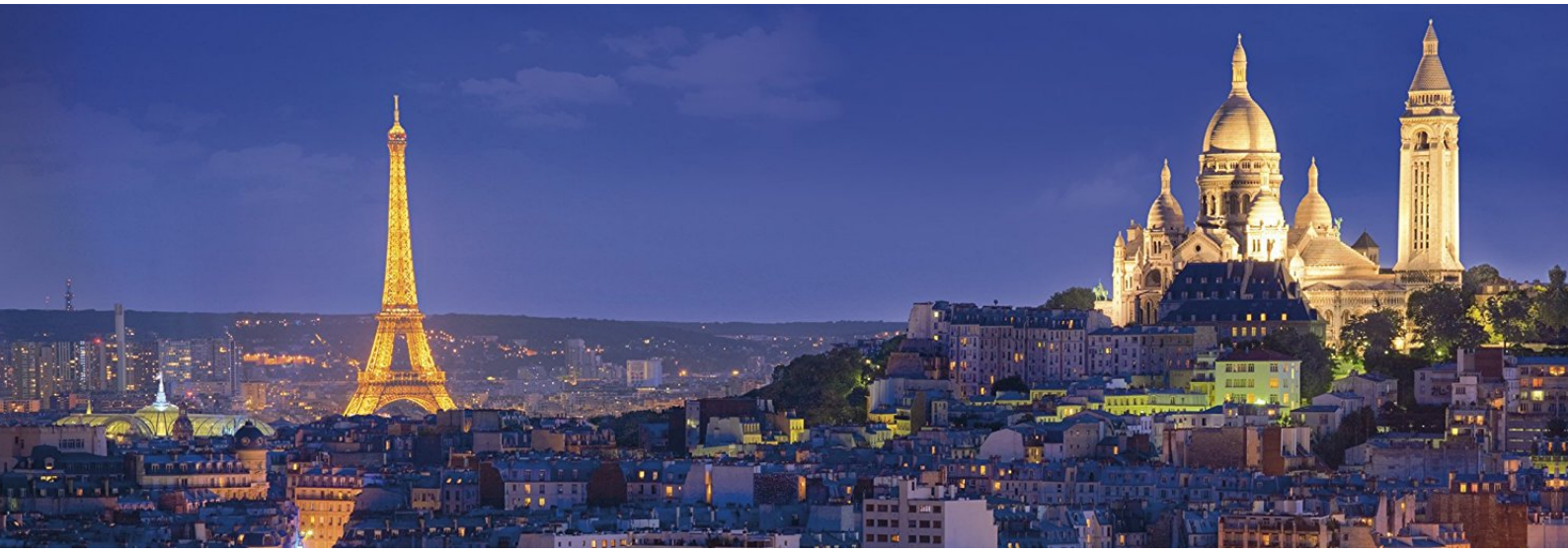
Conference Program



Paris, France
April 13-15, 2018

Conference Location:

Holiday Inn Paris Gare de l'Est
5 rue du 8 Mai 1945, 10th arr., 75010 Paris, France
http://www.hotel-paris-gare-de-lest.com/

Friday 13th April 2018

Conference Room: A
Time: 08:45-09:00
Welcome and opening speech by Assoc. Professor Nikolaos Bardis, Hellenic Military Academy, Greece

Conference Room: A
Time: 09:00-09:30
Plenary Lecture 1:

Digital Image Registration by Swarm Intelligence Algorithms
by Prof. Milan Tuba, State University of Novi Pazar, SERBIA.

Conference Room: A
Time: 09:30-10:00
Plenary Lecture 2:

Determination of Performances of the First and the Second Order of Wireless Communication System in the Presence of Fading, Shadowing and Cochannel Interference by Using Different Mathematical Methods
by Prof. Dragana Krstic, University of Nis, SERBIA.

Friday 13th April 2018

Conference Room: A
Time: 10:00-10:30
Plenary Lecture 3:

Revisiting the Research Unit of Analysis in a Networked Economy
by Prof. Léo-Paul Dana, Montpellier Business School, FRANCE.

Conference Room: A
Time: 10:30-11:00
Plenary Lecture 4:

Studies on Active Operation in Neuron and Neural Groups and Industrial Applications
by Dr. Atsushi Fukasawa, Chiba University, JAPAN.

11:00-11:30: Coffee Break

Friday 13th April 2018

Conference Room: A
Time: 11:30-13:30
Title: Circuits, Systems, Robotics and Signal Processing
Chair: Atsushi Fukasawa, Milan Tuba

Circular Polarization Array Antenna with Orthogonal Arrangement and Parallel Feeding by Simplified Routing Wires	Atsushi Fukasawa, Yumi Takizawa
Extended Kalman Filter and Markov Chain Monte Carlo Methods for Uncertainty Estimation. Application to X-Ray Fluorescence Machine Calibration and Metal Testing	S. Bouhouche, R. Drai, J. Bast
An Image Encryption Based on DNA Coding and 2DLogistic Chaotic Map	Fayza Elamrawy, Maha Sharkas, Abdel Monem Nasser
Examination of Shape Error of Outer Cylindrical Surfaces Machined by Environmentally Friendly Way	Gyula Varga, Tibor Puskás, István Debreceni
Circular Polarization Array Antenna with Orthogonal Arrangement and Parallel Feeding by Smoothed Routing Wires	Yumi Takizawa, Atsushi Fukasawa
Robust PSS-PID Based GA Optimization for Turboalternator	Amina Derrar, Abdelatif Naceri, Djamel El Dine Ghouraf
Modeling Safety Program by Incorporating Component Interactions and Constraints into the Design of the Aircraft System: STAMP Approach	Ali Majdi

Friday 13th April 2018

Conference Room: A
Time: 13:30-15:30
Title: Mathematical Models and Methods in Science and Engineering
Chair: Cristian Lazureanu, Abdelghani Harrag

Fixed or Variable Step Size PV MPPT? Comparative Study between P&O and IC	Abdelghani Harrag, Abbes Remita, Ahmed Oussama Bouzaher
Stability and Some Special Orbits for an Integrable Deformation of the Rikitake System	Cristian Lazureanu, Ciprian Hedrea, Camelia Petrisor
Weakly Convex Sets in Asymmetric Seminormed Spaces and their Properties	Mariana Lopushanski
The Bleustein-Gulyaev Wave and the Electromechanical Coupling Factor in Piezoelectric Layered Structures under the Effect of Coriolis and Centrifugal Forces	Abo-el-nour Abd-alla
Texture-Based Classification Approach to Simulate Absolute Permeability in Reservoir Rock Sample	Mohamed Soufiane Jouini, Ali Al-Sumaiti, Moussa Tembely, Khurshed Rahimov
Theoretical and Experimental Analysis of the Effect of Chip Size Ratio on Cutting Forces in Face Milling of Steel	János Kundrák, Angelos P. Markopoulos, Tamás Makkai, Antal Nagy
Flow of a Viscous Conducting Liquid in the Presence of an External Magnetic Field: Some Analytical Solutions to Test Computer Codes	Agnes Drochon, Manon Beuque, Dima Rodriguez
Analytical Evaluation of Well Productivity Index and Dietz Shape Factor for Double-periodic Multi-well Reservoir Systems	Vladimir Astafev, Pavel Roters, Vladimir Tjan
A Preliminary Approach to Identify the Best Function that Fits the Growth of Company Total Assets	Fernando Juárez
A Research-Based Pedagogical Approach to Introduction to Differential Equations for Undergraduate Students at an American Two-Year College	John A. Gordon, Majid Haghverdi, Johathan Martinez, Yang He, Yanyan Chen

15:30-16:00: Coffee Break

Friday 13th April 2018

Conference Room: A
Time: 16:00-18:00
Title: Applications of Computational Mathematics and Mathematical Modelling in Engineering
Chair: Dragana Krstić, Gabriella Bognár

Analysis of Ratio of One and Product of Two Rayleigh Random Variables and its Application in Telecommunications	Dragana Krstić, Mihajlo Stefanović, Siniša Minić, Miloš Perić
The Application of Accelerated Life Testing Method for Micro Switches	Vivien Sipkás, Gabriella Bognár
Approximate Solution for Magnetohydrodynamics Fluid Flow between Two Circular Discs	Fatma Ayaz, Hayriye Yetim, Nilay Akgonullu Pirim
Sensorless Speed High Gain Observer Based on Field-Oriented Control for the Asynchronous Machine	Ahmed Chouya, Mohamed Chenafa, Abdellah Mansouri
Similarity Analysis for a Heated Ferrofluid flow in Magnetic Field	Gabriella Bognár, Krisztián Hriczó
Quadratic Gradient Descent Methods and Transversality Conditions	J. Arroyo, O. J. Garay, J. Mencia
Finite Element Analysis for Non - proportional Loading	Nimali T. Medagedara, Pdsh Gunawardane

Friday 13th April 2018

Conference Room: A
Time: 18:00-20:00
Title: Computer Science and Informatics
Chair: Antoine Trad, Alen Šimec

A Direct Proof of Improved Biased Random Walk with Gastric Cancer Dataset	Choon Sen Seah, Shahreen Kasim, Mohd Farhan Md Fudzee, Mohd Saberi Mohamad
Blind Facial Images Deblurring Using Dark Channel Prior	Ahmed Hamed, Aliaa Youssif, Gamal M. I. Selim
Business Transformation Projects: An Enterprise Architecture Applied Mathematical Model - The Basics	Antoine Trad, Damir Kalpić
Business Transformation Projects: An Enterprise Architecture Applied Mathematical Model's Proof of Concept	Antoine Trad, Damir Kalpic
Isolated Environment Tools for Software Development	Alen Šimec, Bruno Držanić, Davor Lozić
Seeking a Convergence Solution in Detecting Metamorphic: A Hybrid Evolutionary Stochastic Framework and Model	A. O. Eboka, A. A. Ojugo
A Web-based Solution for Mapping the Power Quality Level	Cojoaca Ionut-Adrian

Saturday 14th April 2018

Conference Room: A
Time: 09:00-09:30
Plenary Lecture 5:

On Nonlinear Surface Growth Models
by Prof. Gabriella Bognar, University of Miskolc, HUNGARY.

Conference Room: A
Time: 09:30-10:00
Plenary Lecture 6:

VFIFE-Based Train-Bridge Interaction Dynamic Analysis
by Prof. J. D. Yau, Tamkang University, TAIWAN.

Conference Room: A
Time: 10:00-10:30
Plenary Lecture 7:

Big Data Analytics and Internet of Medical Things Make Precision Medicine a Reality
by Prof. Plamenka Borovska, Technical University of Sofia, BULGARIA.

10:30-11:00: Coffee Break

Saturday 14th April 2018

Conference Room: A
Time: 11:00-13:00
Title: Applications of Mathematics in Education and Informatics
Chair: Plamenka Borovska, Željko Marčićević

Virtual Internet Classroom System Modules for Distance IT Learning and Teaching within the Shared Space of the Global Network	Željko Marčićević, Branko Milosavljević
Disability and Sports in Social-Emotional and Social Inclusion Processes	María Elisa Alvarez, Edgar H. Ramírez
Dramatic Expression: A Strategy for the English Oral Production through the CLIL Approach	M. A. Gonzalo Romero Martínez, Andrea Medina Soto, Walter Vargas Urrego
From Technical Assistance to Teaching for Online Courses	Pauline Gata-Martin, Dominique Barchiesi
Parallelization and Optimization of Multiple Biological Sequence Alignment Software Based on Social Behavior Model	Plamenka Borovska, Veska Gancheva
Multisensorial Portable Device for Augmented Reality Experiences in Museums	João D. P. Sardo, João A. R. Pereira, Ricardo J. M. Veiga, Jorge Semião, Pedro J. S. Cardoso, João M. F. Rodrigues
Shape-Graph Based Object Recognition Using Node Context Embedding	Marton Szemenyei, Ferenc Vajda
Experimental Investigation of Enhancer-Promoter Interactions out of Genomic Big Data Based on Machine Learning	Desislava Ivanova, Plamenka Borovska, Veska Gancheva

Saturday 14th April 2018

Conference Room: A
Time: 13:00-15:00
Title: Communications and Signal Processing
Chair: Karel Frana, Piotr Augustyniak

Artificial Bee Colony Technique for Optimal Design of Folded Cascode OTA	Bachir Benhala
An Effect of the Fluid Viscosity on the Gas Deposition in the Two-Phase Mixture	Karel Fraňa, Iva Nová
Application of Watermarking Technique to Embedding Homemade Exercise Test Data into a Standard ECG Signal	Piotr Augustyniak
Transformation of Business of Travel Intermediaries in Terms of Dynamic Changes in Macro Environment – Towards New Challenges	Iris Mihajlović, Lucija Raguž
Is Li-Fi the Near Future Wireless Technology?	Abdelghani Harrag, Ahmed Oussama Bouzaher, Abbes Remita
Comparative Analysis of Methods for Reducing Distorting Regime by Simulating Active Power Filters	Marius Marcu, Florin Gabriel Popescu, Titu Niculescu, Ioan Razvan Slusariuc
Study of the Switching Mode of Inductive Loads Using NI-USB Data Acquisition System	Titu Niculescu, Florin Gabriel Popescu, Marius Marcu, Ioan Razvan Slusariuc

15:00-15:30: Coffee Break

Saturday 14th April 2018

Conference Room: A
Time: 15:30-17:30
Title: Applications of Science of Civil & Mechanical Engineering
Chair: Viktor Molnar, Juhee Lee

Buoyancy-driven Thermal and Flow Characteristics in Gaps between Two Glasses of Multi-framed Window	Juhee Lee, Younjun Lee
Experimental Evaluation of 3D Steel Joint with Loading in Both Axis	Alfonso Loureiro, Manuel López, J. Manuel Reinosa, Ruth Gutierrez
Experimental Study on Single Bubble Growth during Subcooled Nucleate Pool Boiling	M. R. M. Nawi
A Study of Factors Affecting Highway Accident Rates in Jordan	Wlla Al Mhairat, Suzanne Al Jazzazi, Asma Al Zyod
Hydrological Performance and Stormwater Management of Humid-Tropical Green Roof	C. Y. Jim, Gwendolyn G. L. Wong
Decision-Making in Procedure Selection on the Basis of Efficiency in Machining Hardened Surfaces	Janos Kundrak, Viktor Molnar, Istvan Deszpoth
A Review of Mechanical Properties of Jute-glass and Luffa-glass Fiber Reinforced Epoxy Hybrid Composites	S. S. Godara, Mukesh
Profit Allocation in Supply Chains on the Basis of Revenue-Sharing Rates	Viktor Molnar, Zoltan Musinszki, Tamas Faludi

Sunday 15th April 2018

Conference Room: A
Time: 09:00-11:00
Title: Applications of Informatics and Computers in the Mathematical Simulation for optimazation Problem in Sciences
Chair: Milan Tuba, Krasimira Prodanova

A Stable Hybrid Potential–SPH Technique to Enforce the Fluid Incompressibility	Juan J. Perea, Juan M. Cordero
Optimazing Multiple Drug Administration from Depot by Applying Pharmacokinetic Concepts	Krasimira Prodanova
Hybridized Monarch Butterfly Algorithm for Global Optimization Problems	Ivana Strumberger, Nebojsa Bacanin
Anisotropic Effect of an External Magnetic Field on Non-Equilibrium Concentration Fluctuations in Nanoparamagnetics	Ana Oprisan, Ashley Rice, Gabrielle Seymore
Moth Search Algorithm for Drone Placement Problem	Ivana Strumberger, Marko Sarac, Dusan Markovic, Nebojsa Bacanin
Markov-Modulated Linear Regression: A Case Study of Coaches' Delay Time	Nadezda Spiridovska

11:00-11:30: Coffee Break

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Plenary Lecture: Digital Image Registration by Swarm Intelligence Algorithms
by Professor Milan Tuba, State University of Novi Pazar, Dept. of Mathematical Sciences, SERBIA.
Email: tuba@ieee.org

Abstract. Digital mage registration represents a problem of great importance in various field such as medicine, security, astronomy, etc. It refers to the problem of matching two or more pictures of the same scene taken at different times, by different sensors, different viewpoints. It is necessary to find a spatial relationship between these images, usually called reference image and floating images. This relationship can be a linear transformation, also known as rigid transformation, or non-linear (nonrigid, elastic) transformation. Image registration techniques can be feature based or area based. Feature based techniques provide transformation which maps floating images to the reference image based on some common features between them. These techniques are limited due the need to find the reliable feature correspondence between images. Area based techniques work with pixel values and search for the optimal parameters for transformation that aligns floating images to the reference image. In order to determine registration quality, some similarity measurement should be defined. Some of the most common similarity measurements are squared intensity differences, cross correlation, mutual information, etc. The main task in image registration is to optimize the similarity metrics, which is a hard optimization problem. In the last two decades nature inspired algorithms, especially swarm intelligence algorithms, have been widely used for solving hard optimization problems. A number of swarm intelligence metaheuristics have been developed and they have been adjusted and tuned for image registration problem. This plenary lecture will present some successful applications of swarm intelligence algorithms to the image registration problem.

Plenary Lecture: Determination of Performances of the First and the Second Order of Wireless Communication System in the Presence of Fading, Shadowing and Cochannel Interference by Using Different Mathematical Methods
by Professor Dragana Krstic, Faculty of Electronic Engineering, University of Nis, SERBIA.
Email: dragana.krstic@elfak.ni.ac.rs

Abstract. Radio waves are subjected to refractions, reflections and diffractions that cause multipath propagation resulting in variations of the signal envelope and degradation of the wireless communication system performances of the first and the second order. Large obstacles between transmitter and receiver cause signal shadowing resulting in comparatively slow variations of average power, and consequently, degradation of the system performance. For interference limited channels in cellular system, the effect of Gaussian noise on the system performance can be ignored, making the propagation effects dominant performance degradation mechanism. Diversity reception can be used to simultaneously reduce multipath fading effects, shadowing effects and cochannel interference effects on the wireless communication systems' performance. Analytical work on determining characteristics of a mobile radio system that operates over composite fading and shadowing channels under cochannel interference will be presented in this lecture. Desired signal and interferences are under Gamma shadowed multipath fading. First, the formulas for probability density function and cumulative distribution unction (CDF) of the signal-to-interference ratio (SIR) will be derived in the closed-forms. Then, the closed-form expressions for the first and the second order system performance will be presented.

Plenary Lecture: Revisiting the Research Unit of Analysis in a Networked Economy

by Professor Léo-Paul Dana, Montpellier Business School, FRANCE & Marie Curie Fellow, Princeton University, USA.
Email: professordana@gmail.com

Abstract. In the past, entrepreneurs could prosper as owner-managers of independent local businesses. Larger firms used financial resources to expand internationally. Consequently, the unit of analysis in business research has typically been – and continues to be – the entrepreneur and/or the enterprise. The central unit of analysis in traditional International Business theories has been the firm, usually large, with a uni-polar, hierarchic structure of power & control. Traditional trait theories of Entrepreneurship attempted to explain entrepreneurship activity based around the individual. Yet, the reality of the global marketplace has been changing as formerly competing firms, both large and small, are now co-operating in various types of horizontal, vertical or trans-industry alliances. Growth need not take place by means of mergers and acquisitions, but can also be attained via networking, leading to a multi-polar distribution of ownership and control. Hence, we see the decline of traditional competition, as business evolves from uni-polar to multi-polar structures. The individual firm is no longer the most important player; rather we have groups. To reflect changing reality, we might consider changing our unit of analysis to relationships, links, networks and alliances rather than individuals/firms in isolation.

Plenary Lecture: Studies on Active Operation in Neuron and Neural Groups and Industrial Applications

by Dr. Atsushi Fukasawa, Former Professor, Chiba University, Research Organization of Information and Systems, JAPAN.
Email: takizawa@ism.ac.jp

Abstract. He and his colleague have studied the operational principle of a neuron and neural groups. It is based on the principles of electrical oscillation and synchronization in telecommunication and control systems. In his talk, it is clarified that a neuron operates as an oscillator of pulse and plateau signals. Then a neural group achieves signal processing under synchronous conditions. Physiological experiments of neurons are too hard where three electrodes must be inserted in the cells. The validation of our model and its analysis are supported by the studies on sensing and motion of unicellular animals. He will also present an application to estimation of event in time and space domain.

Circular Polarization Array Antenna with Orthogonal Arrangement and Parallel Feeding by Simplified Routing Wires

by Atsushi Fukasawa[a], Yumi Takizawa[b]
[a]Chiba University, Kamimeguro, Meguro, Tokyo, JAPAN.
[b]Institute of Statistical Mathematics, Research Organization of Information and Systems, Tokyo, JAPAN.
Email: a) fukasawafuji@yahoo.co.jp, b) takizawa@ism.ac.jp

Abstract. This paper presents a wideband configuration of array antenna with orthogonal arrangement and parallel feeding by simplified routing wires for circular polarization. In conventional studies, the bandwidth of effective circular polarization and flat impedance was limited only as a few per cent of the central frequency. This paper presents first that a novel unit antenna is composed of feed, reactance, and ground elements to realize wideband and less spurious resonances. This paper presents secondly that the array is composed of four antennas arranged in orthogonal and fed in parallel with phase delays of 90 degrees for circular polarization. Based on computer simulation, it was first found that enough bandwidth is obtained for circular polarization. But it was also found that flat-impedance bandwidth is limited to compose a practical array antenna with multiple unit antennas.

Extended Kalman Filter and Markov Chain Monte Carlo Methods for Uncertainty Estimation. Application to X-Ray Fluorescence Machine Calibration and Metal Testing

by S. Bouhouche[1*], R. Drai[1], J. Bast[2]
[1]Division Image and Signal Processing, Industrial Technologies Research Centre, Algiers, ALGERIA.
[2]Institut für Maschinenbau, Bergakademie Freiberg, GERMANY.
Email: *bouhouche11@yahoo.fr, s.bouhouche@crti.dz

Abstract. This paper is concerned with a method for uncertainty evaluation of steel sample content using X-Ray Fluorescence method. The considered method of analysis is a comparative technique based on the X-Ray Fluorescence; the calibration step assumes the adequate chemical composition of metallic analyzed sample. It is proposed in this work a new combined approach using the Kalman Filter and Markov Chain Monte Carlo (MCMC) for uncertainty estimation of steel content analysis. The Kalman filter algorithm is extended to the model identification of the chemical analysis process using the main factors affecting the analysis results; in this case the estimated states are reduced to the model parameters. The MCMC is a stochastic method that computes the statistical properties of the considered states such as the probability distribution function (PDF) according to the initial state and the target distribution using Monte Carlo simulation algorithm. Conventional approach is based on the linear correlation, the uncertainty budget is established for steel Mn(wt%), Cr(wt%), Ni(wt%) and Mo(wt%) content respectively. A comparative study between the conventional procedure and the proposed method is given. This kind of approaches is applied for constructing an accurate computing procedure of uncertainty measurement.

An Image Encryption Based on DNA Coding and 2DLogistic Chaotic Map

by Fayza Elamrawy[a], Maha Sharkas[b], Abdel Monem Nasser[c]
Arab Academy for Science & Technology, Alexandria, EGYPT.
Email: a) engfayzaelamrawy@gmail.com, b) mshsarkas@aast.edu, c) monem_1954@aast.edu

Abstract. A novel image encryption algorithm based on DNA coding and the Two-dimensional logistic chaotic map is presented in this paper. The proposed encryption algorithm consists of three parts, DNA coding, permutation, and diffusion. First, the image is encoded by DNA coding, then, the DNA coded image is permutated by using the 2D logistic chaotic map. Finally, the image is diffused by using the 2Dlogistic chaotic map to get the encrypted images. Simulation results show that the proposed algorithm provides good encryption effect, high performance and high sensitivity.

Examination of Shape Error of Outer Cylindrical Surfaces Machined by Environmentally Friendly Way

by Gyula Varga[a], Tibor Puskás[b], István Debreceni[c]
Institute of Manufacturing Science, University of Miskolc, Miskolc, HUNGARY.
Email: a) gyulavarga@uni-miskolc.hu, b) puskas91@outlook.hu, c) debrec.istvan@gmail.com

Abstract. The paper deals with experimental examination of machining of the cylindrical workpieces with a rotating cutting tool having defined edge geometry. During the examination, it is determined how the technological parameters (cutting speed, feed rate), the volume of the applied coolant and lubricant, furthermore the change of its kinematic viscosity affect to the cylindricity error of the machined workpiece. Our aim is to determine empirical expressions between the technological parameters set up at machining and the geometrical shapes – cylindricity - error. On the base of the examinations, the most appropriate parameter combination can be selected.

Circular Polarization Array Antenna with Orthogonal Arrangement and Parallel Feeding by Smoothed Routing Wires

by Yumi Takizawa[a], Atsushi Fukasawa[b]
[a]Institute of Statistical Mathematics, Research Organization of Information and Systems, Tokyo, JAPAN.
[b]Chiba University, Kamimeguro, Meguro, Tokyo, JAPAN.
Email: a) takizawa@ism.ac.jp, b) fukasawafuji@yahoo.co.jp

Abstract. This paper presents an extremely wideband array antenna with orthogonal arrangement and parallel feeding by smoothed round wires for circular polarization. In conventional studies, the bandwidth of circular polarization and flat impedance was limited only as a few per cent of the central frequency. This paper present first that a novel unit antenna is composed of feed, reactance, and ground elements to realize wideband and lee spurious resonances. This paper present secondly that the array is composed of four antennas arranged in orthogonal and fed in parallel with phase delay of 90 degrees for circular polarization. Based on computer simulation, it was first found that enough wide bandwidth obtained for circular polarization. And it was also found that the flat impedance bandwidth is extremely wide, it was concluded that this configuration first realized to compose a practical array antenna with multiple unit antenna.

Robust PSS-PID Based GA Optimization for Turboalternator

by Amina Derrar[a], Abdelatif Naceri[b], Djamel El Dine Ghouraf[c]
IRECOM Laboratory, Dept. of Electrical Engineering, UDL – SBA University, Sidi Bel Abbes, ALGERIA.
Email: a) amina.derrar@yahoo.com, b) abdnaceri@yahoo.fr, c) jamelbel22@yahoo.fr

Abstract. Proportional Integral Derivative (PID) controllers are widely used in many fields because they are simple and effective .Tuning of the PID controller parameters is not easy and does not give the optimal required response, especially with non-liner system. In the last two decades many intelligent optimization techniques were took attention of researchers like: Particle Swarm Optimization (PSO) and Genetic Algorithm (GA)techniques. The purpose of this paper is to present the modeling and simulation of conventional power system stabilizer (PSS-PID) .then we use Genetic Algorithm technique to find the best parameters of the optimal(PSS-PID) .The obtained results have proved that (G.A) are a powerful tools for optimizing the PSS parameters, and more robustness of the system IEEE SMIB.

Modeling Safety Program by Incorporating Component Interactions and Constraints into the Design of the Aircraft System: STAMP Approach

by Ali Majdi, Zhania Teb Research Corp., Tehran, IRAN.
Email: alimajdi@gmx.us

Abstract. According to Systems-Theoretic Accident Model and Processes (STAMP), the interactions among the system-components and the necessary constraints that must be fulfilled during the course of these interactions must be incorporated into the design of the system for ensuring safety. In the present research, a model has been developed which considers the sequence of interactions among the components of the aircraft system. It also includes the necessary constraints that must be fulfilled during the course of interaction. This system-design approach is used to detect abnormalities in the aircraft system according to STAMP which is better than the method of chain-of-events for analysis.

Fixed or Variable Step Size PV MPPT? Comparative Study between P&O and IC

by Abdelghani Harrag[1a], Abbes Remita[2b], Ahmed Oussama Bouzaher[2c]
[1]Informatics Dept., Faculty of Sciences, Ferhat Abbas University Setif, Sétif, ALGERIA.
[2]Institute of Optics and Precision Mechanics, Ferhat Abbas University Setif, Sétif, ALGERIA.
Email: a) a.b.harrag@gmail.com, b) aabbeess14@gmail.com, c) ah.oussama.bouzaher@gmail.com

Abstract. In this paper we investigate two MPPT commands (P&O and IC) for PV systems. The two algorithms were firstly evaluated independently using fixed and variable step size. In second time, a comparaison between the two methods is carried out. For this, the whole system composed of a PV MSX60 module connected to resistive load via a DC-DC boost converter driver using both proposed MPPTs algorithms are implemented under Matlab/Simulink environment. we were interested in the study and modeling of a photovoltaic system. The obtained results using Matlab/Simulink environment show that the accuracy with the P&O method in the case of high irradiation is less than with the IC method; On the other hand, the precision with the IC method for low irradiation is much less than with the P&O method. As for the response time, the IC method exhibits a better convergence time irrespective of the level of irradiation.

Stability and Some Special Orbits for an Integrable Deformation of the Rikitake System

by Cristian Lazureanu[a], Ciprian Hedrea[b], Camelia Petrisor[c]
Dept. of Mathematics, Politehnica University of Timisoara, Timisoara, ROMANIA.
Email: a) cristian.lazureanu@upt.ro, b) ciprian.hedrea@upt.ro, c) camelia.petrisor@upt.ro

Abstract. The integrable deformations of an integrable system are obtained by altering its constants of motion. These integrable deformations are also integrable systems, and they generalize the initial system. In this paper we consider a particular integrable deformation of the Rikitake system. We aim to see what changes occur in the dynamics of the Rikitake system. The chosen deformation function depends on a positive parameter and, as expected, we find some bifurcation values. We study the stability of the equilibrium points of the considered integrable deformation, and we give the image of the energy-Casimir mapping associated with this system. We obtain that the images of these points through the energy-Casimir mapping lead to a semialgebraic partition of the image of this mapping. In addition, we remark that some nonlinearly stable equilibrium points of the Rikitake system become unstable and they are associated with homoclinic and heteroclinic orbits, and also some unstable equilibrium points of the Rikitake system become nonlinearly stable and there are some special periodic orbits around them. Moreover, in connection with the above-mentioned partition of the image of the energy-Casimir mapping, we give parametric representations of the homoclinic and heteroclinic orbits, as well as of some special periodic orbits.

Weakly Convex Sets in Asymmetric Seminormed Spaces and their Properties

by Mariana Lopushanski, Moscow Institute of Physics and Technology, Dolgoprudny, RUSSIA.
Email: masha.alexandra@gmail.com

Abstract. In this work we present different results for weakly convex sets is spaces with asymmetric seminorm. We present the theorem for the well-posedness of the closest points problem and the Separation Theorem for weakly and strongly convex sets w.r.t. a quasiball. We also proved the proximal normal and Frechet normal regularities for weakly convex sets in spaces with asymmetric seminorm.

The Bleustein-Gulyaev Wave and the Electromechanical Coupling Factor in Piezoelectric Layered Structures under the Effect of Coriolis and Centrifugal Forces

by Abo-El-Nour Abd-Alla, Dept. of Mathematics, Faculty of Science, Jazan University, Jazan, SAUDI ARABIA and Dept. of Mathematics, Faculty of Science, Sohag University, Sohag, EGYPT.
Email: abdalla@jazanu.edu.sa

Abstract. Bleustein-Gulyaev waves under the rotation have many practical importance in different signal transmission, micro-machined gyroscopes, sensors, actuators, signal processing and information storage applications. This work investigates the propagation of Bleustein–Gulyaev (B-G) wave in a piezoelectric layered half-space under the effect of Coriolis and Centrifugal forces. In addition, the expressions for the phase velocity equation of the Bleustein-Gulyaev wave are given under the effect of rotation. Furthermore, the boundary conditions are considered in such a manner the displacements, shear stress, electric potential, and electric displacements are continuous across the interface between the layer and the substrate together with the traction free boundary at the surface of the layer. Moreover, the phase velocity is numerically calculated and illustrated for the electric open and short cases for different thicknesses of the layer and wave number. It is found that the Bleustein-Gulyaev wave and electromechanical coupling factor are influenced by the rotation and the physical properties of the material. The numerical outcomes produced by employing LiNbO3 as the material example are included for more clarification.

Texture-Based Classification Approach to Simulate Absolute Permeability in Reservoir Rock Sample

by Mohamed Soufiane Jouini[1a], Ali Al-Sumaiti[2b], Moussa Tembely[2c], Khurshed Rahimov[2d]
[1]Dept. of Mathematics, Khalifa University Petroleum Institute, Abu Dhabi, UAE.
[2]Dept. of Petroleum Engineering, Khalifa University Petroleum Institute, Abu Dhabi, UAE.
Email: a) mjouini@pi.ac.ae, b) aalsumaiti@adnoc.ae, c) mtembely@pi.ac.ae,
d) khrahimov@pi.ac.ae

Abstract. Carbonate reservoirs represent around half hydrocarbon reserves in the world. However, characterizing rock properties in these reservoirs is highly challenging because of rock heterogeneities revealed at several length scales. In the last two decades, a new approach known as Digital Rock Physics (DRP) revealed high potential to better understand rock properties behaviour at pore scale. This approach uses 3D X-ray Micro tomography images to characterize pore network and also simulate rock properties from these images. Even though, DRP is able to predict realistic rock properties results in sandstone reservoirs it is still suffering from a lack of clear workflow in carbonate rocks. The main challenge is the integration of properties simulated at different scales in order to obtain the effective rock property of core plugs. In this paper, we propose to characterize absolute permeability in a carbonate core plug sample using texture analysis. We propose to segment 3D micro-CT image in terms of textures and predict the overall rock permeability by integrating classification result with absolute permeability simulations values computed locally for each texture class. Finally, we discuss and compare our numerical simulation results with experimental measurement from the laboratory.

Theoretical and Experimental Analysis of the Effect of Chip Size Ratio on Cutting Forces in Face Milling of Steel

by János Kundrák[1a], Angelos P. Markopoulos[2b], Tamás Makkai[1c], Antal Nagy[1d]
[1]Institute of Manufacturing Science, University of Miskolc, Miskolc-Egyetemváros, HUNGARY.
[2]Laboratory of Manufacturing Technology, School of Mechanical Engineering, National Technical University of Athens, Athens, GREECE.
Email: a) kundrak@uni-miskolc.hu, b) amark@mail.ntua.gr, c) tamas.makkai@uni-miskolc.hu, d) antal.nagy@uni-miskolc.hu

Abstract. In this paper, the effect of chip size ratio on the cutting forces in face milling of steel is investigated with both geometrical analysis and experimental work pertaining to the testing of various cutting conditions. More specifically, the focus is on the increase of the amount of material being removed in one pass at high cutting speed, in connection to the increase of the cutting forces; the former increase should be maximum while the latter should be kept to a minimum. For this purpose, five different values of feed are tested and cutting forces are measured by a dynamometer, on a xyz axes coordinate system attached to the workpiece. Furthermore, cutting force components, referring to a coordinate system attached on the tool edge, can be calculated through geometrical assumptions and mathematical formulation. It is concluded that an eight times increase in feed results in eight-fold increase of cutting force Fc while material removal is much higher.

Flow of a Viscous Conducting Liquid in the Presence of an External Magnetic Field: Some Analytical Solutions to Test Computer Codes

by Agnes Drochon[1,2a], Manon Beuque[1b], Dima Rodriguez[3c]
[1]Université de Technologie de Compiègne, Compiègne, FRANCE.
[2]Sorbonne Universités, Paris, FRANCE.
[3]Université Paris-Sud Saclay, Orsay, FRANCE.
Email: a) agnes.drochon@utc.fr, b) manon.beuque@etu.utc.fr, c) dima.rodriguez@u-psud.fr

Abstract. A short review of some reference solutions for the magnetohydrodynamic flow of a viscous newtonian electrically conducting fluid is proposed in this paper. We present in details the solutions of Hartmann (1937), of Vardanyan (1973) and of Sud et al. (1974). In each case, a comparison is provided with the corresponding solution for the flow without any external magnetic field, namely Poiseuille (plane or cylindrical) and Womersley. We also present a synopsis of some other solutions for people who would like to go further in this topic. These fundamental solutions should be used as particular limiting cases to validate any proposed more elaborated solutions or to validate computer codes.

Analytical Evaluation of Well Productivity Index and Dietz Shape Factor for Double-periodic Multi-well Reservoir Systems

by Vladimir Astafev[1a], Pavel Roters[1b], Vladimir Tjan[2c]
[1]Dept. of Oil Fields Development, Samara State Technical University, Samara, RUSSIA.
[2]Dept. of Pipeline Transport, Samara State Technical University, Samara, RUSSIA.
Email: a) vladimir.astafev@mail.ru, b) rotersp@gmail.com, c) V_K_Tjan@mail.ru

Abstract. This work is devoted to the modeling of oil fields development with a multi-well systems located in a homogeneous closed reservoir of constant thickness and working under pseudo-steady state conditions. For these purposes, a closed reservoir is represented as an element of unbounded

doubly-periodic array of multi-well clusters, and the inflow conditions in multi-well systems are described by the Weierstrass elliptic functions. This approach allows us:
• to find the pressure distribution and the field of fluid velocities for any wells location in the reservoir.
• to calculate the productivity index (PI) and the Dietz's shape factor (CA) for any wells location in the reservoir.
• to establish the optimal wells location in the reservoir, maximizing the multi-well productivity index (MPI) of the reservoir.

A Preliminary Approach to Identify the Best Function that Fits the Growth of Company Total Assets
by Fernando Juárez, Escuela de Administración, Universidad del Rosario, Bogotá, COLOMBIA.
Email: fernando_juarez2@yahoo.com

Abstract. The purpose of the study is to analyze the Total Assets company growth finding a function that fits across industries and company size. The method is analytical, deductive and empirical; it is a cross-sectional analysis with two industries and different company sizes, based on Total Assets grouped into the categories of micro, small, medium or big enterprise. Every combination of industry-Total Assets is analyzed to see which function draws the best fit. The functions are: 1) Linear, 2) Logarithmic, 3) Inverse, 4) Quadratic, 5) Cubic, 6) Compound, 7) Power, 8) S, 9) Growth, 10) Exponential, and 11) Logistic. The test consists of a regression analysis. ANOVA significance test and explained variance allow identifying the best function fit. Results show that cubic function gives the best results in all combination if industry-Total-Assets. Other functions are relevant in some, but not all, combinations of categories.

A Research-Based Pedagogical Approach to Introduction to Differential Equations for Undergraduate Students at an American Two-Year College
by John A. Gordon[1a], Majid Haghverdi[2b], Johathan Martinez[3c], Yang He[3d], Yanyan Chen[3e]
[1]Dept. of Mathematics and Computer Science, City University of New York, Queensborough Community College, New York, USA.
[2]Dept. of Mathematics, Islamic Azad University, Arak Branch, IRAN.
[3]City University of New York, Queenborough Community College, New York, USA.
Email: a) jgordon@qcc.cuny.edu, b) majid_haghverdi@yahoo.com,
c) jmartinez91@tigermail.qcc.cuny.edu, d) yhe42@tigermail.qcc.cuny.edu,
e) ychen81@tigermail.qcc.cuny.edu

Abstract. Undergraduate students pursuing degrees in STEM (Science, Technology, Engineering, and Mathematics) at two-year colleges in the United States are usually required to take an introductory course in ordinary differential equation. The pedagogical strategy in most cases has been based primarily on presenting various standard techniques used in solving differential equations. This approach involves very little student research. The Mathematics Department at Queensborough Community College (QCC) has adopted a new student researchbased approach to its introductory course in ordinary differential equations. In this approach students learn very early in the course to apply technology and research techniques to solve real-world problems. This paper presents some of the student research and our preliminary findings.

Analysis of Ratio of One and Product of Two Rayleigh Random Variables and its Application in Telecommunications

by Dragana Krstić[1*], Mihajlo Stefanović[1], Siniša Minić[2], Miloš Perić[3]
[1]Faculty of Electronic Engineering, University of Niš, Niš, SERBIA.
[2]Teachers' Training Faculty, University of Pristina, Prizren, Leposavic, SERBIA.
[3]High Technical School of Vocational Studies, Niš, SERBIA.
Email: *dragana.krstic@elfak.ni.ac.rs

Abstract. In this paper, the ratio of product of two Rayleigh random variables and Rayleigh random variable (RV) is considered. The level crossing rate (LCR) of ratio of product of two Rayleigh random variables and Rayleigh random variable is evaluated. Using this result, the average fade duration (AFD) of wireless relay communication system with two sections operating over multipath fading channel in the presence of co-channel interference can be calculated. Then, the LCR of the ratio of Rayleigh RV and product of two Rayleigh RVs is determined. The formula is obtained in the closed form. The influence of Rayleigh fading average power on the LCR is analyzed. By using this formula, the AFD of wireless relay system with two sections working over Rayleigh multipath fading channel in the presence of two Rayleigh co-channel interferences could be evaluated.

The Application of Accelerated Life Testing Method for Micro Switches

by Vivien Sipkás, Gabriella Bognár*
University of Miskolc, Institute of Machine and Product Design, Miskolc - Egyetemváros, HUNGARY.
Email: *machsv@uni-miskolc.hu

Abstract. The estimation of product reliability has attracted wordwile attention during the past decades. The estimation produce usually begins with parameter estimation based on test date.The aim of this paper is to introduce the Accelerated Life Testing (ALT) method for the testing of micro switches. The analysis aims to take many effecting factors into account, to provide statistical assurance of the reliability and to give statistically reliable lifetime data in brief time. The Weibull distribution is applied for the investigation of the failure rate in the product's 'bathtube' lifetime curve. Weibull distribution capable of modelling bathtub shaped hazard rate function is defined. The importance of this distribution lies in its ability to model monotone as well as non-monotone failure rates, which are quite common in lifetime problems and reliability [10]. The most common failures of the micro switches have been collected, which are essential for testing and understanding the design of test equipment. It is necessary to learn more about the probability and frequency of these failures.

Approximate Solution for Magnetohydrodynamics Fluid Flow between Two Circular Discs

by Fatma Ayaz[a], Hayriye Yetim[b], Nilay Akgonullu Pirim[c]
Gazi University, Ankara, TURKEY.
Email: a) fayaz@gazi.edu.tr, b) hayriyeyetimath@gmail.com, c) nilayakgonullu@gmail.com

Abstract. This study is related to the unsteady magnetohydrodynamic (MHD) squeezing flow of a viscous incompressible fluid between two parallel discs one of which is fixed and permeable. The flow is assumed 2-D and the effects of heat transfer are taken into account. The governing Navier Stokes and heat equation given in cylindrical coordinates with the help of the similarity transformations are reduced into a system of coupled non-linear ordinary differential equations.

Then, the solution of the resulting system is obtained in the form of truncated Taylor series where the coefficients are evaluated by using differential transform method, namely DTM. This method is a generalized algebraic way for obtaining Taylor series coefficients of a smooth function and that reduces the computational cost. Here, we have investigated the flow properties in terms of suction/injection coefficient as well as the other flow parameters. The illustrative examples show that the present results are very consistent with existing ones.

Sensorless Speed High Gain Observer Based on Field-Oriented Control for the Asynchronous Machine

by Ahmed Chouya[a], Mohamed Chenafa[b], Abdellah Mansouri[c]
Dept. of Genie Electrical, University of Djilali Bounaama, Khemis-Miliana, ALGERIA.
Email: a) ahmedchouya@gmail.com, b) mchenafa@yahoo.fr, c) ammansouri@yahoo.fr

Abstract. A state observer is proposed for asynchronous machine; with this observer it possible to observe rotor flux and rotating speed. The gain of this observer involves a design function that has to satisfy some mild conditions which are given. Of particular interest, at the powerful of Field-Oriented Control with the new observer. The control algorithm is studied through simulations and applied in flux and speed profiles, and is shown to be very efficient.

Similarity Analysis for a Heated Ferrofluid flow in Magnetic Field

by Gabriella Bognár[a], Krisztián Hriczó[b]
Faculty of Mechanical Engineering and Informatics, University of Miskolc, Miskolc-Egyetemváros, HUNGARY.
Email: a) v.bognar.gabriella@uni-miskolc.hu, b) mathk@uni-miskolc.hu

Abstract. The aim of this paper is to introduce new results on the magneto-thermomechanical interaction between heated viscous incompressible ferrofluid and a cold wall in the presence of a spatially varying magnetic field. Similarity transformation is applied to convert the governing nonlinear boundary layer equations into coupled nonlinear ordinary differential equations. This system is numerically solved using higher derivative method. The effects of governing parameters corresponding to various physical conditions are investigated. Numerical results are represented for the distributions of velocity and temperature, for the dimensionless wall skin friction and for heat transfer coefficients. Our results show excellent agreement with previous studies and obtained two solutions in some cases.

Quadratic Gradient Descent Methods and Transversality Conditions

by J. Arroyo[a], O. J. Garay[b], J. Mencia[c]
University of the Basque Country UPV/EHU, Dept. of Mathematics, Bilbao, SPAIN.
Email: a) josujon.arroyo@ehu.es, b) oscarj.garay@ehu.es, c) jj.mencia@ehu.es

Abstract. Performance of certain gradient descent methods introduced in [1] is analyzed under transversality constraints. Under the scope of these methods, transversality conditions can be dealt as isoperimetric constraints. Efficiency of the approach is analyzed when two very well known classical problems, the brachystochrone and planar elastica, are considered.

Finite Element Analysis for Non - proportional Loading

by Nimali T. Medagedara[a], Pdsh Gunawardane[b]
Dept. of Mechanical Engineering, Open University of Sri Lanka, Nawala, Nugegoda, SRI LANKA.
Email: a) tmmed@ou.ac.lk, b) pdgun@ou.ac.lk

Abstract. Structural components with complex geometries are frequently subjected to alternating loads, which produce multi-axial stresses. In most cases, the loading is non-proportional. Alternating loads tend to initiate fatigue cracks at notches and at other regions of high stresses. Some typical situations in which fatigue can occur are the repeated expansions and contractions of a pressurised aircraft, a car suspension unit absorbing the undulations of a normal road surface and the rhythmic crashing of waves against hull of a ship. However, occurrence of fatigue is a common phenomenon in many engineering components and their failures are also attributed to fatigue.

A Direct Proof of Improved Biased Random Walk with Gastric Cancer Dataset

by Choon Sen Seah[1a], Shahreen Kasim[1b], Mohd Farhan Md Fudzee[1], Mohd Saberi Mohamad[2c]
[1]Soft Computing and Data Mining Centre, Faculty of Computer Science and Information Technology, Universiti Tun Hussein Onn Malaysia, Johor, MALAYSIA.
[2]Faculty of Creative Technology and Heritage, Universiti Malaysia Kelantan, Kelantan, MALAYSIA.
Email: a) Seanseah0702@gmail.com, b) shahreen@uthm.edu.my, c) saberi@umk.edu.my

Abstract. The relationship between the weight of a single genes and the connection between the genes had been studied. Chemistry and physical sciences have proved the attraction between molecules. Molecules are attracted to each other by bond. This paper is presented to disclose the relationship between weight and connectivity of nodes with biased random walk. An equation of biased random walk which named as significant directed random walk is formed to enhance the connectivity of nodes in directed graph via weigh. To be completely biased to the random walk, references data is implement as directed graph. Weight of genes will be used as one of the parameter in the formula. While the adjacency matrix is further enhanced by Warshall's algorithm to increases the accessibility of nodes via vector. The evolution of random walk is disclosed in this paper as well. Significant directed random walk will be used to prove the importance of weight in this paper. Comparison of the result between biased random walk is presented to prove the enhancement of random walk.

Blind Facial Images Deblurring Using Dark Channel Prior

by Ahmed Hamed[1a], Aliaa Youssif[2b], Gamal M. I. Selim[1c]
[1]Arab Academy for Science, Technology and Maritime Transport (AASTMT), Cairo, EGYPT.
[2]Helwan University, Cairo, EGYPT.
Email: a) ahmed.hamed0@me.com, b) aliaay@yahoo.com, c) dgamalselim@aast.edu

Abstract. In recent years, terrorism, accidents, violence and thefts have increased, and we need to install surveillance cameras everywhere in order to identify the people who have done the bad deeds. In most cases, the picture is not clear to identify and know the people, so we have developed a system that helps to improve the image level So that we can identify people. To obtain a high quality latent image from a blurred image, effective regularizations are required. In our paper, we propose a Contrast-limited adaptive histogram equalization Algorithm and dark channel of blurred images with Down sampling and gradient prior to improve blur kernel estimation (L0 regularized intensity) and finally use bilateral filter to remove Noise. experimental results demonstrate that the proposed method can better handle various complex face poses, as compared with state-of-the-art approaches.

Business Transformation Projects: An Enterprise Architecture Applied Mathematical Model - The Basics

by Antoine Trad[1*], Damir Kalpić[2]
[1]Institute of Business and Information Systems Transformation Management, FRANCE.
[2]University of Zagreb Faculty of Electrical Engineering and Computing, CROATIA.
Email: *antoine.trad@ibistm.org

Abstract. This article's authors based their research on an authentic mixed multidisciplinary research method that is supported by intelligent neural networks and a heuristics module, named the Applied

Mathematical Model (AMM) [1][2][3] [29]. Where the proposed AMM is similar to the human decision-making process. The AMM is supported by a real life case of a business transformation nitiative in the domain of Enterprise Asset Management (EAM)[4]. The proposed AMM offers a set of solutions in the form of financial, technical and managerial recommendations, to be used by the target company's business analysts and enterprise architects to implement EAM solutions in the context of Business Transformation Projects (BTP). Heuristics is applied in real world problems that are very similar to transformation projects. The AMM is not influenced by any specific business domain and has a holistic approach that uses a neural networks processor. The AMM is based on a reasoning concept that is basically a qualitative research method that manages and qualifies Critical Success Factor (CSF) sets, actions and final solutions [5]. The AMM's underlined system supports the BTPs in integrating scenarios that are sets of interactive services.

Business Transformation Projects: An Enterprise Architecture Applied Mathematical Model's Proof of Concept

by Antoine Trad[1*], Damir Kalpić[2]
[1]Institute of Business and Information Systems Transformation Management, FRANCE.
[2]University of Zagreb Faculty of Electrical Engineering and Computing, CROATIA.
Email: *antoine.trad@ibistm.org

Abstract. A complex Business Transformation Project (BTP) needs a qualified Business Transformation Manager (BTM) to manage the complex implementation and integration of an Enterprise Asset Management (EAM) system. A BTM must be assisted with a tuneable framework for the integration of a plethora of EAM's types of problems and business requirements [1]. EAM tooling support for such systems is one of the foci of the authors' business transformation research project that started in the year 2010. In this research paper, the authors try to prove that the BTM must be supported by a framework to help him or her (in further text for simplicity "he") with the EAM integration process. The authors apply an adequate mixed research methodology, design and prototyping that are based on a real-world framework named the Applied Mathematical Model (AMM); used to build and assess this research subproject's hypothesis. The EAM is considered to be the research sub-project's implementation and its technical and managerial benefit. This current phase's objective is to offer a framework with EAM capacities. The implementation of this research and the proposed framework offer a neural networks reasoning module that supports an implementation environment that has to cope with complex EAMs and as a result, it proposes a proof of concept to prove its feasibility [2].

Isolated Environment Tools for Software Development

by Alen Šimec[a], Bruno Držanić[b], Davor Lozić[c]
Zagreb University of Applied Sciences, Zagreb, CROATIA.
Email: a) alen@tvz.hr, b) bdrzanic@tvz.hr, c) dlozic@tvz.hr

Abstract. Docker and Vagrant are virtualization containers. Both worlds have their own quirks but each one serves their purpose well. Vagrant, the older brother, uses virtual machines to create isolated environments for software development. On the other side, Docker uses another technique called Containers for isolation and in that term uses local system files and resources. Before those tools, there were so many problems with porting applications, setting them up on other development machines or servers. The problem was that all machines had different setups, some had different versions of required files or they didn't have required extensions. Modern distributed applications development often faces two problems, first problem is inconsistency of development

environments because of multiple versions of operating systems and packages and the second one is services and discrepancies between development and test/deployment environments. Virtualization technology, such as virtual machines (VMs) and containers that can handle these problems effectively, but they are often difficult to use in real-world development processes due to the lack of appropriate tools for developers. Modern distributed applications, especially web applications, are typically built using a set of loosely coupled services, with rapid development and deployment cycles. These services may run in multiple virtual machines and are ephemeral according to clients demands. This paper presents both tools, compares them and shows which one of them is the best for which specific use. The purpose of this paper is to show when and why to use which tool and to show advantages and disadvantages of each one.

Seeking a Convergence Solution in Detecting Metamorphic: A Hybrid Evolutionary Stochastic Framework and Model

by A. O. Eboka[1a], A. A. Ojugo[2b]
[1]Dept. of Computer Science, Federal College of Education Technical, Asaba, Delta State, NIGERIA.
[2]Dept. of Mathematics/Computer Science, Federal University of Petroleum Resources, Effurun, Delta State, NIGERIA.
Email: a) andre_y2k@yahoo.com, b) ojugo.arnold@fupre.edu.ng

Abstract. Malware alter the behaviour of a host machine's file by self-replicating its codes unto it. On execution, some malware change its structure so that its copies have same functionality but differ in signature and syntax from its parent – making signature-based detection unreliable. Machine learning has yielded ways to evolve malware codes (even when some employ code obfuscation) to generate complex variants of base virus. This study samples metamorphic engine as hybrid with GAPSO to yield faster, highly diverse variants of base virus. It employs GA's exploratory and flexibility to learn feats within extracted data as well as PSO's speed and navigation to yield a robust optimal solution and faster, completely morphed copies of base virus. With learning rates set between [0.2, 0.35], $\phi 1$, = 1.5, $\phi 2$ = 2.5, ϖ = 0.14 and MaxGen of 500 epochs – yields better and faster convergence. Other values led to a slower convergence and/or non-convergence. Result shows the evolved variants as tested on commercial antivirus.

A Web-based Solution for Mapping the Power Quality Level

by Cojoaca Ionut-Adrian, Development and Asset Management Dept., Oltenia Distribution SA, Craiova, ROMANIA.
Email: adrian.cojoaca92@yahoo.com

Abstract. Power quality influences the operating conditions of a power network, having important technical and economic implications over the power consumption and also on the security of the power network's operation environment. Therefore, the power grid operators are found in the position to search for the best tools capable to convert huge volume of heterogenous information into knowledge, briefly and easily understandable and available to a large category of execution personnel. The content of this paper gravitates on a web-based tool designed for a general evaluation and geographical visualization of the power quality level in the power distribution grids – MAPPQ (Mapping of the power quality).

Plenary Lecture: On Nonlinear Surface Growth Models
by Professor Gabriella Bognar, Faculty of Mechanical Engineering and Informatics, University of Miskolc, HUNGARY.
Email: v.bognar.gabriella@uni-miskolc.hu

Abstract. The technique of growth surfaces under Molecular Beam Epitaxy has received considerable attention for a wide range of technological and industrial applications. This approach provides unique capability to grow crystalline thin films with precise control of thickness, composition and morphology. This enables scientists to build nanostructures as pyramidal objects or mounds. The evolution of the surface morphology during MBE growth results from a competition between the molecular flux and the relaxation of the surface profile through surface diffusion. The aim of this talk is to describe the coarsening process, to present results showing that surfaces can be mathematically and physically classified into different categories, to provide analytical results on the wavelength and amplitude. Numerical simulations are presented to show the roughening and coarsening of the surface pattern and the evolution of the surface morphology in time for different parameter values in one- and in two-dimensions.

Plenary Lecture: VFIFE-Based Train-Bridge Interaction Dynamic Analysis
by Professor J. D. Yau, Dept. of Architecture, Tamkang University, TAIWAN.
Email: jdyau@mail.tku.edu.tw

Abstract. This study presents a new approach based on the Vector Form Intrinsic Finite Element (VFIFE) method for the dynamic analysis of train-bridge system. Based on Newton's 2nd law, the VFIFE method is used to discretize a structure into a group of mass particles connected by massless stiffness elements. Then the equation of each mass particle is solved individually and the internal forces induced by pure deformations in the massless elements are recovered using the fictitious reverse motion method, from which the updating and factorizing procedure in structural matrices of conventional finite element procedure is skipped. With the computational algorithm of VFIFE method, the bridge is discretized into a group of mass particles linked by massless beam elements and the multi-body coach supported by suspension systems is simulated as a set of mass particles connected by parallel spring-dashpot systems. Numerical verifications demonstrate that the present VFIFE method has a good accuracy as previous numerical works. Meanwhile, the resonance phenomenon on the running coaches will be studied as well once the train- and bridge- induced resonances on the train-bridge system occurs simultaneously.

Plenary Lecture: Big Data Analytics and Internet of Medical Things Make Precision Medicine a Reality
by Professor Plamenka Borovska, Informatics Dept., Faculty of Applied Mathematics and Informatics, Technical University of Sofia, Sofia, BULGARIA.
Email: pborovska@tu-sofia.bg

Abstract. In Digital Era, modern society faces the challenges of advanced knowledge that technology helps us create. Advanced information and communication technologies facilitate the efficiency of scientific research in all areas – life sciences, technology, and humanities. The computational paradigm in scientific research involves computer-based models and simulations (in silico experimentation) that offer greater potential and facilities to investigate then theoretical analysis

does. Globally, this resulted in the accumulation of huge amounts of in silico experimentation data that can be subjected to analysis in order to extract value. The fourth scientific research paradigm – Data Intensive Science Discovery - revolutionized fundamental and applied science research. Innovative modern technologies, such as Big data analytics, Internet of Things, cloud computing, give researchers powerful opportunities for Knowledge Data Discovery and intelligent decision making. Precision medicine has been one of the hottest topics nowadays and involves disease treatment that takes into account individual genetic profile, environmental specifics, and lifestyle of the individual. Knowledge Data Discovery (KDD) solutions are crucial for the detection of complex DNA anomalies implicated in genetic diseases and cancer. The capacity of DNA databases is exponentially growing for the last decade. Precision medicine starts with genomics and relies on the omics platforms for the analysis and interpretation of multi-scale data. The major sources of genomic data acquisition within the Big genomic data ecosystem are the new DNA sequencing technologies, “omics” data generation, in silico technologies, genome databases, cancer genome databases, and the related technologies Internet of medical Things (IomT) and cloud technologies. Wireless Body Area Networks (IomT) provide continuous health monitoring of patients for applications, such as remote monitoring, biofeedback and assisted living. Leader IT companies such as Amazon’s Genomics in the Cloud, Google Genomics, IBM Watson Health, and SAP Health offer healthcare innovation portfolio on their big data platforms and cloud services for infrastructure, software tools and data sets for genomic analyses with the aim of facilitating personalized medicine.

Virtual Internet Classroom System Modules for Distance IT Learning and Teaching within the Shared Space of the Global Network

by Željko Marčićević*, Branko Milosavljević
Dept. of Computing and Control Engineering, Faculty of Technical Sciences, University of Novi Sad, Novi Sad, SERBIA.
Email: *marcic@uns.ac.rs

Abstract. This paper displays some modular units within the structure of an interactive, online virtual Internet classroom for collaborative strategies in an open educational environment inside the shared work space of the Internet. The Internet resources global search engine will be presented. Weather forecast module, web gallery of images and structures with frequently asked questions and answers in a virtual classroom. It displays the component for multipurpose connection with the virtual professor, as well as the use of the component for cooperative team work. A virtual hypermedia classroom was implemented using ASP development technology with a user interface to distributed databases.

Disability and Sports in Social-Emotional and Social Inclusion Processes

by María Elisa Alvarez[a], Edgar H. Ramírez[b]
Faculty of Education Sciences, Central University of Valle del Cauca, Valle del Cauca, COLOMBIA.
Email: a) mealvarez@uceva.edu.co, b) eramirez@uceva.edu.co

Abstract. This article aims to explore the social-emotional condition and the incidence of sports in the social inclusion processed in a group of athletes with disabilities of the wheelchair-basketball modality in the municipality of Tuluá, Valle del Cauca, Colombia. It is a qualitative case study, in which the narrative method and content analysis were used with nine athletes. In Colombia, the rising of the population in disability situation justifies the need for educational processes and public policies generating alternatives for a population affected by social discrimination, facing difficulties in accessing to health, nutrition, education, social integration, rehabilitation programs and physical activity. Thus, this research study shows that sport has become a very important option for improving the quality of life and for allowing their active participation in the society.

Dramatic Expression: A Strategy for the English Oral Production through the CLIL Approach

by M. A. Gonzalo Romero Martínez*, Andrea Medina Soto, Walter Vargas Urrego
Central University of Valle del Cauca, Valle del Cauca, COLOMBIA.
Email: *gromero@uceva.edu.co

Abstract. This paper reports an action research project which analyzed the influence of the dramatic expression strategy in the English oral production through CLIL approach at a school in a monolingual context in Colombia with students of seventh grade (12-14 year-old-students). Initially, the oral production level was identified through an oral production test. Later, the implementation was carried out during twenty sessions of two hours each one, where the dramatic expression was used through the CLIL approach; where the students had to keep the permanent interaction in the target language to achieve the objectives of each class. Moreover, the Low and High Order Thinking Skills were considered to establish the microcurriculum, according to the theoretical framework of CLIL. Finally, the influence of the dramatic expression strategy through the CLIL approach in the oral production of English was evaluated by means of the final test for this ability. In this process was

evidenced that more of the half of the students were located in the initial level of the test and just one in the advanced level; meanwhile, in the final test, more of the half of the students were located in the medium level and three in the advanced level.

From Technical Assistance to Teaching for Online Courses

by Pauline Gata-Martin[a], Dominique Barchiesi[b]
Operational Research, Applied Statistics and Simulation Dept., University of Technology of Troyes, Troyes, FRANCE.
Email: a) Pauline.gata_martin@utt.fr, b) dominique.barchiesi@utt.fr

Abstract. Online courses propose to students various digital resources which realization is time consuming and may be costly (videos of experts, interactive experiments, and quiz from a bank of questions…). Moreover, if discussion forums, active tutoring of productions and of projects realization, the time spent supervising students can exceed that for traditional classrooms. The resources might soon become obsolete and a continuous improvement of resources is necessary for the course to remain attractive for students. Moreover, resolving technical problems of connection, of access to resources, of misunderstanding in their use requires assistance for the teacher. The condition of the success of online courses goes through using appropriate digital tools and scenarios that are not intuitive for the teacher. Therefore, a specific job of Assistant to Teaching for Online Courses (ATOC) is necessary. The understanding of the teacher's objective by the ATOC induces the development of skills in the subject taught. Therefore, the technical assistant can become a teaching assistant (TA) and belong to the educational team. We report here the above progressive transformation of ATOC to TA in a learning module dedicated to innovation.

Parallelization and Optimization of Multiple Biological Sequence Alignment Software Based on Social Behavior Model

by Plamenka Borovska[1a], Veska Gancheva[2b]
Dept. of Informatics, Technical University of Sofia, Sofia, BULGARIA.
Dept. of Programming and Computer Technologies, Technical University of Sofia, Sofia, BULGARIA.
Email: a) pborovska@tu-sofia.bg, b) vgan@tu-sofia.bg

Abstract. This activity is aimed to investigate and to improve the performance of the multiple sequence alignment software MSA_BG, for the case study of the influenza virus sequences. The objective is code optimization, porting, scaling and performance evaluation of the parallel multiple sequence alignment software MSA_BG for Intel Xeon Phi (the MIC architecture). For this purpose a parallel multithreaded optimization including OpenMP has been implemented and verified. The experimental results show that the hybrid parallel implementation utilizing MPI and OpenMP provides considerably better performance than the original code.

Multisensorial Portable Device for Augmented Reality Experiences in Museums

by João D. P. Sardo[1a], João A. R. Pereira1[b], Ricardo J. M. Veiga1[c], Jorge Semião[2d], Pedro J. S. Cardoso[1e], João M. F. Rodrigues[1f]

[1]LARSyS & ISE, University of the Algarve, Faro, PORTUGAL.

[2]INESC-ID & ISE, University of the Algarve, Faro, PORTUGAL.

Email: a) jdsardo@ualg.pt, b) japereira@ualg.pt, c) rjveiga@ualg.pt, d) jsemiao@ualg.pt, e) pcardoso@ualg.pt, f) jrodrig@ualg.pt

Abstract. It is presented in this paper a portable device, capable of providing a full five sense augmented reality experience, through the reproduction of touch, taste and smell stimulus. The presented hardware is part of a mobile five senses augmented reality system for Museums (M5SAR) project, which aims at developing an augmented reality (AR) system to be a guide in cultural, historical events and museums, complementing or replacing the traditional orientation given by a guide, directional signs or maps. The complete system consists of an App (out of the scope of this paper) and the hardware portable device (presented in this work), referred as "gadget", to be integrated with the user's smart device, allowing him to explore all 5 human senses, to improve and augment, as much as possible, the visiting of a museum, for example, see, ear, touch, feel and experience all its interesting objects. Most of the existing solutions for this type of devices, are either too big and not designed for portability or either fail to make use of all the five senses at once. In this work, a new small and portable device is presented, able of integrating and connecting with the user's smart device, to provide a full five sense experience. The device is flexible enough to adapt itself to different sizes of tablets and smartphones. The proposed hardware is powered by a rechargeable battery, giving the module portability to be used during the visit of the museum. It uses a microcontroller for the core unit, which receives instructions from the mobile application, running on the user's smart device, and acts respectively, activating the physical interfaces to deliver the five-sense experience to the user. These interfaces are responsible for generating the stimuli that reproduce the three senses, touch, taste and smell, while the other senses, sight and hearing, are already reproduced through the smartphone's screen and speakers, respectively. This communication between the mobile application and the device is done via Bluetooth.

Shape-Graph Based Object Recognition Using Node Context Embedding

by Marton Szemenyei[a], Ferenc Vajda[b]

Budapest University of Technology, Dept. of Control Engineering, Budapest, HUNGARY.

Email: a) szemenyei@iit.bme.hu, b) vajda@iit.bme.hu

Abstract. Graphical object representation is fequently used for visual object recognition and detection methods. Since most machine learning methods requira vectorial input, significant research has been done on assigning feature vectors to graphs - a process known as graph embedding. However, when one wishes to detect objects in a larger scene, it is a more viable strategy to assign feature vectors to graph nodes, and classify them individually. In this paper, we present a graph node embedding algorithm for 3D object detection based on primitive shape graphs. Our embedding algorithm encodes the local context of the selected node into the feature vector, thus improving the classification accuracy of nodes. The method also imposes no restriction on the structure of the graphs or the weights on the nodes and edges. The method presented here will be used as part of an intelligent object pairing algorithm for Tangible Augmented Reality.

Experimental Investigation of Enhancer-Promoter Interactions out of Genomic Big Data Based on Machine Learning

by Desislava Ivanova[1a], Plamenka Borovska[1b], Veska Gancheva[2c]
[1]Dept. of Informatics, Technical University of Sofia, Sofia, BULGARIA.
[2]Dept. of Programming and Computer Technologies, Technical University of Sofia, Sofia, BULGARIA.
Email: a) d_ivanova@tu-sofia.bg, b) pborovska@tu-sofia.bg, c) vgan@tu-sofia.bg

Abstract. This paper reviews the existing methods for detection of enhancer-promoter interactions. It presents the experimental investigation for detection of enhancer-promoter interactions from genomic big data based on machine learning. The authors are spent time to explain the importance of promoters and enhancers and their impacts on gene expression. The main purpose of the paper is to propose a pipeline for detection of enhancer-promoter interactions. It is realized by using Decision Tree and Support Vector Machine classifiers. The experimental framework is based on Apache Spark environment that allows streaming and real time analysis of big data. Machine learning library of Apache Spark (MLlib) is implemented in python programming language for processing genomic big data. To perform the results, the enhancer-promoter interactions GM12878 and K562 datasets are used. Finally, the experimental results are presented and discussed.

Artificial Bee Colony Technique for Optimal Design of Folded Cascode OTA

by Bachir Benhala, Laboratory of Electronics, Automatics and Biotechnology, LEAB, University of Moulay Ismail, Faculty of Sciences, Meknes, MOROCCO.
Email: b.benhala@fs-umi.ac.ma

Abstract. This paper presents an application of a Swarm Intelligence (SI) algorithm for automatic sizing of analog circuits. For this purpose, a CMOS folded cascode Operational Transconductance Amplifier (OTA) is designed using Artificial Bee Colony technique (ABC). The performances, namely open-loop voltage gain (Av), the unity-gain frequency (Ft), the power-supply rejection ratio (PSRR) and the common mode rejection ratio (CMRR) are optimized. The optimal design of the OTA circuit is carried out using ABC method in MATLAB and the accuracy of performance prediction is verified by SPICE simulation (0.35-µm). A comparison results with published works are also highlighted.

An Effect of the Fluid Viscosity on the Gas Deposition in the Two-Phase Mixture

by Karel Fraňa[1a], Iva Nová[2b]
[1]Dept. of Power Enginerring, Technical University of Liberec, Liberec, CZECH REPUBLIC.
[2]Dept. of Engineering Technology, Technical University of Liberec, Liberec, CZECH REPUBLIC.
Email: a) karel.frana@tul.cz, b) iva.nova@tul.cz

Abstract. Cellular metal structures are preferred in many applications because of the lower specific weight and favorable material properties. The production of these structures has been mostly studied by experiments. In this paper, a numerical approach was adopted to predict gas deposition in the two-phase mixture. The effect of the gas deposition was studied with respect to different fluid viscosities. Simultaneously, the intensity of foaming using a gas filling was taken into account as well. The compressible multiphase solver with the heat transfer was successfully applied for unsteady calculations. The shape and volume fraction of the bubbles was found to be depending on the viscosity magnitude of the liquid. Velocity magnitudes of the air flow driven by a buoyancy effect above the liquid material determined the maximal time step used for the unsteady calculations.

Application of Watermarking Technique to Embedding Homemade Exercise Test Data into a Standard ECG Signal

by Piotr Augustyniak, AGH University of Science and Technology, Krakow, POLAND.
Email: august@agh.edu.pl

Abstract. Digital watermarking is a steganographic technique for hiding the confidential data into an open message, usually employed for content authentication, proof of authorship and copy control. This tool may also be useful for broadening the measurement context by coding auxiliary digital information into the main (host) signal of variable bandwidth. In this paper we present the application of the watermarking technique to embedding in-field screening or homemade exercise test data into a standard digital ECG signal. This approach allows to track the physical load of the patient even in natural living environment with a standard Holter recording and messaging equipment with no additional data storage structures or transmission channel.

Transformation of Business of Travel Intermediaries in Terms of Dynamic Changes in Macro Environment – Towards New Challenges

by Iris Mihajlović[1a], Lucija Raguž[2b]
[1]Dept. of Economics and Business Economics, University of Dubrovnik, Dubrovnik, CROATIA.
[2] University of Dubrovnik, Dubrovnik, CROATIA.
Email: a) iris.mihajlovic@unidu.hr, b) lucija.raguz@live.co

Abstract. This paper examines the impact of global trends in the macro-environment on the transformation of travel agencies. For purposes of this study new trends are analyzed through changes of socio - environmental and economic variables. First part gives emphasis on theoretical aspect of the impact analysis of these factors on the development of business continuity of tourism subjects and the way of adaptation of subjects to new business conditions. This indicates the importance of transformation of business intermediaries focused on contents of product innovations, respecting social and environmental elements and using the advantages in creation of products. In order to additionally study the impact of these changes on busyness of travel agencies, the paper includes empirical research among managers of travel agencies. The empirical research has been conducted using the method of inferential statistics on a sample size of 200 travel agencies in Croatia. The significance of changes on a macro environment level has been studied. Competitive conditions are influencing transformation processes. Economic growth as a stimulus to business activities of travel agencies creates new opportunities for intermediaries through more favorable transactions, thus reinvigorating the role, but also testing market position and the competitiveness. Research findings point out global macro-environment trends like socio-environmental changes in tourism are, affect the business transformation through product innovations of travel agencies. According the attitudes of respondents –socio-environmental responsibility is very significant or significant for further business activities of travel agencies towards innovations.

Is Li-Fi the Near Future Wireless Technology?

by Abdelghani Harrag[1a], Ahmed Oussama Bouzaher[2b], Abbes Remita[2c]
[1]Informatics Department, Faculty of Sciences, Ferhat Abbas University Setif, Sétif, ALGERIA.
[2]Institute of Optics and Precision Mechanics, Ferhat Abbas University Setif, Sétif, ALGERIA.
Email: a) a.b.harrag@gmail.com, b) ah.oussama.bouzaher@gmail.com, c) aabbeess14@gmail.com

Abstract. Li-Fi is transmission of data using visible light by sending data through a LED light bulb that varies in intensity faster than the human eye can follow. If the LED is on, the photo detector registers a binary one; otherwise it's a binary zero. This paper introduces the visible light communication technology as a solution for the current telecommunication crunch, also deals with the implementation of the most basic Li-Fi based system to transfer data from one computer to another. Also we have demonstrates the working of Li-Fi by simulating and implementing a simple circuit which gave us the required output. Furthermore we managed to achieve transmission data until 1 meter in daily room with an acceptable noise by using a 10mm ordinary LED and without any encryption technique. This work was done by using Matlab/Simulink code as well as Proteus software for the simulation and the emulation.

Comparative Analysis of Methods for Reducing Distorting Regime by Simulating Active Power Filters

by Marius Marcu[a], Florin Gabriel Popescu[b], Titu Niculescu[c], Ioan Razvan Slusariuc[d]
Dept. of Control Engineering, Computers, Electrical Engineering and Power Engineering, University of Petrosani, Petrosani, ROMANIA.
Email: a) mariusmarcu66@yahoo.com, b) floringabriel82@yahoo.com,
c) niculescu_titu@yahoo.com, d) razvansir@yahoo.com

Abstract. The paper presents the structure of an active power filter to compensate higher order harmonics. Active Power Filter Control is performed using three theories (instantaneous reactive power, generalized power, and synchronous reference theories). The authors present the parallel active power filter based on these theories, and the results were simulated in MATLAB-Simulink. As a result of these simulations, the advantages and disadvantages of each method were revealed, and the comparison of these methods shows that the synchronous reference system is the most efficient.

Study of the Switching Mode of Inductive Loads Using NI-USB Data Acquisition System

by Titu Niculescu[a], Florin Gabriel Popescu[b], Marius Marcu[c], Ioan Razvan Slusariuc[d]
Dept. of Control Engineering, Computers, Electrical Engineering and Power Engineering, University of Petrosani, Petrosani, ROMANIA.
Email: a) niculescu_titu@yahoo.com, b) floringabriel82@yahoo.com,
c) mariusmarcu66@yahoo.com, d) razvansir@yahoo.com

Abstract. In industrial power plants there are situations of switching inductive circuits powered by alternating voltage sources. These operations lead to specific transient modes that may result in overvoltage or overcurrent peaks that may endanger the circuit elements. The evaluation of these parameters and other specific electrical parameters is the subject of this paper. The measurement method is based on the use of a data acquisition system produced by National Instruments and the MATLAB software. For one value of the inductance of the connected circuit there are plotted variation diagrams of the inductive voltage, the current in the circuit and the instantaneous power dissipated on the coil. The introduction of the paper presents the theoretical phenomenon, in the situations of connection and disconnection of the inductive circuit. The experimental measurements are made with real elements, where the power cord has a parasitic capacity. The differences between the real and the ideal situation are highlighted.

Buoyancy-driven Thermal and Flow Characteristics in Gaps between Two Glasses of Multi-framed Window

by Juhee Lee[1a], Younjun Lee[2b]
[1]Dept. of ICT Automotive Engineering, Hoseo University, Dangjin, KOREA.
[2]BEL Technology, KOREA.
Email: a) juheelee@hoseo.edu, b) leeyj@beltec.co.kr

Abstract. In building industry, both the beauty of the building facades and cost-effectiveness of the building are critical to occupants. The occupants long for the building that is more beautiful as well as comfort with low cost. For the beautiful facade, the more glasses are used and sometimes, the building covered with glasses. However, no glasses can prevent the heat energy flows out effectively. Under the circumstance, to prevent the energy leakage through the window glass, multiple-framed window are employed in architectural engineering in Korea. The gap between glasses is inevitable and the buoyancy-driven air flow in the gap between window glasses is a key of the heat transfer through the window. A numerical program for the air flow is developed considering gravity and buoyancy-driven momentum. Both the energy based on the temperature and the incompressible Navier-Stokes equations by using Boussinesq assumption are employed. A finite volume method based on a second-order is used to discretize, and a SIMPLE algorithm is employed to solve the pressure field, and momentum equations for the incompressible flow instead of a decoupled continuity equation. The numerical validations are also performed, and the reliability of the method is assessed. The characteristics of heat transfer and flow in three gaps are closely investigated with the developed code.

Experimental Evaluation of 3D Steel Joint with Loading in Both Axis

by Alfonso Loureiro*, Manuel López, J. Manuel Reinosa, Ruth Gutierrez
Dept. of Naval and Industrial Engineering, University of A Coruña, A Coruña, SPAIN.
Email: *a.loureiro@udc.es

Abstract. The current European standard of steel structures (Eurocode 3), establishes the necessity of taking into account the rigidity and resistance of joints in the overall calculation of the structure. This normative uses the method of the components for obtaining the elastic characteristics of the joints, as rigidity and resistance. In the case of 3D joints, the problem of determining the components comportment, is more complex, because the comportment of the components of the joint in one of the axis is influenced by the loads in the other one. The level of stress in the minor axis influences the rigidity of the major axis, and vice versa. In the present work, two tests of an external 3D joint with additional plates in the weak axis is conducted. In the first one the major axis is loaded while the minor axis remains unloaded. In the second test, the minor axis is loaded and the load in the major axis is applied while the minor axis remains loaded, and then, the influence of the weak axis loading in the major axis stiffness is evaluated. Along this loading process, measurements of displacement sensors and load cells are carried out. In this work, the tests are conducted in the elastic range, in order to determine the global elastic stiffness of the strong axis. The moment-displacement curves for the major axis are shown, and the values of global initial stiffness in both tests are compared. These results of the tests will be used in future works for calibrating the FEM model of the joint. This work will allow a parametric analysis with the aim of characterizing the different parameters that influence the interaction between major and minor axis in the 3D joints.

Experimental Study on Single Bubble Growth during Subcooled Nucleate Pool Boiling
by M. R. M. Nawi, Faculty of Mechanical Engineering, Universiti Teknologi MARA, Shah Alam, MALAYSIA.
Email: muhad@salam.uitm.edu.my

Abstract. This paper presents an experimental investigation on single bubble growth from an artificial nucleation site during subcooled nucleate pool boiling. The experiments were conducted under constant heat flux at atmospheric pressure with an environmental friendly refrigerant HFE-7000 as the working fluid. During the experiment, three levels of liquid subcooling were set to be low, mid and high. A high speed video camera with a combination of powerful lens and a tube extension were used to capture the bubble images during the boiling process. Image processing in Matlab was used to process the images and determine relevant parameters such as bubble shape and size. From the study, it was found that the shapes of the bubbles at the early growth stage were towards sphere possibly due to the downward force by the fluid moving downwards as a result of high density difference. The bubble size at departure is found independent to the subcooling levels, which contradicts the other studies. The bubble departure frequency was relatively high for low subcooling and decreases sharply as the subcooling increased. The bubble growth curves show notable differences between the three levels of subcooling with a continuous growth curve closer to the saturated case for low subcooling and an abrupt change for mid and high subcooling.

A Study of Factors Affecting Highway Accident Rates in Jordan
by Wlla Al Mhairat*, Suzanne Al Jazzazi, Asma Al Zyod
Dept. of Civil and Infrastructure Engineering, American University of Ras Al Khaimah, Ras Al Khaimah, UNITED ARAB EMIRATES.
Email: *wlla.almhairat@aurak.ac.ae

Abstract. Traffic accidents are one of the problems that all countries around the world face. One of the countries that face this problem is Jordan which witnesses continuous growth in population in addition to the development that Jordan passes through. This study has adopted descriptive and statistical analysis of the data and information concerning traffic accidents. The study aims at illustrating the factors and the causes that lead to traffic accidents. It also compares the data concerning accidents during the period (2008-2017). This research work discusses the factors that affect the rate of accidents in Jordan, this factors include: number of accidents in (peak hour, off peak hour), day or night conditions, weather conditions, road surface conditions and speed limit.
The Multiple linear Regression Model in this study has been developed to recognize the factors that affect the rate of accidents in Jordan. One of the results was fair weather is one of the most effective factors that affect the rate of accidents in Jordan.

Hydrological Performance and Stormwater Management of Humid-Tropical Green Roof
by C. Y. Jim*, Gwendolyn G. L. Wong
Dept. of Geography, University of Hong Kong, Hong Kong, CHINA.
Email: *hragjcy@hku.hk

Abstract. Urbanization has replaced extensively permeable surfaces with impervious to aggravate the quantity and time-dependent release of stormwater. Long duration of heavy rainfall could generate excessive urban runoff to exceed the design capacity of the drainage systems, inducing the acute problems of flooding or combined sewer overflow. Green roof, as an innovative urban greening approach, can provide on-site source-reduction sustainable stormwater management to compensate

for the loss of pre-urbanization hydrological functions. The vegetated roof can detain and retain stormwater discharge, and delay and suppress its peak flow. Most relevant studies occurred outside the tropics, which has different rainfall regimes to deserve dedicated studies. The complex influence of substrate material and depth could impost notable influence on water relationships. An experimental extensive green roof site was established on an urban rooftop in humid-tropical Hong Kong to: (1) evaluating green roof stormwater mitigation performance and potentials; and (2) investigating systematically the effect of substrate depth and inclusion of a high water-retaining growth medium layer called rockwool. An array of 1.1-m2 raised green-roof basins assessed four substrate-depth treatments under different natural rainfall conditions through a 10-month period. The results indicated somewhat limited influence on stormwater retention under the frequent and heavy rainfall regime. However, considerable peak delay and peak reduction were demonstrated despite full moisture-storage capacity. No statistical significance was found between substrate-thickness treatments, but the 80-mm case recorded slightly better mean performance. The notably lighter 40-mm substrate could provide satisfactory peak performance, suggesting that a relatively thin substrate is sufficient for effective peak mitigation. This finding has important implications for green roof installation on many buildings with limited load-bearing roof slab. Overall, the simple extensive type of green roof can offer a promising and cost-effective alternative mitigation strategy to urban stormwater management in Hong Kong, with potential applications in other tropical cities.

Decision-Making in Procedure Selection on the Basis of Efficiency in Machining Hardened Surfaces

by Janos Kundrak[1], Viktor Molnar[2*], Istvan Deszpoth[1]
[1]Institute of Production Engineering, University of Miskolc, HUNGARY.
[2]Institute of Management Science, University of Miskolc, HUNGARY.
Email: *szvmv@uni-miskolc.hu

Abstract. Due to the rapid development of machining a component machining problem can be solved by more than one procedure when the same quality requirements can be fulfilled. In the paper the efficiency of material removal is analyzed in machining hardened surfaces. The analysis was performed on the basis of the time consumption necessary for production when different machining procedures (grinding, turning) and different tools were applied. The time data were obtained from a concrete plant. On the basis of the results a ranking was obtained for the hard machining procedures.

A Review of Mechanical Properties of Jute-glass and Luffa-glass Fiber Reinforced Epoxy Hybrid Composites

by S. S. Godara[a], Mukesh[b]
Dept. of Mechanical Engineering, Rajasthan Technical University Kota, INDIA.
Email: a) ssgodara@rtu.ac.in, b) mukeshjuly91@gmail.com

Abstract. In this work comparison of the various mechanical properties such as tensile strength, flexural strength, and interlaminar shear strength of distinctive natural fibers of Jute-glass and Luffa-glass fibers reinforced with epoxy hybrid composites is evaluated. For this purpose eight distinctive type laminates have been used. The values of Tensile, Flexural Properties and Inter laminar shear strength of the jute-glass and luffa-glass fiber epoxy hybrid composites are good for stacking sequence of GJJG- jute glass and GLLG.

Profit Allocation in Supply Chains on the Basis of Revenue-Sharing Rates

by Viktor Molnar*, Zoltan Musinszki, Tamas Faludi
Faculty of Economics, University of Miskolc, HUNGARY.
Email: *szvmv@uni-miskolc.hu

Abstract. Supply chain coordination with contract types is a wide area of cooperation of supply chain members. Although several approaches and models have been developed in the recent decades, supply chains rarely tend to take academic advice; more practice-oriented analyses and empirical research are needed in this topic. In this paper an approach is introduced that keeps the conventional decentralized setting of wholesale price but shifts to a fairer setting with the use of the revenue-sharing contract type. Analysis highlights that this model ensures fairer profit allocation among the supply chain members. The supply chain was modeled as a sequential one. It was also introduced in the paper that the topic is wider because of the legal regulations of transfer pricing between supply chain members.

A Stable Hybrid Potential–SPH Technique to Enforce the Fluid Incompressibility
by Juan J. Perea[a], Juan M. Cordero[b]
University of Seville, School of Computer Engineering, Sevilla, SPAIN.
Email: a) jperea@us.es, b) jmcordero@us.es

Abstract. The SPH method has extensively used in fluid flow simulation. Through SPH the fluid is modelled by a particles system whose mutual interaction is weighed by a function, named kernel function, whose limits define the neighbouring of each particle. In spite of the high capabilities of SPH for simulate complex environments, it shows shortcomings specially if the fluid is subject to high changes in the pressure, the velocity and the density as occur in phenomena such as shock–tube, blast–wave or in the boundary and discontinuities where the number of neighbour particles is relatively low. In this case, the pressure gradient is inaccurate. As consequence, the simulation is instable with an erratic behaviour of particles. To avoid this problem, we propose a hybrid technique. This one consists in formulating the pressure gradient from a potential defined on each particles pair. Thus, the pressure gradient is immune to the low number of neighbour particles. Also, our proposal allows enforcing the fluid incompressibility. To show the improvements obtained we will carry out a set of simulations.

Optimazing Multiple Drug Administration from Depot by Applying Pharmacokinetic Concepts
by Krasimira Prodanova, Dept. of Mathematical Analysis & Differential Equations,
Technical University of Sofia, Sofia, BULGARIA.
Email: kprod@tu-sofia.bg

Abstract. For the multiple drug administration it is important from therapeutic reasons to maintain the concentration in the blood plasma in an appropriate range. The effectiveness and toxicity of antibiotics and especially of aminoglycosides show a strong direct positive relationship with blood drug concentrations, therefore, therapy with aminoglycosides in adults is usually guided by therapeutic drug monitoring. In the present paper an optimization approach was developed to determine Amikacin dosage regimen to achieve the desired plasma concentrations after application from depot. The developed methodology allows the optimization of both the dose and the dosage interval. Performance of the developed methodology was evaluated by computing bias and precision of the estimated trough and peak Amikacin concentrations that were reached after dosage regimen determinations.

Hybridized Monarch Butterfly Algorithm for Global Optimization Problems
by Ivana Strumberger[a], Nebojsa Bacanin[b]
Singidunum University, Faculty of Informatics and Computing, Belgrade, SERBIA.
Email: a) istrumberger@singidunum.ac.rs, b) nbacanin@singidunum.ac.rs

Abstract. This paper introduces hybridized monarch butterfly optimization algorithm for solving global optimization problems. Despite of the fact that the monarch butterfly optimization algorithm is relatively new approach, it has already showed great potential when tackling NP-hard optimization tasks. However, by analyzing original monarch butterfly algorithm, we noticed some deficiencies in the butterfly adjusting operator that in early iterations exceedingly directs the search process towards the current best solution. To overcome this deficiency, we incorporated firefly's algorithm

search mechanism into the original monarch optimization approach. We tested our algorithm on six standard global optimization benchamarks, and performed comparative analysis with original monarch butterfly optimization, as well as with other five state-of-the-art metaheuristics. Experimental results are promising.

Anisotropic Effect of an External Magnetic Field on Non-Equilibrium Concentration Fluctuations in Nanoparamagnetics

by Ana Oprisan[a], Ashley Rice[b], Gabrielle Seymore[c]
College of Charleston, Dept. Physics and Astronomy, Charleston, South Carolina, U.S.A.
Email: a) oprisana@cofc.edu, b) riceae@g.cofc.edu, c) seymoregp@g.cofc.edu

Abstract. We performed two shadowgraph-based experiments using superparamagentic nanocolloids to investigate the effect of a horizontal magnetic field on the intensity of concentration - enhanced non-equilibrium fluctuations (c-NEFs). The experiments were performed on Earth with a concentration gradient oriented vertically upward under the influence of a horizontal (perpendicular to the concentration gradient) external magnetic field. We used a shadowgraph method to record c-NEFs and a differential dynamic algorithm (DDA) to investigate quantitatively the changes in the structure factor and the correlation time of c-NEFs. We found that the diffusion coefficient transiently decreases when the magnetic field is turned on/off presumably due to the formation/destruction of paramagnetic clusters.

Moth Search Algorithm for Drone Placement Problem

by Ivana Strumberger[a], Marko Sarac[b], Dusan Markovic[c], Nebojsa Bacanin[d]
Singidunum University, Faculty of Informatics and Computing, Belgrade, SERBIA.
Email: a) istrumberger@singidunum.ac.rs, b) msarac@singidunum.ac.rs,
c) dmarkovic@singidunum.ac.rs, d) nbacanin@singidunum.ac.rs

Abstract. This paper presents implementation of the moth search algorithm adjusted for solving static drone location problem. The optimal location of drones is one of the most important issues in this domain, and it belongs to the group of NP-hard optimization. The objective of the model applied in this paper is to establish monitoring all targets with the least possible number of drones. For testing purposes, we used problem instance with 30 uniformly distributed targets in the network domain. According to the results of simulations, where moth search algorithm established full coverage of targets, this approach shows potential in dealing with this kind of problem.

Markov-Modulated Linear Regression: A Case Study of Coaches' Delay Time

by Nadezda Spiridovska, Mathematical Methods and Modelling Dept., Transport and Telecommunication Institute, Riga, LATVIA.
Email: Spiridovska.N@tsi.lv

Abstract. This research presents alternating Markov-modulated linear regression application for analysis of delays of regional buses (coaches). Markov-modulated linear regression suggests that the parameters of regression model vary randomly in accordance with external environment. The latter is described as a continuous-time homogeneous irreducible Markov chain with known parameters. For each state of the environment the regression model parameters are estimated. Data on weather conditions in the Ventspils city provided by the Latvian Environment, Geology and Meteorology Centre database is used for the environment description: two states are assumed: "no precipitation" and "precipitation". The model of the external environment is tested for the markovian properties.

Actual data on coaches' trip times is provided by the Riga International Coach Terminal. Data is analysed by means of descriptive statistics. Different experiments are carried out and the application of Markov-modulated linear regression model on given sample showed adequate results indicating the validity of the model.

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