exciton binding energy (60 meV) [2]. One-dimensional ZnO is among the most promising nanostructures due to their exceptional properties in wide range of applications such as electronic, optoelectronic, electrochemical, electromechanical and photoelectrochemical devices [3]. Dye sensitized solar cell as the third generation of solar photovoltaic device has attracted considerable interest during the past two decades, due to its low fabrication cost, simple manufacturing process and higher energy conversion efficiency. A perfect nano-structure of ZnO is required, which could provide the direct pathway for electron transmission. The typical one dimensional nano-structure of ZnO such as nanowires, nanorods and nanotubes, which can be beneficial to electron transport and can reduce the probability of charge recombination [1]. The ZnO nanorods have been synthesized by hydrothermal method. The seed layer properties are vitally important to control the structural, morphological, and optical features of the ZnO nanorods [3]. In this study, the effects of seed layer on the growth of ZnO nanorods during hydrothermal process and also on the photovoltaic properties of ZnO nanorod-based dye sensitized solar cells have been examined. The ZnO seed layers have been deposited on FTO coated glass substrates by sol-gel dip coating and preheated at 400°C. Zinc acetate dihydrate as precursor, monoethanolamine as an additive and ethanol as an solvent have been used to provide the sol to synthesize the seed layers. ZnO nanorods have been produced by hydrothermal route from precursor solution contains Zinc nitrate, hegzamethilenetetramine and water. General morphologies and detailed structural characterizations have been obtained by using scanning electron microscope, X-ray diffractometer, Raman spectroscopy, Open-circuit photovoltage measurements have been performed to investigate the photoelectrochemical characteristics of ZnO nanorod-based dye sensitized solar cells.[a]

Keywords: ZnO, nanorods, hydrothermal process, seed layer effects

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Anomaly-Based Intrusion Detection: Feature Selection and Normalization Influence to the Machine Learning Models Accuracy

Danijela Protic

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Abstract

Anomaly-based intrusion detection system detects intrusion to the computer network based on a reference model that has to be able to identify its normal behaviour and flag what is not normal. In this process network traffic is classified into two groups by adding different labels to normal and malicious behaviour. Main disadvantage of anomaly-based intrusion detection system is necessity to learn the difference between normal and not normal. Another disadvantage is the complexity of datasets which simulate realistic network traffic. Feature selection and normalization can be used to reduce data complexity and decrease processing runtime by selecting a better feature space This paper presents the results of testing the influence of feature selection and instances normalization to the classification performances of k-nearest neighbour, weighted k-nearest neighbour, support vector machines and decision tree models on 10 days records of the Kyoto 2006+ dataset. The data was pre-processed to remove all categorical features from the dataset. The resulting subset contained 17 features. Features containing instances which could not be normalized into the range [-1, 1] have also been removed. The resulting subset consisted of nine features. The feature 'Label' categorized network traffic to two classes: normal (1) and malicious (0). The performance metric to evaluate models was accuracy. Proposed method resulted in very high accuracy values with Decision Tree giving highest values for not-normalized and with k-nearest neighbour giving highest values for normalized data.

Keywords: feature selection, normalization, k-NN, weighted k-NN, SVM, decision tree, Kyoto 2006+

The Principles of Energy Efficient Microclimate Provision in the Skyscraper "Biotecton" of 1 Km Height

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Abstract

The article deals with the questions of formation of a healthy human living environment in superstructure buildings with the requirements of temperature, humidity, air exchange, gas composition of air in rooms, environmental and constructive safety. The results of the development of "Biotecton" - an ultra-high-rise multi-functional building (the height is 1000 m) are presented. In order to effectively overcome the wind and seismic loads of the vertical spatial structure in the building, the principles of the structure of the natural form (Gramineae stems, Triticale) are used. It is a multi-tiered spatial structure, in the nodes of which there are dampers for limiting oscillatory movements. For solving the problems of increasing the energy efficiency of ventilation and air conditioning, the use of air from height 1000 m with the minimum of anthropogenic pollution regardless of the air pollution in the city of construction is investigated. Taking into account the difference in temperature at the height of the skyscraper, two mechanisms of the movement of air in a superstructure were investigated: natural impulses (under the action of gravitational pressure and wind) and mechanical (fans). To ensure the qualitative and quantitative composition of air in the air exchange, the use of "oxygen gardens" in green areas, which are evenly spaced along the entire height of the building, is explored. The study proposed a list of plants that effectively clean air from pollution, sequestrate excess CO_2, enrich the air with oxygen and release phytoncides that effectively fight against pathogenic microorganisms. The considered studies represent the direction of development of the superstructure of architecture using shapes similar to natural that provide the bearing capacity of the building and solving the problems of forming in them a healthy living environment of man.

Keywords: The Principles of Energy Efficient Microclimate Provision in the Skyscraper "Biotecton" of 1 Km Height

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A Finite Difference Spectral-Collocation Method for Fractional Reaction-Diffusion Systems

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Abstract

This presentation deals with the numerical solution of a reaction-diffusion problems, where the time derivative is of fractional order. Since the fractional derivative of a function depends on its past history, these systems can successfully model evolutionary problems with memory, as for example electrochemical processes, porous or fractured media, viscoelastic materials, bioengineering applications. On the side of numerical simulation, the research mainly focused on suitable extensions of methods for PDE. This approach often produced low accuracy and/or high computational methods, due to the lack of smoothness of the analytical solution and to the long-range history dependence of the fractional derivative. Here we consider a finite difference scheme along space, to discretize the integer-order spatial derivatives, while we adopt a spectral collocation method through time. A suitable choice of the function basis produces an exponential convergence though time at a low computational cost, since the spectral method avoids the step-by-step methods.

Keywords: A Finite Difference Spectral-Collocation Method for Fractional Reaction-Diffusion Systems

Contrast of the Use of Open Educational Resources, in the Students of System Engineering of the Tecnologico Nacional De Mexico, Campus Mexicali

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Abstract.

The open educational resources are a movement that has impacted the communities of students and teachers around the world, and the Tecnologico Nacional de Mexico, Campus Mexicali seeks to contrast it in the Systems Engineering students, with a research where the answers obtained as result of the survey on Open Educational Resources, were very important for the results.Paris Declaration on open educational resources, was the beginning of this movement that has impacted the communities of students and teachers around the world, and Tecnologico Nacional de Mexico, Campus Mexicali has not been left behind because of the importance of contrast of the use of Open Educational Resources, in the students of System Engineering of the Tecnologico Nacional de Mexico, Campus Mexicali. The design of the research and the idea of carrying out this important research was planned, first defining the problem of the research, and defining the objectives of the research, formulating the research questions; and following the methodology, we will focus on the specific description of our study population, define the technique and the instrument used for the compilation of the information, and finally, we will detail the assumptions used in the research, as well as the analytical techniques for compare them statistically.

Keywords: Open Educational Resources, MOOCS, Ingenieria de sistemas.

DLC Coatings on Spherical Elements of HIP Endoprostheses

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Abstract

Hard coatings are increasingly being used in medicine to protect metal endoprostheses The experimental process for the high-productive synthesis of high-quality diamond-like carbon (DLC) coatings with high hardness and a sufficiently high level of adhesion to the spherical shaped parts of the hip joint made from the stainless steel or cobalt-chrome alloy have been developed. DLC coating deposition was performed by vacuum-arc method from a high-productive source of the filtered vacuum-arc carbon plasma of rectilinear type with a "magnetic island". The high degree of thickness uniformity in the coating on the head of the hip joint with a high adhesion to the metal joint base was developed. Modernization of the vacuum arc plasma source allowed to accelerate the cathode spot motion, exclude substrate overheating and increase the diamond-like carbon hardness up to 30-40 GPa. The high adhesion level was achieved as a result of the high voltage pulsed of substrate bias potential use and multilayer architecture of DLC coating. The DLC coating on the heads of hip endoprosthesis did not peel off when boiling endoprosthesis or when immersing it into the liquid nitrogen.

Keywords: diamond-like carbon, head of hip joint, vacuum-arc, filtered plasma source, adhesion.

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Determination of Insecticide Residues in European Honey Bees: Exposure in Conventional and Organic Cropping Systems

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Abstract

Bees play such an essential role as crop pollinators that it is crucial to preserve their diversity and to encourage the conservation of their populations. The decline of European honey bees (*Apis mellifera* L.) has many possible causes, including pathogens, parasites, malnutrition, habitat loss, climate change or the incorrect use of phytosanitary products. This study is intended to acquire knowledge on the degree of exposure of *A. mellifera* to Plant Protection Products (PPPs) in agronomic systems by comparing conventional versus organic production crops. Forager bees may be exposed to residues of PPPs when they collect nectar or pollen from flowers of crops previously treated. Bees may intercept pesticide residues via consumption of guttation droplets from plants, via contact with the dust drift originating from sowing treated seeds or via inhalation of high vapour pressure compounds during spray treatments. A particular concern has been raised about some systemic insecticides, such as neonicotinoids, which are used to control a wide range of insect pests. This 3-year field study was carried out in peach and apricot orchards in the Region of Murcia (Spain). The methodological approach involved an Ultrasound Assisted Extraction (UAE) and mass spectrometric analysis of insecticide residues in samples of honey bees.[1]

Keywords: European honey bee, insecticide residues, field study, cropping systems, mass spectrometric analysis.

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Abstract
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Gaussian Noise Reduction in Images Using Non-Local Means Filter And Variational Methods

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Abstract

Noise is an unwanted signal resides in images that deteriorates the crucial information and structures in images. In this study, the advantages of Non-local Means filter and Total Variation based Sparsity Driven Despeckling with Quadratic Linear term is combined in a single cost function. NL means is used on texture areas and SDD-QL is used on homogeneous areas. Gaussian noise is artificially added to test images. The results of applying proposed method to noisy images are showed both qualitatively and quantitatively.

Keywords: NLTV, SDD-QL, NL Means, Gaussian Noise

Detection of Pesticide Residues in Honeybees in a Cropping System Under Integrated Pest Management

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Abstract

Pollination of crops is possible due to the action of pollinators, so honeybees have a very important role. The honeybee population is facing growing threats. Various factors have been identified in causing the reduction in pollinators including an expansion of pathogens, the incorrect use of phytosanitary products and environmental contaminants, along with other factors such as loss or fragmentation of habitat, invasive species and climate change. In economic terms, agriculture is a key sector in the EU; the estimated value of pollination is around 22 billion euros annually. In the Spanish agricultural sector, the citrus cultivation has a great socio-economic importance. In citrus, integrated pest management (IPM) attempts the most available use of strategies for the control of pests populations by means of taking actions that prevent problems, remove levels of damage and use of chemical control only when and where is necessary. The purpose of this work is to evaluate the exposure of honeybees to the usage of plant protection products (PPPs). Honeybees may intercept residues of PPP via consumption of nectar or pollen of plants treated by foliar spray or, via inhalation of high vapor pressure compounds during spray treatments. Due to the foliar spray in the crops, it is produced the absorption of hydrophobic PPPs, capable of crossing the cuticle of the plants or of entering through the stomata of the leaf, occurs mainly. The work presented here is a three-year field study, an approach to improve knowledge about exposure to PPPs on citrus orchards on honeybees. The methodological approach involves a generic extraction and mass spectrometric analysis of pesticide residues in samples of pollen collected from treated plants and in the honeybees themselves.[1]

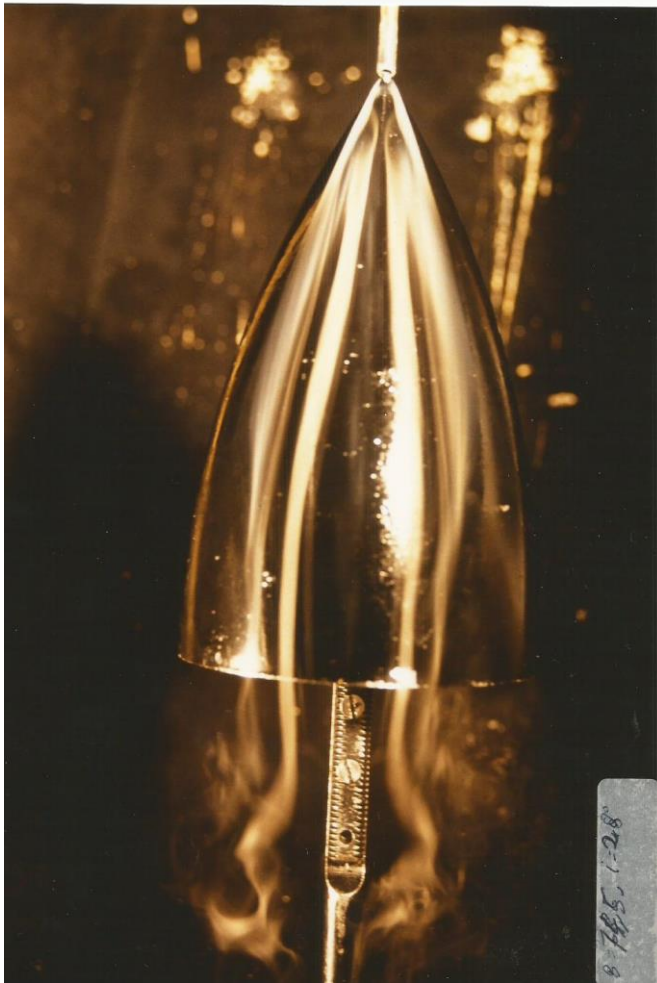**Keywords***: pollinators, pesticide residues, field-study, citrus, exposure vias.*

The Visualization of the Swirling Structures and the Swirling Burst of a Revolution Warhead

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Study on Urban Sustainable Restructuring of Leinefelde, Germany and Revealing the Important Strategies for Environmental Well-Being for Shrinking Cities

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Abstract

Why habitat Mars when you can make earth livable. Demographic change led to the shrinking of the city and also aging native population were big problems in leinefelde. Sustainable urban structures, housing affordability and availability was a big criteria. The political and economic change in the eastern Germany after reunification in 1989, anticipated and intensified the problems. By 1993 municipality realized that it should develop strategies and policies to stop the breakdown of economic and political breakdown of the city. As a result of the actions taken, leinefelde has become successful transformation of shrinking cities in the world. This research paper finds the problems led to shrinking of the city and then focuses on the different parameters and strategies like project context, social aspects, environmental aspects, economic aspects, organizational aspects, sustainable aspects that were carried out in order to have a successful transformation of leinefelde. And finally list down the key indicator for project being successful as a conclusion.

Keywords: Restructuring, project context, social characteristics, environmental features, economic aspects, organizational aspects, sustainable and innovation.

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Experimental and Numerical Investigation for Mechanical Ventilated Greenhouse (Comparison Between Different Turbulence Models)

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Abstract

Using computational fluid dynamics (CFD) in agriculture field especially in designing greenhouses is becoming ever more important to reduce the energy consumption, wherefore a comparison between the experimental and numerical results increasing the credibility of theoretical studies and therefore depending on it. Forced ventilation greenhouse has been used in even span greenhouse to study the experimental measurements of temperature distribution in summer rush hours, the experiment has been performed in October 6 University, Giza, Egypt. More than one turbulence models (Standard K-ε, RNG K- ε, Reynolds Stress Model (RSM), Transition Shear-Stress Transport (SST), Standard K-ω and K-KL-ω) are used for the (CFD) numerical study implemented for comparison between the experimental and numerical measurements. After this study can get that SST turbulence model is the most efficient numerical solution for this case, a good qualitative and quantitative agreement found between the numerical results and the experimental measurements.

Keywords: Greenhouse; Mechanical ventilation; CFD.

Eigenfrequency and Euler's Critical Load Evaluation of Transversely Cracked Beams with a Linear Variation of Widths

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Abstract

For a truthful evaluation of the mechanical response of structures reliable and adequate computational models are essential. Consequently, various researches have been devoted to the mathematical representation of cracked structures. This paper studies the performance of the simplified crack model in estimations of fundamental eigenfrequency as well as elastic Euler's critical load for transversely cracked beams of rectangular cross-sections with linearly-varying widths. To obtain these solutions for different beams with diverse boundary conditions Rayleigh's energy method which requires an assumed transverse displacement function can be applied. After the appropriate displacement function is being selected, kinetic and strain energy, as well as the work done by an external axial compressive force P are evaluated. From these values, the estimations of the fundamental eigenfrequency, as well as the critical load, are assessed. To obtain these preliminary estimates, static deflection functions were applied initially. These functions represent a wide group of suitable functions since they automatically satisfy the required kinematic boundary conditions. Afterwards, alternative functions constructed from a dedicated polynomial solution were applied. Since this mathematical form offers straightforward integration, the genuinely applied displacement functions were further upgraded, separately for eigenfrequency as well as for critical load estimation. All obtained simplified model's solutions were afterwards compared to the results from equivalent and more detailed 3D finite models of the examined structures. The comparisons of the results demonstrated very fine agreements with the results from 3D FE models for all performed analyses. The considered simplified model thus clearly yields a suitable alternative in modelling of cracked beams with a linear variation of width in those situations, where cracks have to be considered within the analysis.

Keywords: Eigenfrequency, Euler's critical Load evaluation, transversely cracked beams, linear variation, widths

New Approach to Basel IV using AI

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Abstract

The Basel Committee on Banking Supervision (BCBS) has released the Basel IV standards in December 2017. The major focus of the Basel committee has always been to improve capital and manage risk in the Banks. Basel IV, in this regards, targets the calculation of risk weighted assets for now and the capital floors by the end of 2022. In order to be compliant to this, the banks can either go the conventional way, which is not only cost heavy but also is a massive amount of manual work or the banks can strive for innovative solutions to cater to the requirement. Off late, Artificial Intelligence (AI) has been a major game changer in the fin-tech area. This paper is to showcase the capability of AI to eliminate manual effort and optimize the Basel IV implementation. AI can help in the real time assessment and consolidation of data from various sources to standardize the same and transmit the reports to the regulators in the required formats. AI can also anticipate the liquidity scenarios (based on trends, events etc.) and provide solutions to control the crests and troughs of the same. AI also helps data governance by generating reliable self-service data insights to make better decisions. Moreover, AI will help to optimize the operational procedures required to run the bank. All these along with an analytical engine put on the top can prove to be a breakthrough in the Basel IV implementation. Our paper explains in detail about how each of the Basel IV requirements can be implemented through Artificial Intelligence, thus proving to be a cost effective and optimized solution.

Keywords: new, approach, Basel IV, AI

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Exponentially Fitted Quadrature Formulae for Oscillatory Problems

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Abstract

Gaussian-type quadrature rules for oscillatory integrand functions are presented. The weights and nodes depend on the frequency of the problem and they are constructed by following the exponential fitting theory. The error analysis proves that the exponentially fitted Gaussian rules are more accurate than the classical Gaussian rules when oscillatory functions are treated. Some numerical tests are reported.

Keywords: exponentially, fitted, quadrature, formulae, oscillatory, problems