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Advances in Automatic Control, Modelling & Simulation

Proceedings of the 15th International Conference on Automatic Control, Modelling & Simulation (ACMOS '13)

Brasov, Romania, June 1-3, 2013

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Recent Advances in Electrical Engineering Series | 13

ISSN: 1790-5117
ISBN: 978-1-61804-189-0

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Published by WSEAS Press
www.wseas.org

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All papers of the present volume were peer reviewed by no less that two independent reviewers. Acceptance was granted when both reviewers' recommendations were positive.
See also: http://www.worldses.org/review/index.html

ISSN: 1790-5117
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Preface

This year the 15th International Conference on Automatic Control, Modelling & Simulation (ACMOS '13) was held in Brasov, Romania, June 1-3, 2013. The conference provided a platform to discuss large scale systems, digital control, fuzzy systems and fuzzy control, intelligent control, parallel and distributed systems, optimization problems in control engineering, fault tolerance, control of large systems via internet, signal processing systems for control etc with participants from all over the world, both from academia and from industry.

Its success is reflected in the papers received, with participants coming from several countries, allowing a real multinational multicultural exchange of experiences and ideas.

The accepted papers of this conference are published in this Book that will be sent to international indexes. They will be also available in the E-Library of the WSEAS. Extended versions of the best papers will be promoted to many Journals for further evaluation.

Conference such as this can only succeed as a team effort, so the Editors want to thank the International Scientific Committee and the Reviewers for their excellent work in reviewing the papers as well as their invaluable input and advice.

The Editors

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Plenary Lecture 1

Controlling Risk in Flexible Manufacturing Processes

Associate Professor Calin I. Ciufudean
"Stefan Cel Mare" Universtity of Suceava
Faculty of Electrical Engineering and Computer Science
Department of Automatics and Computers
ROMANIA
E-mail: calin@eed.usv.ro

Abstract: We consider this discussion important, as there is a lot of confusion about the cohabitation of the risk and optimum control of flexible manufacturing system analysis.
Thinking of risk and reliability analysis of flexible manufacturing systems (FMS's) from a probabilistic perspective, we come to the conclusion that probability is a measure of expressing uncertainty about the process seen through the point of view of the assessor (i.e. the controller of a process), and based on some background information and knowledge that we have at the time we quantify our uncertainty.
We focus our work on modeling risks and controller of FMA with discrete event formalisms in order to give a new approach to this important issue for modern production systems.
We consider that this new approach is a practical one, considering the fact that discrete event formalisms allow efficient simulations of the analyzed systems.

Brief Biography of the Speaker:
• Academic Positions: Assoc. Professor Ph.D. Eng., Dept. of Automatics and Computers, Faculty of Electrical Engineering and Computer Science, "Stefan cel Mare" University of Suceava, Romania.
• Fields of Scientific Activities: Discrete Event Systems, Complex Measurement Systems, Reliability and Diagnosis of Control Systems, Environmental Management.
• He published 11 books, 12 patents and over 160 scientific papers in conference proceedings and journals.
• Honor Member of the Romanian Society of Electrical & Control Engineering - Member of the Romanian Technical Experts Corp.
• Technical Expert of the Romanian Ministry of Justice.
• President of the Romanian Society of Electrical & Control Engineering, Suceava Branch.
• He is a member of the editorial boards of several international scientific journals and conferences of control systems and electric engineering science. He was designated chairmen at 21 international conferences.

Plenary Lecture 2

Modeling and Simulation Method Applied in a Multimachine Power System

Professor Dimitrios Bandekas
Department of Electrical Engineering
Kavala Institute of Technology
Greece
E-mail: dbandek@teikav.edu.gr

Abstract: This paper presents a new modeling and simulation method for the dynamic performance analysis of a multimachine power system under a symmetrical and unsymmetrical fault conditions. This method called, dynamic voltage - current combination method and transient analysis of the system is based on a-d-c phase coordinate system. Modeling and simulation technique using digital computer with the appropriate software has also been described.

Brief Biography of the Speaker: Prof. Bandekas obtained his Diploma in Electrical Engineering in 1990 and his Ph.D. in 1994, from the Democritus University of Thrace. He joined the Kavala Institute of Technology in 1995 as an assistant professor, and became permanent professor at the Department of Electrical Engineering in 2002. Since 1998 he is Head of Faculty of Electrotechnics and Electric Measurements, Department of Electrical Engineering and is also a member of the Technical Committee of KavTech. Prof. Bandekas is also vice-president of Academic Affairs. His research interests include: Modeling and simulation, power systems and automated energy systems, biomechanics and systematic measurements. He has 41 articles in recognized and prestigious international scientific journals and seven (7) articles in international and national conferences with a jury system. He has participated as a researcher in sixteen (16) research projects of which the nine (9) as project leader. He is the founder and editor (Editor-in-Chief) of the recognized and prestigious international journal ‘Journal of Engineering Science and Technology Review’’ (www.jestr.org), which was incorporated in 2011 in the prestigious scientific database SCOPUS, and is one of the most recognized scientific journals of CERN.

Plenary Lecture 3

Techniques to Improve THD in Multilevel Inverter for Photovoltaic Systems

Professor Aldo Pardo Garcia
Dean of the Faculty of Engineering
University of Pamplona
Norte de Santander, Colombia
E-mail: fingenierias@unipamplona.edu.co

Abstract: The conference is focused on the developments and current state of the DC / AC inverters for photovoltaic systems. In the Inverters for photovoltaic system is necessary to consider the waveform produced, inverters with a high harmonic content reduces system's performance. The waveforms generated by the cascaded multilevel inverters present very good quality and low harmonic content making them an ideal choice. These devices have been recognized as an important alternative in the medium-voltage inverter market, due that they meet the specifications for photovoltaic systems.
The conference presents some the results of research group:
- The Design and Implementation of a single phase multilevel inverter using the asymmetric cascade multilevel converter type. The selective harmonic elimination (SHE) was used for the computation of the firing angles. All the simulated results in MATLAB were validated by the Implementation of the converter. In order to evaluate the performance, it was used the total harmonic distortion factor (THD).
- Bio-Inspired Algorithms have been applied to find the best operational parameters of a PWM applied to a power inverter. It were also used optimization algorithms based on tabu search, genetic algorithms, and others.

Brief Biography of the Speaker: PhD. Aldo Pardo Garcia is an Electrical Engineer, graduated in Belarusian State Agrarian Technical University 1983, (MSc 1983,Esp. 1982) and graduated PhD in Belarusian National Technical University 1990. Postdoctoral research at CINVESTAV Guadalajara, Mexico (2007/2 – 2007/4), Postdoctoral research at Florida International University, USA (2007/9 – 2009/3).Over 25 years of experience of teaching and research in Universities - of Camaguey, (Cuba, 12 years), of Byelorussia (Minsk, Byelorussia, 3 years) and Pamplona, Norte de Santander, Colombia (14 years and currently).
For 7 years was the head of the research in The Institute for Research and Applied Technology Development (IIDTA 2000 - 2007), University of Pamplona, Colombia, dedicated to create innovative products and researches processes for university and Industry. Dean of the Faculty of Engineering (2010 to present). Lector plenary in Universities of Mexico, of Venezuela, of Spain, of Byelorussia, of Colombia, of Cuba, of Puerto Rico and of United State of America. The results in the last 5 years: Articles published (52), Projects research (4), Softwares with copyright (5), Books published (5), and Participation as an opponent for Masters (11) and PhD thesis (3).

Plenary Lecture 4

Theoretical and Numerical Aspects of Magnetic Shielding at Low Frequencies

Associate Professor Dumitru Cazacu
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University of Pitesti
Romania
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Abstract: Shielding of low frequency magnetic field represents an important topic of research due to the widespread areas of applications: designing electric, electronic and medical devices, atomic physics experiments, fusion experiments. Recently, possible health hazards have emphasized the interest for the subject.
The lecture will cover theoretical, numerical and experimental aspects concerning the effectiveness of spherical and cylindrical configurations, single or multi-layered.
2D and 3D, linear and non linear finite element numerical models are considered, using nodal, vector and infinite elements. Magnetic and scalar potentials are used and their computational costs are evaluated and compared.
Symbolic computation is used to compute the magnetic field expressions inside the structures. The influence of certain slots on the efficiency of the shields is considered.

Brief Biography of the Speaker: The lecturer is Assoc. Professor at the Electrical Engineering department, Faculty for electronics, communications and computers, University of Pitesti, Romania.
He has a Ph.D. in electrical engineering from the Faculty for electrical engineering, Craiova, Romania, in 2000.
Since 2001 he is with the Faculty for electronics, communications and computers, University of Pitesti, Romania.
After that he attended a one-year post-doc stage at the Laboratory for automation and industrial informatics (LAII), ESIP, University of Poitiers (2002-2003).
Another research stages have followed: RWTH-Aachen, Germany (2003), IUT Angoulleme, France (2004), RISC-Linz Research Institute for symbolic computation As an author (co – author) he published more then 50 papers in scientific journals and international conferences proceedings. He is member in ACER (Romanian Association for electromagnetic compatibility IEEE – EMC Chapter) and activates as a reviewer for Progress in Electromagnetic research (PIER) and certain international conferences.
The research interests include: computational electromagnetics, electromagnetic compatibility, co-simulation of electromechanical systems, parallel computing.

Plenary Lecture 5

Multitime Modeling in Robotics

Professor Constantin Udriste
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University Politehnica of Bucharest
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Abstract: The talk presents two-time motor control strategies for skilled movements. There are found movements which are optimum with various "costs", given by double integrals and different PDEs constraints (Newton Law as first order PDEs, multitime hyperbolic-parabolic Newton Law, multitime elliptic Newton Law). For simplicity, the movements, the constraints and the costs depend upon two independent variables.
The model-based investigation of human and human-like motions is an important inter-disciplinary research topic which involves aspects of biomechanics, physiology, orthopedics, psychology, neurosciences, robotics, sport, computer graphics and applied mathematics. Two-time mathematical models can help to better understand the basic underlying mechanisms of these motions and to improve them.

Brief Biography of the Speaker: Important Career Positions: Emeritus Professor, Consultant Professor, Dean, Director, Chair, Full Professor 1990-, University Politehnica of Bucharest, Department of Mathematics-Informatics.
Number of PhD Students: 25 in due time and 21 Doctors in Mathematics.
Membership of Associations: AMS, 1987; Tensor Society, 1985; Balkan Society of Geometers, President, 1994;
Publications: over 50 books; 300 papers; 300 communications.
Honors: D. Hurmuzescu Prize, Romanian Academy, 1985; Award MEI, 1988; Correspondent Member, Academia Peloritana, Messina, 1997; Prize COPIRO - 2000 for Exact Sciences; Premio Anassiloos International 2002, Arte Cultura Scienze, Italy; Titular Member, Academy of Romanian Scientists, 2007; Honorary Member, World Scientific and Engineering Academy and Society, 2008-; Stefan Hepites Prize, Academy of Romania, 2010.
Organizer: Chair-Committee: American Conference on Applied Mathematics (Math'08) and Management, Marketing and Finances (MMF'08), Cambridge, Massachusetts, USA, March 24-26, 2008. International Program Committee: The Applied Computing Conference (ACC-08), Istanbul, Turkey, May 27-30, 2008; The International Conference of Differential Geometry and Dynamical Systems (DGDS-2009), October 8 - 11, 2009, University Politehnica of Bucharest, Bucharest, Romania; European Computing Conference (ECC-09), 115-119, Tbilisi, Georgia, June 26-28, 2009; The International Conference of Differential Geometry and Dynamical Systems (DGDS-2010), 25-28 August 2010, University Politehnica of Bucharest , Romania.
Fields of Interest: Differential Geometry, Optimizations on Riemannian Manifolds, Magnetic Dynamical Systems, Geometric Dynamics.