



# **COMPUTERS and SIMULATION in MODERN SCIENCE Volume III**

**"This book contains important selected papers from WSEAS Conferences organized in the University of Cambridge (UK), University of Harvard (USA), Massachusetts Institute of Technology -- MIT (USA), China Jiliang University (China), Beijing Jiaotong University (China), Univ. Politecnica of Bucharest (Romania), Technical University of Sofia (Bulgaria), Tianjin University of Technology and Education (China), Zhejiang Univ. of Technology (China), University of Alcalá, Madrid (Spain), University of Cantabria, Santander (Spain), Budapest Tech (Hungary), University of La Laguna (Spain), Politehnica University of Timisoara (Romania)"**



# **COMPUTERS and SIMULATION in MODERN SCIENCE**

## **Volume III**

**"This book contains important selected papers from WSEAS Conferences organized in the University of Cambridge (UK), University of Harvard (USA), Massachusetts Institute of Technology -- MIT (USA), China Jiliang University (China), Beijing Jiaotong University (China), Univ. Politecnica of Bucharest (Romania), Technical University of Sofia (Bulgaria), Tianjin University of Technology and Education (China), Zhejiang Univ. of Technology (China), University of Alcala, Madrid (Spain), University of Cantabria, Santander (Spain), Budapest Tech (Hungary), University of La Laguna (Spain), Politehnica University of Timisoara (Romania)"**

Published by WSEAS Press  
[www.wseas.org](http://www.wseas.org)

**Copyright © 2010, by WSEAS Press**

All the copyright of the present book belongs to the World Scientific and Engineering Academy and Society Press. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of the Editor of World Scientific and Engineering Academy and Society Press.

All papers of the present volume were peer reviewed by two independent reviewers. Acceptance was granted when both reviewers' recommendations were positive.

See also: <http://www.worldses.org/review/index.html>

ISSN: 1792-6882

ISBN: 978-960-474-256-1



World Scientific and Engineering Academy and Society

# **COMPUTERS and SIMULATION in MODERN SCIENCE Volume III**

**"This book contains important selected papers from WSEAS Conferences organized in the University of Cambridge (UK), University of Harvard (USA), Massachusetts Institute of Technology -- MIT (USA), China Jiliang University (China), Beijing Jiaotong University (China), Univ. Politecnica of Bucharest (Romania), Technical University of Sofia (Bulgaria), Tianjin University of Technology and Education (China), Zhejiang Univ. of Technology (China), University of Alcalá, Madrid (Spain), University of Cantabria, Santander (Spain), Budapest Tech (Hungary), University of La Laguna (Spain), Politehnica University of Timisoara (Romania)"**

*Editors:*

**Prof. Nikos Mastorakis**, Technical University of Sofia, BULGARIA / Hellenic Naval Academy, GREECE  
**Prof. Metin Demiralp**, Istanbul Technical University, TURKEY  
**Prof. Valeri M. Mladenov**, Technical University of Sofia, BULGARIA

*Editor-in-Chief:*

**Prof. Nikos Mastorakis**, Technical University of Sofia, BULGARIA / Hellenic Naval Academy, GREECE

*Editorial Board:*

**Prof. Siavash H. Sohrab**, Northwestern University, Evanston, Illinois, USA  
**Prof. Mikhael Wasfy**, University of Central Florida, USA  
**Prof. Slobodan I. Babic**, Ecole Polytechnique de Montreal, CANADA  
**Prof. Yiming Li**, National Chiao Tung University, Hsinchu 300, TAIWAN  
**Prof. Petr Y. Ekel**, Pontif. Cathol. Univ. of Minas Gerais, 30535-610, Belo Horizonte, BRAZIL  
**Prof. Tuan Pham**, James Cook University, Townsville, QLD 4811, AUSTRALIA  
**Prof. M. Isabel Garcia-Planas**, Univ. Polit. de Catalunya, C.Mineria 1, 08038, Barcelona, SPAIN  
**Prof. Demetrios Kazakos**, Texas Southern University, 3100 Cleburne Str., Houston, Texas 77004, USA  
**Prof. Olga Martin**, University Politehnica of Bucharest, ROMANIA  
**Prof. José M<sup>a</sup> Zamanillo Sáinz de la Maza**, University of Cantabria, SPAIN  
**Prof. Alexander Zemliak**, Puebla Aut. Univ, Av. San Claudio s/n, Ciudad, Puebla, Pue, 72570, MEXICO  
**Prof. Jose Carlos Quadrado**, Electrical Engineering Department, ISEL, Lisbon, PORTUGAL  
**Prof. Pablo Luis López Espí**, Universidad de Alcalá, SPAIN

## **Preface**

This book contains important selected papers from WSEAS Conferences organized in the University of Cambridge (UK), University of Harvard (USA), Massachusetts Institute of Technology -- MIT (USA), China Jiliang University (China), Beijing Jiaotong University (China), Univ. Politecnica of Bucharest (Romania), Technical University of Sofia (Bulgaria), Tianjin University of Technology and Education (China), Zhejiang Univ. of Technology (China), University of Alcalá, Madrid (Spain), University of Cantabria, Santander (Spain), Budapest Tech (Hungary), University of La Laguna (Spain), Politehnica University of Timisoara (Romania)

The contents of this Book will be sent to the WSEAS collaborating indices after the conference: **[www.worldses.org/indexes](http://www.worldses.org/indexes)**

The contents of this Book are also published in CD-ROM. Both will be sent to the WSEAS collaborating indices after the conference: **[www.worldses.org/indexes](http://www.worldses.org/indexes)**

The friendliness and openness of the WSEAS conferences, adds to their ability to grow by constantly attracting young researchers. The WSEAS Conferences attract a large number of well-established and leading researchers in various areas of Science and Engineering as you can see from **<http://www.wseas.org/reports>**. Your feedback encourages the society to go ahead as you can see in **<http://www.worldses.org/feedback.htm>**

Expanded and enhanced versions of papers published in this conference proceedings are also going to be considered for possible publication in one of the WSEAS journals that participate in the major International Scientific Indices (Elsevier, Scopus, EI, ACM, Compendex, INSPEC, CSA .... see: [www.worldses.org/indexes](http://www.worldses.org/indexes)) these papers must be of high-quality (break-through work) and a new round of a very strict review will follow. (No additional fee will be required for the publication of the extended version in a journal). WSEAS has also collaboration with several other international publishers and all these excellent papers of this volume could be further improved, could be extended and could be enhanced for possible additional evaluation in one of the editions of these international publishers.

Finally, we cordially thank all the people of WSEAS for their efforts to maintain the high scientific level of conferences, proceedings and journals.



## Table of Contents

### Chapter 1:

- A New Index for Heavy Metals in Biological Monitoring** 13  
*Mariko Mochizuki, Makoto Mori, Ryo Hondo, Fukiko Ueda*

### Chapter 2:

- The Computer in the Mathematics Teaching** 23  
*Ana Julia Viamonte*

### Chapter 3:

- Data Transmission Errors Detection in Amplitude-Phase Modulated Channels using the Residue Number System** 33  
*N. G. Bardis, N. Doukas, O. Markovskiy*

### Chapter 4:

- Maximum Entropy Method Solution for Computer Networks Initial Topology and Feasible Routing** 47  
*Milan Tuba*

### Chapter 5:

- Numerical Study of Specific Absorption Rate (SAR) Reduction in Muscle Cube with Metamaterial** 57  
*Mohammad Rashed Iqbal Faruque, Mohammad Tariqul Islam, Norbahiah Misran*

### Chapter 6:

- End Winding Inductance of Three-Phase A.C. Machines** 67  
*Olivian Chiver, Liviu Petrean, Liviu Neamt, Zoltan Erdei*

### Chapter 7:

- Analysis of a Finite Difference Scheme for a slow, 3-D Permeable Boundary, Navier-Stokes Flow** 77  
*Joe Hlomuka*

### Chapter 8:

- On the Design, Simulation and Implementation of an Improved Analog Current Mirror** 93  
*Nikolaos Charalampidis, Kyriakos Tsiakmakis, Michalis Spasos, Khaled Hayatleh, Nikolaos Mallios*

### Chapter 9:

- Traffic Control System based on Intelligent Agents** 103  
*Florin Leon, Mihai Horia Zaharia, Cristea Pal, Stefan Adrian Boronea, Tudor Didilescu*

**Chapter 10:**

- Optimal size of Kanban Board in a Single Stage Multi Product System** 113  
*T. Murino, G. Naviglio, E. Romano, P. Zoppoli*

**Chapter 11:**

- Autonomous Robot Path Planning in 3D Environments** 123  
*Ouarda Hachour*

**Chapter 12:**

- Improving Performance and Reliability of Adaptive Fault Tolerance Structure in Distributed Real Time Systems** 133  
*Negar Mosharraf, Mohammad Reza Khayyambashi*

**Chapter 13:**

- Model of the Usability Evaluation based on the Fuzzy Logic** 144  
*Miloslav Hub, Michal Zatloukal*

**Chapter 14:**

- Intelligent Decision Support in Intensive Care Units Nursing Information Modeling** 155  
*Manuel Santos, Filipe Portela, Marta Vilas-Boas, Jose Machado, Antonio Abelha, Jose Neves, Alvaro Silva, Fernando Rua, Maria Salazar, Cesar Quintas, Alexandra Cabral*

**Chapter 15:**

- Intelligent Data Modeling using Mobile Agents** 165  
*C. I. Popirlan, L. Stefanescu, C. Popirlan*

**Chapter 16:**

- A Colored Data Triggered Architecture for Cryptographic Applications** 175  
*Hala A. Farouk, Mahmoud El-Hadidi, Magdy Saeb*

**Chapter 17:**

- A Simulation Study of MANET Routing Protocols using Mobility Models** 186  
*Valentina Timcenko, Mirjana Stojanovic, Slavica Bostjancic Rakas*

**Chapter 18:**

- An Image Search for Tourist Information by using a Mobile Phone** 197  
*Wichian Premchaiswadi*

**Chapter 19:**

- On Performance of TCP and VoIP Traffic in Mobile WiMAX Networks** 207  
*Z. S. Bojkovic, D. A. Milovanovic*



**Chapter 20:**

- Enhanced Web Service Discovery with Ghsom** 217  
*F. Ismaili, Bogdan Shishedjiev, Xhemal Zenuni, Bujar Raufi*

**Chapter 21:**

- Realization Mechanism of Differentiated QoS based on Network Processors** 227  
*Yechang Fang, Kang Yen, Amaury Caballero, Nansong Wu*

**Chapter 22:**

- Design and Development of an Optimized Low Power Wireless Sensor Network based on ZigBee for Agricultural Applications** 237  
*Kyriakos Tsiakmakis, Nikolaos Charalampidis, Nikolaos Mallios, Michalis Spasos*

**Chapter 23:**

- Generating Content Recommendation for Adaptive Web-Based Systems** 248  
*Bujar Raufi, Juliana Georgieva, Artan Luma, F. Ismaili, Xhemal Zenuni*

**Chapter 24:**

- Towards Scalable Real-Time Online Applications in Edutain@Grid** 258  
*S. Gorlatch, F. Glinka, A. Ploss, T. Fahringer, R. Prodan, V. Nae, M. SurrIDGE, S. Middleton, C. Anthes, A. Arragon, A. Lipaj, C. Rawlings*

**Chapter 25:**

- Using edutainment in e-learning Applications: An Empirical Study** 269  
*D. Rigas, K. Ayad*

**Chapter 26:**

- The Relationship between Housing Market and the Financial Crisis** 280  
*Milena Lopreite, Antonio Scarpino*

**Chapter 27:**

- Multimodal Metaphors in E-learning Note-Taking** 291  
*Mohamed S. Sallam, Dimitrios Rigas*

**Chapter 28:**

- Calculating Return on Investment in Business Intelligence** 301  
*Zeljko Panian*

**Chapter 29:**

- Comparing Virtual Classroom, Game-Based Learning and Storytelling Teachings in E-learning** 311  
*K. Ayad, D. Rigas*

**Chapter 30:**

- A Controllability and Customisation Approach to Personalised Web Content** 321  
*Dimitrios Rigas, Khalid Al-Omar*

**Chapter 31:**

- A Decision Model for Reverse Logistics Management using Simulation** 331  
*L. Guerra, T. Murino, E. Romano*

**Chapter 32:**

- Comparing user Satisfaction and Customisation for Variable Size Personalised Menus** 342  
*Khalid Al-Omar, Dimitrios Rigas*

**Chapter 33:**

- Bank Loan Processes using BPMN Modelling** 353  
*G. Mpardis, N. V. Karadimas, V. Nikolopoulos, T. Kotsilieris*

**Chapter 34:**

- Clean Energy and Poor People: Ecological Impacts of Hydroelectric Dams on Fish and Fishermen in the Amazon Rainforest** 363  
*Renato A. M. Silvano, Anastacio A. Juras, Alpina Begossi*

**Chapter 35:**

- A new Approach for Water Purification from Microbial Pollution** 374  
*E. Moosavi, V. Martirosyan, S. Ayrapetyan*

**Chapter 36:**

- Risks Influences on the Built Environment** 384  
*Razvan Oprita*

**Chapter 37:**

- The Influence of the Socio-Economic and Genetic Factors on the Core Temperature of School Pupils, as an Indicator of Stress** 394  
*Carmen Daniela Domnariu*

**Chapter 38:**

- Sorting Algorithm by Shape Independently from Geometrical Measures** 404  
*Z. Szakal, I. Zsoldos*

**Chapter 39:**

- Creep and Shrinkage of High Performance Concrete** 413  
*Cornelia Magureanu, Camelia Negrutiu, Bogdan Heghes, Adela Chiorean*

**Chapter 40:****Designing Complex Adaptive Systems as Self-Organized Multi-Agent Hierarchies 423***R. Dobrescu, D. Hossu, S. Mocanu, D. Popescu***Chapter 41:****Low Power Semiconductor Devices at 65 nm Technology Node 434***Kiran Bailey, K. S. GuruMurthy***Chapter 42:****Energy Saving and the Contribution of Green Marketing to Behavioural Change 445***Arminda do Paco, Lilia Varejao***Chapter 43:****ECG Classification by using Wavelet-Domain hidden Markov Models 462***Pedro R. Gomes, Filomena O. Soares, J. H. Correia, C. S. Lima***Chapter 44:****Fluid Flow Modeling of a Coastal Fractured Karstic Aquifer by means of a Lumped Parameter Approach 473***Claudia Cherubini, Concetta Giasi, Nicola Pastore***Chapter 45:****Conserving Energy using Efficient Lighting 483***Arvind Dhingra, Tejinder Singh***Chapter 46:****Wood Energy for Domestic Heating: Extensive Reduction of Toxic Gas and Particulate Matter Emissions by Optimised Control of The Firing Process and use of Gas Sensors 492***Heinz Kohler, Paul Butschbach, Thomas Trautmann, Hicham Belmir***Chapter 47:****A Salt and Pepper Noise Reduction Scheme 503***Nucharee Premchaiswadi, Sukanya Yimngam, Wichian Premchaiswadi***Chapter 48:****Modelling and Optimization of Check-In Desks and Security Check Points in the Airport Terminal 513***Guido Guizzi, Teresa Murino, Elpidio Romano***Chapter 49:****Research Regarding the use of New Systems to Control Fluid Flow in Pipelines 524***O. Stoicuta, M. S. Nan, G. Dimirache, N. Buda, D. L. Dandea*

**Chapter 50:****Presentation of a UML System Design for the Medical Healthcare of Mentally Ill Patients after their Rehabilitation in the Society 545***Vasilios Christou, Maria Polizou, Vasilios Apostolopoulos, Andriana Prentza***Chapter 51:****Design and Application of CdS Nanolayers by Chemical Bath Deposition 556***M. C. Acosta-Enriquez, A. Apolinar-Iribe, M. E. Alvarez-Ramos, M. A. Quevedo-Lopez, R. Ramirez-Bon, A. F. Jalbout, A. De Leon, A. Duarte-Moller, R. P. Duarte-Zamorano, L. E. Regalado, M. R. Manzo-Valencia, S. J. Castillo***Chapter 52:****ZnO/glass Substrate Thin-Films and ZnO:SiO<sub>2</sub> Obtained by Soft-Chemistry 567***S. J. Castillo, M. C. Acosta-Enriquez, Ma. E. Zayas, H. Arizpe, T. Mendivil-Reynoso, A. Garcia-Juarez, M. E. Alvarez-Ramos, E. Larios-Rodriguez***Author Index 579**

## Author Index

### A

Abelha A., 155  
Acosta M., 556, 567  
Al-Omar K., 321, 342  
Alvarez-Ramos M. E., 556, 567  
Anthes C., 258  
Apolinar-Irube A., 556  
Apostolopoulos V., 545  
Arizpe H., 567  
Arragon A., 258  
Ayad K., 269, 311  
Ayrapetyan S., 374

### B.

Bailey K., 434  
Bardis N. G., 33  
Begossi A., 363  
Belmir H., 492  
Bojkovic Z. S., 207  
Boronea S. A., 103  
Bostjancic Rakas S., 186  
Buda N., 524  
Butschbach P., 492

### C.

Caballero A., 227  
Cabral A., 155  
Castillo S. J., 556, 567  
Charalampidis N., 93, 237  
Cherubini C., 473  
Chiorean A., 413  
Chiver O., 67  
Christou V., 545  
Correia J. H., 462

### D.

Dandea D. L., 524  
De Leon A., 556

Dhingra A., 483  
Didilescu T., 103  
Dimirache G., 524  
Do Paco A., 445  
Dobrescu R., 423  
Domnariu C. D., 394  
Doukas N., 33  
Duarte-Moller A., 556  
Duarte-Zamorano R. P., 556

### E.

El-Hadidi M., 175  
Erdei Z., 67

### F.

Fahringer T., 258  
Fang Y., 227  
Farouk H. A., 175

### G.

Garcia-Juarez A., 567  
Georgieva J., 248  
Giasi C., 473  
Glinka F., 258  
Gomes P. R., 462  
Gorlatch S., 258  
Guerra L., 331  
Guizzi G., 513  
GuruMurthy K. S., 434

### H.

Hachour O., 123  
Hayatleh K., 93  
Heghes B., 413  
Hlomuka J., 77  
Hondo R., 13  
Hossu D., 423  
Hub M., 144

**I.**

Iqbal Faruque M. R., 57  
Islam M. T., 57  
Ismaili F., 217, 248

**J.**

Jalbout A. F., 556  
Juras A. A., 363

**K.**

Karadimas N. V., 353  
Khayyambashi M. R., 133  
Kohler H., 492  
Kotsilieris T., 353

**L.**

Larios-Rodriguez E., 567  
Leon F., 103  
Lima C. S., 462  
Lipaj A., 258  
Lopreite M., 280  
Luma A., 248

**M.**

Machado J., 155  
Magureanu C., 413  
Mallios N., 93, 237  
Manzo-Valencia M. R., 556  
Markovskyi O., 33  
Martirosyan V., 374  
Mendivil-Reynoso T., 567  
Middleton S., 258  
Milovanovic D. A., 207  
Misran N., 57  
Mocanu S., 423  
Mochizuki M., 13  
Moosavi E., 374  
Mori M., 13  
Mpardis G., 353  
Murino T., 113, 331, 513

**N.**

Nae V., 258  
Nan M. S., 524  
Naviglio G., 113  
Neamt L., 67  
Negar M., 133  
Negrutiu C., 413  
Neves J., 155  
Nikolopoulos V., 353

**O.**

Oprita R., 384

**P.**

Pal C., 103  
Panian Z., 301  
Pastore N., 473  
Petrean L., 67  
Ploss A., 258  
Polizou M., 545  
Popescu D., 423  
Popirlan C. I., 165  
Popirlan Cr., 165  
Portela F., 155  
Premchaiswadi N., 503  
Premchaiswadi W., 197, 503  
Prentza A., 545  
Prodan R., 258

**Q.**

Quevedo-Lopez M. A., 556  
Quintas C., 155

**R.**

Ramirez-Bon R., 556  
Raufi B., 217, 248  
Rawlings C., 258  
Regalado L. E., 556  
Rigas D., 269, 291, 311, 321, 342  
Romano E., 113, 331, 513  
Rua F., 155

**S.**

Saeb M., 175  
Salazar M., 155  
Sallam M. S., 291  
Santos M., 155  
Scarpino A., 280  
Shishedjiev B., 217  
Silva A., 155  
Silvano R. A. M., 363  
Singh T., 483  
Soares F. O., 462  
Spasos M., 93, 237  
Stefanescu L., 165  
Stoicuta O., 524  
Stojanovic M., 186  
Surridge M., 258  
Szakal Z., 404

Zayas M. E., 567  
Zenuni X., 217, 248  
Zoppoli P., 113  
Zsoldos I., 404

**T.**

Timcenko V., 186  
Trautmann T., 492  
Tsiakmakis K., 93, 237  
Tuba M., 47

**U.**

Ueda F., 13

**V.**

Varejao L., 445  
Viamonte A. J., 23  
Vilas-Boas M., 155

**W.**

Wu N., 227

**Y.**

Yen K., 227  
Yimngam S., 503

**Z.**

Zaharia M. H., 103  
Zatloukal M., 144