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Advances in Automatic Control

**Proceedings of the 16th International Conference on
Automatic Control, Modelling & Simulation (ACMOS '14)**

Brasov, Romania, June 26-28, 2014

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Technical University of
Civil Engineering of
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Faculty of Civil Engineering
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Preface

This year the 16th International Conference on Automatic Control, Modelling & Simulation (ACMOS '14) was held in Brasov, Romania, June 26-28, 2014. The conference provided a platform to discuss circuits and electronics for control, digital control, intelligent control, man-machine interaction, modeling, simulation, machine learning, knowledge acquisition, virtual reality for automation, embedded systems, control education 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.

Conferences 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

Non-Stationary Dynamics in Reliability Analysis of Adaptive Multi-Agent Systems



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Abstract: In uncertain dynamic business environments, the decisions that profile the direction of the organization in the near future have to meet factors that influence organization's operating situation with the external influences. Allocating the resources of complex systems between different alternatives and over different time periods in an uncertain environment (clients, suppliers, competition, technology; laws, market, social and economic trends) in cost constrain conditions are important aspects that technical and economic agents have to evaluate in decision process. The cost, time, and resource savings decisions are based on decision making model that conclude which decisions need to be made and how to find alternatives for each decision in the benefit the company. Modeling reliability by means of artificial intelligence is increasingly required because of multiple problems that systems are facing in socio-technical, and economical context. The risk prediction and decision making tools are designed by means of interconnected structures. The risk estimation is aligning in the larger framework of solving business and technical issues by adopting solution and decision-making under the simultaneous multi-objective conditions where processes are mainly non-stationary.

A process is stationary when the statistical properties as joint probability distribution, and consequently mean and variance (if they appear) are invariant. Allowing that stationarity is an unrealistic assumption for the multi-state components of complex systems where row data are not seasonal, the numerical characteristics of the non-stationary of complex structure are developed in the paper. Considering the uncertainty of transitions states, the paper proposes a stochastic model of assessing probability transition states, applying the, non-homogeneous Markov chain in an ageing system. The capability of time-dependent method to describe a multi-state system is based on a case study, assessing the operational situation of complex system. The rationality and validity of the presented model are demonstrated via an engineering example. The effect of randomness of the structural parameters is also examined.

Brief Biography of the Speaker: Graduated "Politehnica" Institute of Bucharest and defined her professional training by earning Ph. D degree in Electrical Engineering at Technical University Cluj Napoca.

Actively caring out research and teaching projects in reliability engineering and management is, at present, associate professor of the Faculty of Electrical Engineering and Information Technology, University of Oradea.

Recent research conducted includes reliability analysis and data modeling in dynamical, non-linear systems, simulation modeling for risk assessment in context-aware computing and intelligent e-learning technologies.

Certified external quality auditor, has an extensive experience in strategic total quality management applied in manufacturing processes and quality system improvements with six sigma initiatives, optimizing TQM (zero defects, six sigma), quality planning (QFD).

Participated in several international and national projects as director, scientific manager or member.

In the fields above she has authored and/or co-authored 10 books and 9 chapters in books, 31 papers in editor conference proceedings; 67 journal papers, 106 conference papers.

Member in Editorial Boards of 7 journals, delivered 17 plenary/keynote lectures.

Reviewer for WSEAS conferences WSEAS Transactions journals.

Actively participated at international and national conferences, in 16 was a member of scientific and/or organizing committees of conferences.

Plenary Lecture 2

Optimization Techniques and Variable Transformation for 2-D and 3-D Filter Design



Professor Nikos E. Mastorakis
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Abstract: The Design of m-D (Multidimensional) Filters attracted much attention in Systems Theory and Digital Signal Processing due to great interest as well as numerous applications in Medical Data, Seismic Data and Satellite Data Processing, X-ray Enhancement, Pattern Recognition etc. In this Plenary lecture we present new 2-D and 3-D Filter Design techniques.

We present two major methodologies in m-d Filter Design: a) appropriate variable transformations and b) Optimization. Stability of m-D Filters is examined and ensured. The validity of the methods is proven and illustrated by various numerical examples.

Brief Biography of the Speaker: Prof. Dr. Nikos E. Mastorakis received his B.Sc. and M.Sc. (Diploma) in Electrical Engineering from the National Technical University of Athens (Greece) and the Ph.D. in Electrical Engineering and Computer Science from the same university. He also received the B.Sc. (Ptychion) in Pure Mathematics from the National University of Athens, Greece. He also studied Medicine in Medical School of Athens of the same university. He have served as special scientist on Computers and Electronics in the Hellenic (Greek) Army General Staff (1993-1994) and taught several courses in the Electrical and Computer Engineering Department of the National Technical University of Athens (1998-1994). He has also served as Visiting Professor at the University of Exeter, School of Engineering (UK, 1998), Visiting Professor in the Technical University of Sofia (Bulgaria, 2003-2004) while he is now Professor in the Technical University of Sofia (Bulgaria, <http://elfe.tu-sofia.bg/elfe/staff.htm>, <http://elfe.tu-sofia.bg/elfe/curriculum4.htm> and <http://elfe.tu-sofia.bg/elfe/curriculum3.htm> and also Professor in the department of Computer Science at the Military Institutions of University Education (MIUE) -Hellenic Naval Academy, Greece.

Prof. Dr. Nikos Mastorakis was the first that solved with several different approaches the former unsolved problem of Multivariable Factorization and published it. He was also the first scholar that completely solved the problem of stability for Multidimensional Systems using Genetic Algorithms. Also, was the first that constructed Electronic Musical Instrument with the spaces of the Byzantine music. He is an active researcher in Applied Mathematics and Computer Science (Systems Theory, Control, Optimization Theory, Algorithms Theory, Signal Processing, Robotics, Computational Intelligence). The editor of over than 200 Books and the author of 5 books, Dr. Mastorakis has published more than 600 papers (see below) in international books, journals and conferences. An active reviewer of 26 International Journals and member of the Editorial Board of 13 International Journals and Editor of International Book Series: (Editor of the series "Electrical and Computer Engineering" (WSEAS Press) and Editor of the series "Mathematics and Computers in Science and Engineering" (WSEAS-Press), Member of the Editorial Board of "Advances in Computation: Theory and Practice" by NOVA), Dr. Mastorakis has received several awards (Royal Society of England, Hellenic National Research Foundation, etc) for his academic studies and his scientific research. Prof. Dr. Nikos Mastorakis is the Editor-in-Chief in many International Journals. He was the General Chairman in more than 30 International Conferences. He has organized more than 40 Special Sessions, 3 Workshops and has given many plenary lectures. He is also member of IEEE (Senior Member), New York Academy of Sciences, of A.F. Communications and Electronics Association, American Association for the Advancement of Science and other smaller scientific societies.

Dr. Mastorakis is a registered professional electrical and mechanical engineer. He is also Honorary Professor, University of Cluj, ROMANIA <http://outstanding.wseas.us> He has received the Prize of Excellence from Romanian Academy of Science, Bucharest, ROMANIA <http://outstanding.wseas.us> and he is also Professor at the ASEI (Military Institutes of University Education), Hellenic Naval Academy, GREECE since 1994 <http://www.hna.gr>

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