Editors: Valeri Mladenov, Olga Martin

Recent Researches in Circuits, Systems, Mechanics and Transportation Systems

Recent Researches in Circuits, Systems, Mechanics and Transportation Systems

- Proceedings of the 10th WSEAS International Conference on Circuits, Systems, Electronics, Control & Signal Processing (CSECS '11)
- Proceedings of the 7th WSEAS International Conference on Applied and Theoretical Mechanics (MECHANICS '11)
- Proceedings of the 2nd International Conference on Automotive and Transportation Systems (ICAT '11)

Montreux, Switzerland, December 29-31, 2011

ISBN: 978-1-61804-062-6

RECENT RESEARCHES in CIRCUITS, SYSTEMS, MECHANICS and TRANSPORTATION SYSTEMS

Proceedings of the 10th WSEAS International Conference on CIRCUITS, SYSTEMS, ELECTRONICS, CONTROL & SIGNAL PROCESSING (CSECS '11)

Proceedings of the 7th WSEAS International Conference on APPLIED and THEORETICAL MECHANICS(MECHANICS '11)

Proceedings of the 2nd International Conference on Automotive and Transportation Systems (ICAT '11)

Montreux, Switzerland
December 29-31, 2011

Published by WSEAS Press
www.wseas.org

ISBN: 978-1-61804-062-6

RECENT RESEARCHES in CIRCUITS, SYSTEMS, MECHANICS and TRANSPORTATION SYSTEMS

Proceedings of the 10th WSEAS International Conference on CIRCUITS, SYSTEMS, ELECTRONICS, CONTROL & SIGNAL PROCESSING (CSECS '11)
Proceedings of the 7th WSEAS International Conference on APPLIED and THEORETICAL MECHANICS(MECHANICS '11)
Proceedings of the 2nd International Conference on Automotive and Transportation Systems (ICAT '11)

Montreux, Switzerland
December 29-31, 2011

Published by WSEAS Press
www.wseas.org

Copyright © 2011, 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

ISBN: 978-1-61804-062-6

World Scientific and Engineering Academy and Society

European Society for Environmental Research and Sustainable Development

RECENT RESEARCHES in CIRCUITS, SYSTEMS, MECHANICS and TRANSPORTATION SYSTEMS

Proceedings of the 10th WSEAS International Conference on CIRCUITS, SYSTEMS, ELECTRONICS, CONTROL & SIGNAL PROCESSING (CSECS '11)

Proceedings of the 7th WSEAS International Conference on APPLIED and THEORETICAL MECHANICS(MECHANICS '11)

Proceedings of the 2nd International Conference on Automotive and Transportation Systems (ICAT '11)

Montreux, Switzerland
December 29-31, 2011

Editors:
Prof. Valeri Mladenov, Technical University of Sofia, Bulgaria
Prof. Olga Martin, Politehnica University of Bucharest, Romania

International Program Committee Members:
Dimitris Bertsekas, USA
David Staelin, USA
A. Bers, USA
Leon Trilling, USA
Lotfi Zadeh, USA
Leon Chua, USA
Brian A. Barsky, USA
Leonid Kazovsky, USA
Rao Kamissety, USA
Stamatios Kartalopoulos, USA
Athanasios Manikas, UK
Valeri Mladenov, BULGARIA
Nikos Mastorakis, BULGARIA
Panos Pardalos, USA
George Tsamasphyros, GREECE
Tadeusz Kaczorek, POLAND
Constantin Udriste, ROMANIA
Andris Buikis, LATVIA
Metin Demiralp, TURKEY
D. Perkins, USA
Dionysios (Dion) D. Dionysiou, USA
Leonid Perlovsky, USA
Kent Davey, USA
David Landgrebe, USA
D. L. Russell, USA
Steven H. Collicott, USA
Marco Ceccarelli, ITALY
Misha Kilmer, USA
Suzanne Lenhart, USA
Tim Mattson, USA
Jon Chapman, UK
Juan Meza, USA
Alex Pothen, USA
Uli Ruede, GERMANY
Giorgio Guariso, ITALY
Kimio Morimune, JAPAN
George Hornberger, USA
Andrzej Banaszuk, USA
Bard Ermentrout, USA
Cheng Hsiao, USA
Michael Field, USA
Hinke Osinga, UK
Ira Schwartz, USA
Evangelos Sapountzakis, GREECE
Manouchehr Amiri, IRAN
Viktor Baranov, RUSSIA
Tomas Bodnar, CZECH REPUBLIC
L. Borges, PORTUGAL
Fernando Carapau, PORTUGAL
Paulo Correia, PORTUGAL
Paul Deuring, FRANCE
Alexander Dmitriev, RUSSIA
Bernard Ducomet, FRANCE
Paschalis Grammenoudis, GERMANY
Alexander Gvozdev, RUSSIA
Toshiaki Hishida, JAPAN
Joao Janela, PORTUGAL
Roger Khayat, CANADA
Stanislav Krasmar, CZECH REPUBLIC
Petr Kucera, CZECH REPUBLIC
Aouni Lakis, CANADA
Vladislav Malinin, RUSSIA
Alexey Markin, RUSSIA
Nikolay Matchenko, RUSSIA
Bugaru Mihai, ROMANIA
Jiri Neustupa, CZECH REPUBLIC
Juan Ospina, COLOMBIA
Adelia Sequeira, PORTUGAL
Yoshihiro Shibata, JAPAN
Nickolay Smirnov, RUSSIA
Maria Specovius-Neugebauer, GERMANY
Aleksander Treschev, RUSSIA
Nikolay Tutyshkin, RUSSIA
Werner Varnhorn, GERMANY
Kobelev Vladimir, GERMANY
Joseph Sifakis, FRANCE
Lotfi A. Zadeh, USA
Leon O. Chua, USA
K. R. Rao, USA
Biswa N. Datta, USA
Irwin Sandberg, USA
A. Manikas, UK
T. Kaczorek, POLAND
Wlodzislaw Duch, POLAND
Sidney Burrus, USA
Leonid G. Kazovsky, USA
Georgios B. Giannakis, USA
Nikolaos G. Bourbakis, USA
Brian A. Barsky, USA
Ryszard S. Choras, POLAND
Wasfy B. Mikhael, USA
M. Kostic, USA
A. Venetsanopoulos, Canada
K. Benra, GERMANY
S. Sohrab, USA

Table of Contents

Plenary Lecture 1: Statistical Techniques for Virtual Sensors Design using Neural Networks 10
Francklin Rivas-Echeverria

Plenary Lecture 2: Protective System Reliability Enhancement in Smart Power Grid 11
Hamid Bentarzi

Relation between the Otto Engine RPM and the Exhaust Gas Speed 13
Charalampos Arapatsakos, Anastasios Karkanis, Ioannıs Pantokratoras

Diesel - Soy Oil Blends as Fuel in a Four Stroke Engine when the Fuel Temperatures are Different 20
Charalampos Arapatsakos, Dimitrios Christoforidis, Anastasios Karkanis, Konstantinos Mitroulas, Marianthi Moschou

The Exhaust Gas Refrigeration and the Pollutants Variation 26
Charalampos Arapatsakos, Anastasios Karkanis, Stella Maria Strofylla

Geographic Information Systems for Campus/University Transportation Planning 31
V. K. Bansal

Transportation Project Planning and Modeling 35
Sunil Sharma

Calculating Indicators of Rail Transport 40
Karel Greiner, Josef Volek

The Identification of Aircraft Sensor Fault Size via Fuzzy Logic 46
Emre Kiyak, Fikret Caliskan

Hybrid Optimization Technique for the Design of Digital Differentiator 52
Damanpreet Singh, Ranjit Kaur

Application of Asymptotic Method to Study Flexural Wave Motion in Transversely Isotropic Thermoelastic Media 58
P. K. Sharma, S. K. Rana

Multiple Objects Tracking Method based on Particle Filter 64
Budi Sugandi, Hyoungsep Kim, Joo Kooi Tan, Seiji Ishikawa

A Bi-Directional Auto-Zeroing Floating-Gate Amplifier 70
Mehdi Azadmehr, Yngvar Berg

On the Relation between the Dual Principle of Least Constraints and the Principle of Maximal Dissipation 75
Kerim Yunt

Diphone-Based Concatenative Speech Synthesis Systems for Arabic Language 81
Hazem M. El-Bakry, M. Z. Rashad, Islam R. Isma'il

ISBN: 978-1-61804-062-6

Microcontroller Based Protective Relay Testing System 87
Abderrahmane Ouadi, Hamid Bentarzi, Mahfoud Chafai, Abdelkader Zitouni

Distance Protective System Performance Enhancement Using Optimized Digital Filter 92
Hamid Bentarzi, Abderrahmane Ouadi, Abdelkader Zitouni

The Impulsive Action Integral 98
Kerim Yunt

Earthing Resistance Tester developed using Resonant Circuit Technology with No Auxiliary Electrodes 104
Kazuo Murakawa, Masanobu Machida, Hideshi Ohashi, Hitoshi Kijima

Pulse Shaping Method using Bridge Tap for Fast Transient Burst Test Generator 110
Hitoshi Kijima, Koji Ochi

The Influence of Irradiation on Electrophysical and Optical Properties of Pb1-Xmnxte(Se) Thin Films 116
M. A. Mehrabova, I. R. Nuriyev, T. I. Kerimova, R. M. Mamishova

Comparative Analysis of Quantum and Classical Simulations Regarding Corner Effect in a Saddle MOSFET for Sub-50 nm DRAM Cell Transistor 120
Syed Atif Pervez, Umar Farooq

Modelling of Mechanical Blocking 123
Kerim Yunt

Symmetric Autozeroing Floating-Gate Transconductance Amplifier for Ultra Low-Voltage Applications 129
Yngvar Berg, Mehdi Azadmehr

Differential Static Ultra Low-Voltage CMOS Flip-Flop for High Speed Applications 134
Yngvar Berg

Novel Static Differential Ultra Low-Voltage and High Speed Domino CMOS Logic 138
Yngvar Berg, Omid Mirmotahari

Static Ultra Low-Voltage and High Performance CMOS NAND and NOR Gates 143
Yngvar Berg, Omid Mirmotahari

200M-4Gbps Wide-Range Clock and Data Recovery Circuit 147
Kisang Jung, Kangjik Kim, Guihan Ko, Wonki Park, Sungchul Lee, Seongik Cho

Design of Wide-Range Transceiver 151
Kangjik Kim, Kisang Jung, Guihan Ko, Wonki Park, Sungchul Lee, Seongik Cho

Grid Interface Design and Simulation for a Utility Interactive PV Inverter 156
Savita Nema, R. K. Nema, Gayatri Agnihotri

A Combinational Approach of Modeling Analog Phase Locked Loop 162
Savita Nema, R. K. Nema, Gayatri Agnihotri

ISBN: 978-1-61804-062-6

Digital Image Watermarking Technique Based On Discrete Wavelet Transform 168
Asim Ali Khan, Parul Gupta

Amorphous Core Distribution Transformers: Challenges, Opportunity and Loss Capitalization for Power Applications in India 172
Gayatri Agnihotri, Savita Nema, R. K. Nema

Dynamic Data Selection for the Particle Swarm Optimization of Filter Circuitry 177
Jiri Drinovsky, Jiri Zachar, Vaclav Ruzek

A Brief Review of Vision Based Hand Gesture Recognition 181
Georgiana Simion, Vasile Gui, Marius Otesteanu

An Image Tracking System for PTZ Cameras Using OpenCV 189
Sang Gu Lee

Design of Genetic Algorithms Based Fuzzy Logic Power System Stabilizers in Multimachine Power System 193
Manisha Dubey, Nikos E. Mastorakis

Authors Index 203

ISBN: 978-1-61804-062-6

Plenary Lecture 1

Statistical Techniques for Virtual Sensors Design using Neural Networks

Professor Francklin Rivas-Echeverria
Universidad de Los Andes
Laboratorio de Sistemas Inteligentes (LabSIULA)
Merida, VENEZUELA
E-mail: rivas@ula.ve

Abstract: This plenary speech covers the advantages of having statistical analysis to input data previous to training Artificial Neural Networks. It will be also presented some industrial applications including methodologies for designing virtual sensors for oil companies.
Shorter training periods, simpler topologies and more reliable networks can be found. The presented techniques for variables and patterns selection allow reducing the data dimension, obtaining quicker training, simpler topologies and lower prediction errors.
The pattern reduction techniques allow generating a data partition for training and validation based on statistical analysis. Additionally, these selection techniques can be used for reducing the patterns number in the data when it is very high.
The Outliers detection techniques can be used when great volumes of data are used for neural networks training and it is possible to use them for developing algorithms that detect possible observations significantly different from the rest of the data. These techniques can depurate and select those data that provide a better training.
It is very important the fusion of both disciplines: Artificial intelligence and Statistical Data Analysis. The work shows the advantages that it has for the practical Statistic the Artificial intelligence and vice versa.

Brief Biography of the Speaker:
Francklin Rivas-Echeverria Systems Engineer, MSc. in Control Engineering and Applied Science Doctor. Full professor in Control Systems Department, at Universidad de Los Andes, Venezuela. He has been invited professor in the Laboratoire d'Architecture et d'Analyse des Systemes (LAAS, Toulouse-France) and some Venezuelan and international Universities. He has also been technical advisor for “Venezuelan Oil Company” (PDVSA), “Aluminum Venezuelan Company” (VENALUM), “Steel Venezuelan Company” (SIDOR), Trolleybus System in Venezuela (TROLMERIDA). He has created and is the Director of the Intelligent Systems Laboratory and is the head of the University consulting unit (UAPIT-ULA). Over 180 publications in high level conferences and journals: the main topics of his papers are: Artificial Intelligence, Intelligent Control, Automation Systems and Industrial Applications. He has applied his results to many fields: Processes Control and Supervision, Oil production, Steel production processes, among others. Also, has developed several tools for automatic control teaching. He is coauthor of two books concerning Artificial Intelligence and Nonlinear Systems.

ISBN: 978-1-61804-062-6

Plenary Lecture 2

Protective System Reliability Enhancement in Smart Power Grid

Professor Hamid Bentarzi
IGEE, Boumerdes university
ALGERIA
E-mail: bentarzi_hamid@yahoo.com

Abstract: The functional security of the power Grid depends upon the successful operation of thousands of relays that may be used in protective scheme for preventing the power system from cascading failures. The failure of one relay of the protective scheme to operate as intended may jeopardize the stability of the entire power grid and hence it may lead the whole system to blackout. In fact, major power system failures after a transient disturbance appearance are more likely to be caused by unnecessary protective relay tripping rather than by the failure of a relay to take action. In other words, the performance of protective relay or system is determined by several criteria including reliability, selectivity, speed of operation, etc. However, reliability which has two aspects: dependability and security is very important especially in smart power grid. Dependability is a degree of certainty that the protective relay will operate correctly when there is a fault in the power system. However, security relates to the degree of certainty that the protective relay or scheme will operate unnecessary when there is transient distribution in the power grid.

Appropriate relay testing provides a first defense against relay mal-operations and hence improves power grid stability and prevents catastrophic bulk power system failures. Relay testing can help to validate the design of relay logic, compare the performance of different relays, verify relay settings, identify power system conditions that might cause unintended relay operation, and carry out post-event analysis to understand the causes of unintended or incorrect relay actions. Relay testing system improvements need to continue because of the use of relays in smart power grids where the conditions that are not the same as in the simple conventional one.

In this talk we discuss new technologies that allow designing an enhanced relay testing system that can be used for improving the performance of protective relay. At the beginning, we present the different steps which may be followed in order to develop an enhanced relay testing system taking into count all conditions of the power grid. After that, we discuss how to improve protective system reliability, both dependability and security; using this relay testing system in smart power grid. We have already designed and implemented Microprocessor based relay testing system through the use of the new technologies such as microcontroller or PC associated with acquisition as well as we have tested its performances for showing its experimental evaluation. Besides, we have developed some relays where these advanced testing system have been used for evaluating their performances. We will end up this talk by presenting our research projects related to this subject.

Brief Biography of the Speaker:

Hamid BENTARZI was born in Leguatta, Boumerdes, Algeria. He received both bachelor in Electrical Engineering and Magister Degrees in Applied Electronics with honors from “Institut National d’Electricite et d’Electronique” (INELEC), Boumerdes, Algeria, in 1989 and 1992 respectively and Ph.D in Microelectronic systems from “Ecole Nationale Polytechnique” (ENP), Algiers, Algeria, in 2004. Till 1993, he was a lecturer at INELEC, Boumerdes, Algeria. Since 1999, he has been a faculty member at the Institute of Electrical and Electronic Engineering, University of Boumerdes, Algeria. Besides, he is head of research team working in developing microelectronic systems applied to power systems in the Signal and System Laboratory, Boumerdes, since 2001. His current research interests are in the fields of microelectronics, electrical protection systems, electric energy systems and systems reliability. He has authored and co-authored over 70 technical papers. Besides, he has been a member of organizing and technical committee of several conferences including WSEAS group.

ISBN: 978-1-61804-062-6

Authors Index

Agnihotri, G. 156, 162, 172
Arapatsakos, C. 13, 20, 26
Azadmehr, M. 70, 129
Bansal, V. K. 31
Bentarzi, H. 87, 92
Berg, Y. 70, 129, 134
Berg, Y. 138, 143
Caliskan, F. 46
Chafai, M. 87
Cho, S. 147, 151
Christoforidis, D. 20
Drinovsky, J. 177
Dubey, M. 193
El-Bakry, H. M. 81
Farooq, U. 120
Greiner, K. 40
Gui, V. 181
Gupta, P. 168
Ishikawa, S. 64
Isma'il, I. R. 81
Jung, K. 147, 151
Karkanis, A. 13, 20, 26
Kaur, R. 52
Kerimova, T. I. 116
Khan, A. A. 168
Kijima, H. 104, 110
Kim, H. 64
Kim, K. 147, 151
Kiyak, E. 46
Ko, G. 147, 151
Lee, S. 147, 151
Lee, S. G. 189
Machida, M. 104
Mamishova, R. M. 116
Mastorakis, N. E. 193
Mehrabova, M. A. 116
Mirmotahari, O. 138, 143
Mitroulas, K. 20
Moschou, M. 20
Murakawa, K. 104
Nema, R. K. 156, 162, 172
Nema, S. 156, 162, 172
Nuriyev, I. R. 116
Ochi, K. 110
Ohashi, H. 104
Otesteanu, M. 181
Ouadi, A. 87, 92
Pantokratoras, I. 13
Park, W. 147, 151
Pervez, S. A. 120
Rana, S. K. 58
Rashad, M. Z. 81
Ruzek, V. 177
Sharma, P. K. 58
Sharma, S. 35
Simion, G. 181
Singh, D. 52
Strofylla, S. M. 26
Sugandi, B. 64
Tan, J. K. 64
Volek, J. 40
Yunt, K. 75, 98, 123
Zachar, J. 177
Zitouni, A. 87, 92

ISBN: 978-1-61804-062-6