

2016 Third International Conference on Mathematics and Computers in Sciences and in Industry (MCSI 2016)

**Chania, Greece
27-29 August 2016**



**IEEE Catalog Number: CFP1670Y-POD
ISBN: 978-1-5090-0974-9**

**Copyright © 2016 by the Institute of Electrical and Electronics Engineers, Inc
All Rights Reserved**

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

******This publication is a representation of what appears in the IEEE Digital Libraries. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP1670Y-POD
ISBN (Print-On-Demand):	978-1-5090-0974-9
ISBN (Online):	978-1-5090-0973-2

Additional Copies of This Publication Are Available From:

Curran Associates, Inc
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: (845) 758-0400
Fax: (845) 758-2633
E-mail: curran@proceedings.com
Web: www.proceedings.com

CURRAN ASSOCIATES INC.
proceedings
.com

2016 Third International Conference on Mathematics and Computers in Sciences and in Industry

MCSI 2016

Table of Contents

Message from General Chair.....	x
Message from Program Chair.....	xi
Organizing Committee.....	xii
Program Committee.....	xiii
Reviewers.....	xiv

Computers in Electrical Circuits and Motors

Advanced Laser Processes for Energy Production	1
<i>Konstantinos Petridis, Emmanuel Kymakis, and Emmanuel Stratakis</i>	
Optimization of Standard PMDC Motors Used in Automotive Applications for Higher Power Density	7
<i>Yannis L. Karnavas, Ioannis D. Chasiotis, and Emmanouil D. Peponakis</i>	
Post-Implementation Evaluation of a University Management Information System (UMIS)	14
<i>E. Symeonaki, M. Papoutsidakis, D. Tseles, and M. Sigala</i>	
Shaft-Generators in Ships: Techno-Economic Sensitivity Analysis Study	20
<i>Konstantina Gkotzia, George J. Tsekouras, Fotios D. Kanellos, Panayiotis Michalopoulos, John M. Prousalidis, and Nikolaos E. Mastorakis</i>	
Nonlinear Models for the Vibrational Analysis of a Complex Dynamical System	26
<i>Vincenzo Niola, Giuseppe Quaremba, Gennaro Pellino, and Angelo Montanino</i>	
Heading Control of Unmanned Submersible Vehicle	33
<i>Nenad Popovich and Rajul Singh</i>	

Mathematics in Mechanical Engineering and Industry

The Role of Computational Fluid Dynamics in Solving Wind Engineering Problems	39
<i>Neihad Hussen Al-Khalidy</i>	
New Solutions for Aircraft Wing and Helicopter Blade Airfoils	46
<i>Constantin Rotaru and Mihai Mihaila-Andres</i>	
Aspects Regarding Aerodynamic Shape of Turbojet Combustion Chamber	51
<i>Constantin Rotaru</i>	
Linear Complexity Cubic Sequences over Finite Fields	57
<i>Vladimir Edemskiy and Nikita Sokolovskiy</i>	

Mathematics in the Wireless Networks

The Key Theoretical Models for the Safety and Security Ensuring	61
<i>Ludek Lukas, Martin Hromada, and Lukas Pavlik</i>	
Molecular Dynamics Simulation of Lysine Dendrimer and Oppositely Charged Semax Peptides	66
<i>Igor Neelov and Elena Popova</i>	
Under-Actuated Finger Driven by Un-extendible Tendons Grasping Tests by WM 2D™	72
<i>Vincenzo Niola, Cesare Rossi, Sergio Savino, and Francesco Timpone</i>	
Classification-Based VQ Model for Simulation of Binary Error Process on the Wireless Channel	77
<i>Tibor Csóka, Jaroslav Polec, Filip Csóka, and Kvetoslava Kotuliaková</i>	
Radiation Performance of Satellite Reflector Antennas Using Neural Networks	85
<i>Theodoros N. Kapetanakis and Ioannis O. Vardiambasis</i>	

Analysis of Communications' Networks

Maximum Power Point Tracking of Photovoltaic Modules: Comparison of Fuzzy Logic and Artificial Network Controllers' Performances	89
<i>Jemaa Aymen, Zarrad Ons, Mansouri Mohamed Nejib, and Aurelian Craciunescu</i>	
Modeling the Probabilities of Failures of 22 nm CMOS Logic Cells	94
<i>Azam Beg</i>	
Optimization of Stochastic Discrete Event Simulation Models Using "AFO" Heuristic	100
<i>Bendato Ilaria, Cassettari Lucia, Fioribello Simone, and Giribone Pier Giuseppe</i>	
Real-Time Load Identification by Active Power Feature Extraction and Switching Detection	107
<i>Mingyue Ding, Jinxiao Huang, Jiazen Li, Nikos E. Mastorakis, and Xiaodong Zhuang</i>	

Interference Calculations for Aeronautical Communications Using Cells in Greek Airspace	112
<i>Evangelos Kokkinos, Ilias Peteinatos, and Rajagopal Nilavalan</i>	

Applications of Fuzzy Logic and Optimazation Problems

Lyapunov Dimension of Attractors of the Lorenz-Like Differential Equations	119
<i>G. A. Leonov and S. M. Seledzhi</i>	
Quadratic Stabilization and Transit Problems for Switched Linear Systems via State Feedback	122
<i>Naohisa Otsuka and Shota Sekiguchi</i>	
Fuzzy Multimeasures in Birkhoff Weak Set-Valued Integrability	128
<i>Anca Croitoru, Alina Iosify, Nikos Mastorakis, and Alina Gavrilut</i>	

Applications of Computers in Sensors Networks

The Influence of Parameters of Biomimetic Underwater Vehicle Control System on the Ability of the Vehicle to Avoid Obstacles	136
<i>Tomasz Praczyk</i>	
Sensors Networks - Localization and Topology	143
<i>Marios Sfendourakis, Rajagopal Nilavalan, and Emmanuel Antonidakis</i>	
Functional Virtual Prototyping Environment for a Family of Map-Reduce Embedded Accelerators	155
<i>Calin Bîra, Gheorghe M. Stefan, and Mihaela Malita</i>	
Performance Enhancement of Underlay Cognitive Radio Networks by Intelligent Multiple Relay Selection	161
<i>Kiran Sultan, Bassam A. Zafar, Muhammad Zubair, and Zeeshan Shafi Khan</i>	
High Throughput Software Multithreshold Decoder on GPU	168
<i>V. Zolotarev, G. Ovechkin, P. Ovechkin, D. Satybalina, N. Tashatov, and D. Sankibayev</i>	

Applications of Signal Processing

An Efficient Segmentation Algorithm for Arabic Handwritten Characters Recognition System	172
<i>Mohamed A. Fadeel</i>	
Real Emotion Recognition by Detecting Symmetry Patterns with Dihedral Group	178
<i>Mehdi Ghayoumi and Arvind K. Bansal</i>	
Speech Intent Recognition for Robots	185
<i>Borui Shen and Diana Inkpen</i>	
A Distributed Approach for Traffic Signal Synchronization Problem	191
<i>Ludovica Adacher and Marco Tiriolo</i>	
An Optimizing Algorithm to Minimize the Delay Signal Setting Problem	197
<i>Ludovica Adacher and Andrea Gemma</i>	

Graphics Visualization of Specific Dashboards in Transport Technologies	203
<i>Pavel Pokorný and Kamil Stokláska</i>	

Panspermia of GeoData in Support Systems for Design and Execution of Operational Procedures	207
------------------------------------------------------------------------------------------------------	-----

George Tsavdaridis, Elias Koukoutsis, and Nikolaos V. Karadimas

Military Student Assignment Using NexClass Decision Support System	213
<i>George Rigopoulos and Nikolaos V. Karadimas</i>	

Mathematical Models in Environmental Sciences

On One Model of Temperature Control in Hothouses	219
--------------------------------------------------------	-----

Irina Astashova, Alexey Filinovskiy, and Dmitriy Lashin

Numerical Analysis and Reconstruction of the Temperature Regime of the Lena River Segment	224
----------------------------------------------------------------------------------------------------	-----

Segmentigor Zhilyaev and Vera Fofanova

Detection of Occupancy Events from Indoor Air Monitoring Data	229
---------------------------------------------------------------------	-----

Anadrzej Szczerk and Monika Maciejewska

Applications of Mathematics in Sciences

Average Domain Size Scales Like Population Size in the Absorbing	
------------------------------------------------------------------	--

Configurations of the One-Dimensional Axelrod Model with Three Features and Three States	235
---------------------------------------------------------------------------------------------------	-----

Stylianos Scarlatos

Parallel Version of the Mirror Descent Algorithm for the Two-Armed Bandit Problem	241
--------------------------------------------------------------------------------------------	-----

Alexander Kolnogorov and Dmitry Shiyan

The Accounting Equation and Claims on Assets Value Change	246
<i>Fernando Juárez</i>	

A More Efficient Card-Based Protocol for Generating a Random Permutation without Fixed Points	252
--------------------------------------------------------------------------------------------------------	-----

Takuya Ibaraki and Yoshifumi Manabe

A Non-blocking Online Cake-Cutting Protocol	258
<i>Koki Kubo and Yoshifumi Manabe</i>	

Fast Extremum Seeking of Model Predictive Control Based on Hammerstein Model	264
---------------------------------------------------------------------------------------	-----

Chagra Wassila, Degachi Hajar, and Ksouri Moufida

Mathematical Models for Internet of Things and Web

Mathematical Model of Underwater Vehicle with Undulating Propulsion	269
<i>Piotr Szymak</i>	

Age Prediction through Pelvis X-Ray Images a Case Based Approach to Problem Solving	275
----------------------------------------------------------------------------------------------	-----

Diana Martins, Henrique Vicente, Victor Alves, and José Neves

Fast Empirical Mode Decomposition Based on Gaussian Noises	282
<i>Risheng Wang, Jianjun Zhou, Jie Chen, and Yanjie Wang</i>	
Using Collaborative Based Algorithm for Efficient Management of Limited Resources on Social Networks	289
<i>Valon Xhafa, Korab Rrmoku, and Blerim Rexha</i>	
Erasure Code for Efficient Error Correction in Block Data Transmission	296
<i>Nikolaos Bardis, Nikolaos Doukas, and Oleksandr P. Markovskyi</i>	
Availability and Security Assessment of Smart Building Automation Systems: Combining of Attack Tree Analysis and Markov Models	302
<i>Al-Sudani Mustafa Qahtan Abdulmunem and Vyacheslav S. Kharchenko</i>	
Assurance Case Driven Design for Computer Systems: Graphical Notations versus Mathematical Methods	308
<i>Vladimir Sklyar and Vyacheslav Kharchenko</i>	
Reliability and Security Issues for IoT-based Smart Business Center: Architecture and Markov Model	313
<i>Vyacheslav Kharchenko, Maryna Kolisnyk, Iryna Piskachova, and Nikolaos Bardis</i>	
Author Index	319