





# **RECENT ADVANCES in CIRCUITS, SYSTEMS, SIGNAL and TELECOMMUNICATIONS**

**5th WSEAS International Conference on CIRCUITS, SYSTEMS,  
SIGNAL and TELECOMMUNICATIONS (CISST '11)**

**Puerto Morelos, Mexico  
January 29-31, 2011**

# **RECENT ADVANCES in CIRCUITS, SYSTEMS, SIGNAL and TELECOMMUNICATIONS**

**5th WSEAS International Conference on CIRCUITS, SYSTEMS,  
SIGNAL and TELECOMMUNICATIONS (CISST '11)**

**Puerto Morelos, Mexico  
January 29-31, 2011**

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

ISSN: 1792-779X  
ISBN: 978-960-474-271-4



World Scientific and Engineering Academy and Society

# **RECENT ADVANCES in CIRCUITS, SYSTEMS, SIGNAL and TELECOMMUNICATIONS**

**5th WSEAS International Conference on CIRCUITS, SYSTEMS,  
SIGNAL and TELECOMMUNICATIONS (CISST '11)**

**Puerto Morelos, Mexico  
January 29-31, 2011**



**Editors:**

Prof. Alexander Zemliak, Autonomous University of Puebla, MEXICO

Prof. Nikos Mastorakis, Technical University of Sofia, BULGARIA

**International Program Committee Members:**

Alexander Zemliak, MEXICO

Weilian Su, USA

Gorazd Kandus, SLOVENIA

AbdulRahman Al-Othman, KUWAIT

Chandra Sekhar Paidimarry, INDIA

Yuan-shyi peter Chiu, TAIWAN

Guergana Mollova, AUSTRIA

Zhao zhengjie Zhang jilong, CHINA

Irma Siller-Alcala, MEXICO

Masoud Saeed, IRAN

Mikhail Arkhipov, MEXICO

Yumi Takizawa, JAPAN

Ciprian Racuciu, ROMANIA

Singa wang Chiu, TAIWAN

Kanwarjit singh Sandhu, INDIA

George Szentirmai, USA

Michael Peter Kennedy, IRELAND

Paresh C. Sen, CANADA

Michel Gevers, BELGIUM

James S. Thorp, USA

Irwin W. Sandberg, USA

Asad A. Abidi, USA

Andreas Antoniou, USA

Antonio Cantoni, AUSTRALIA

Lotfi Zadeh, USA

Armen H. Zemanian, USA

Guanrong Chen, HONG KONG

Edgar Sanchez-Sinencio, USA

Jim C. Bezdek, USA

A. J. van der Schaft, the NETHERLANDS

Istvan Nagy, Hungary

Wasfy B. Mikhael, USA

M. N. S. Swamy, CANADA

M. Araki, JAPAN

Abbas El Gamal, USA

Franco Maloberti, Italy

Alan N. Willson Jr., USA

Yoji Kajitani, JAPAN

Mohammed Ismail, USA

Kemin Zhou, USA

Ruey-Wen Liu, USA

Nabil H. Farhat, USA

John I. Sewell, UK

Jerry M. Mendel, USA

Magdy A. Bayoumi, USA

Bertram E. Shi, HONG KONG

M. Omair Ahmad, CANADA

N. K. Bose, USA

Igor Lemberski, LATVIA

Alfred Fettweis, GERMANY

Brockway McMillan, USA

H. J. Orchard, USA

Jacob Katzenelson, ISRAEL

Vincent Poor, USA

Abraham Kandel, USA

Bor-Sen Chen, CHINA

C. S. George Lee, USA

Hamid R. Berenji, USA

Kevin M. Passino, USA

Lawrence O. Hall, USA

Ronald R. Yager, USA

Witold Pedrycz, CANADA

Agoryaswami J. Paulraj, USA

Ahmed H. Tewfik, USA

Alan V. Oppenheim, USA

Alfonso Farina, ITALY

Alfred O. Hero, USA

Ali H. Sayed, USA

Anders Lindquist, SWEDEN

Arthur B. Baggeroer, USA

Arye Nehorai, USA

Benjamin Friedlander, USA

Bernard C. Levy, USA

Bhaskar D. Rao, USA

Bin Yu, USA

Boualem Boashash, AUSTRALIA

Brian D. O. Anderson, AUSTRALIA

Bruce A. Francis, CANADA

C. Richard Johnson, USA

C. Sidney Burrus, USA

Charles M. Rader, USA

Desmond P. Taylor, NEW ZEALAND

Donald L. Duttweiler, USA

Donald W. Tufts, USA

Douglas L. Jones, USA

Earl E. Swartzlander, USA

Ed F. Deprettere, the NETHERLANDS

Edward A. Lee, USA

Edward J. Powers, USA

Ehud Weinstein, ISRAEL

Eli Brookner, USA

Ezio Biglieri, Italy

Faye Boudreaux-Bartels, USA

Georgios B. Giannakis, USA

Gonzalo R. Arce, USA

H. Vincent Poor, USA

Hagit Messer, ISRAEL

Joos Vandewalle, BELGIUM

Jose C. Principe, USA

Jose M. F. Moura, USA

K. J. Ray Liu, USA

Kaushik Roy, USA

Kenneth Rose, USA

Keshab K. Parhi, USA

Kon Max Wong, CANADA

Kung Yao, USA

Louis L. Scharf, USA  
Martin Vetterli, USA  
Mati Wax, USA  
Meir Feder, ISRAEL  
Michael C. Wicks, USA  
Michael D. Zoltowski, USA  
Michael T. Orchard, USA  
Michael Unser, SWITZERLAND  
Miguel Angel Lagunas, SPAIN  
Moeness G. Amin, USA  
Mohamed Najim, FRANCE  
Neil J. Bershad, USA  
P. P. Vaidyanathan, USA  
Patrick Dewilde, NETHERLANDS  
Peter Willett, USA  
Petre Stoica, SWEDEN  
Phillip A. Regalia, FRANCE  
Pierre Duhamel, FRANCE  
Pierre Moulin, USA  
Pramod K. Varshney, USA  
Rabab Kreidieh Ward, CANADA  
Robert M. Gray, USA  
Rolf Unbehauen, GERMANY  
Ronald W. Schafer, USA  
Rui J. P. Figueiredo, USA  
Russell M. Mersereau, USA  
Sadaoki Furui, JAPAN  
Shun-Ichi Amari, JAPAN  
Simon Haykin, CANADA  
Soo-Chang Pei, CHINA  
Soutra Dasgupta, USA  
Stefan L. Hahn, POLAND  
Steven Kay, USA  
Takao Hinamoto, JAPAN  
Takashi Matsumoto, JAPAN  
Tapio Saramaki, FINLAND  
Tariq S. Durrani, U.K.  
Thomas F. Quatieri, USA  
Thomas L. Marzetta, USA  
Thomas S. Huang, USA  
Thomas W. Parks, USA  
Uri Shaked, ISRAEL  
V. John Mathews, USA  
Vladimir Cuperman, USA  
William A. Pearlman, USA  
Wolfgang Fichtner, SWITZERLAND  
Wu-Sheng Lu, CANADA  
Yaakov Bar-Salom, USA  
Yingbo Hua, USA  
Yong Ching Lim, SINGAPORE  
Yoram Bresler, USA  
Zhi Ding, USA  
A. A. Goldenberg, CANADA  
Angel Rodriguez-Vasquez, SPAIN  
Erol Gelenbe, USA  
F. L. Lewis, USA  
Harry Wechsler, USA  
Howard C. Card, CANADA  
Lei Xu, P. R. CHINA  
Leon O. Chua, USA  
Marco Gori, ITALY  
Narasimhan Sundararajan, SINGAPORE  
Sankar K. Pal, India  
Tamas Roska, USA  
A. Stephen Morse, USA  
Alberto Isidori, USA  
Ali Saberi, USA  
Andrew R. Teel, USA  
Antonio Vicino, ITALY  
Anuradha M. Annaswamy, USA  
Benjamin Melamed, USA  
Bruce H. Krogh, USA  
David D. Yao, USA  
Donald Towsley, USA  
Eduardo D. Sontag, USA  
Edward J. Davison, CANADA  
G. George Yin, USA  
Giorgio Picci, ITALY  
Graham C. Goodwin, AUSTRALIA  
Han-Fu Chen, CHINA  
Harold J. Kushner, USA  
Hidenori Kimura, JAPAN  
Ian Postlethwaite, UK  
Ian R. Petersen, AUSTRALIA  
Jan C. Willems, NETHERLANDS  
Jim S. Freudenberg, USA  
Karl Johan Astrom, SWEDEN  
Lennart Ljung, SWEDEN  
M. Vidyasagar, INDIA  
Mark W. Spong, USA  
Matthew R. James, AUSTRALIA  
Munther A. Dahleh, USA  
P .R. Kumar, USA  
Peter E. Caines, CANADA  
Pramod P. Khargonekar, USA  
Richard T. Middleton, AUSTRALIA  
Roberto Tempo, Italy  
Roger W. Brockett, USA  
Romeo Ortega, FRANCE  
Shankar Sastry, USA  
Stephane Lafortune, USA  
Steven I. Marcus, USA  
T. E. Duncan, USA  
Tamer Basar, USA  
W. M. Wonham, CANADA  
Weibo Gong, USA  
Xi-Ren Cao, Hong Kong  
Yu-Chi Ho, United Kingdom  
Ibrahim Al-Bahadly, NEW ZEALAND  
Saad Al-Shahrani, SAUDI ARABIA  
Shuangching Chen, JAPAN  
Eunmi Choi, KOREA  
YounOk Choi, KOREA  
Yung-shan Chou, TAIWAN

Chin-tun Chuang, TAIWAN  
Algimantas Citavicius, LITHUANIA  
Lawrence Deng, TAIWAN  
Octavian Dranga, AUSTRALIA  
Chen-chien Hsu, TAIWAN  
Gorazd Kandus, SLOVENIA  
Seokjoo Koh, KOREA  
Pei-Jun Lee, TAIWAN  
Jie Li, CHINA  
Shieh-Shing Lin, TAIWAN  
Ming-chih Lu, TAIWAN  
Hsi-Pin Ma, TAIWAN  
Vincenzo Niola, ITALY  
Nattapong Phanthuna, THAILAND  
Harsh Sadawarti, INDIA  
Dat Tran, AUSTRALIA  
Jih-Fu Tu, TAIWAN  
Ti-ho Wang, TAIWAN  
Wei-yen Wang, TAIWAN  
Chin-Long Wey, TAIWAN  
Yanlei Zhao, CHINA





**Preface**

This year the 5th WSEAS International Conference on CIRCUITS, SYSTEMS, SIGNAL and TELECOMMUNICATIONS (CISST '11) was held in Puerto Morelos, Mexico, January 29-31, 2011. The conference remains faithful to its original idea of providing a platform to discuss molecular electronics, molecular computing, metabolic networks, microelectronics, optoelectronic devices, laser and optical systems, amplifiers, non-linear circuits, semiconductors, logic synthesis, digital filters, superconductivity circuits, video technologies, systems theory, robotics, hybrid systems, hierarchical control, man-machine interaction, cybernetics, microprocessors, unmanned vehicles, signal reconstruction, broadband audio coding, evolutionary computation, microwave theory and techniques, microwave superconductivity, antennas, diffraction, applied electromagnetics, aerospace systems 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 indexed by ISI. Please, check it: [www.worldses.org/indexes](http://www.worldses.org/indexes) as well as in the CD-ROM Proceedings. They will be also available in the E-Library of the WSEAS. The best papers will be also promoted in many Journals for further evaluation.

A 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



## Table of Contents

<b>Real-Time Digital Oscilloscope Implementation in 90nm CMOS Technology FPGA</b>	13
<i>Nasir Mehmood, Jens Ogniewski, Vinodh Ravinath</i>	
<b>Microcontroller based Closed-Loop Automatic Speed Control of DC Motor using PWM</b>	18
<i>I. Moazzem, S. Rahman, M. A. Matin</i>	
<b>A Design of Parameter Optimal Iterative Learning Control for Linear Discrete-Time Systems</b>	22
<i>Wataru Kase</i>	
<b>Wall Climbing Robot: Mechanical Design and Implementation</b>	28
<i>A. Albagul, A. Asseni, O. Khalifa</i>	
<b>Graph Method for Solving Switched Capacitors Circuits</b>	33
<i>Bohumil Brtnik</i>	
<b>Isolated Word Recognition based on Intelligent Segmentation by Using Hybrid HTD-HMM</b>	38
<i>A. Reza Kazemi, B. Bahram Ehsandoust, C. Alborz Rezazadeh, D. Shahrokh Ghaemmaghami</i>	
<b>Utilizing Intelligent Segmentation in Isolated Word Recognition Using a Hybrid HTD-HMM</b>	42
<i>R. Kazemi, A. Rezazadeh Sereshkeh, B. Ehsandoust</i>	
<b>Performance Studies of Antenna Pattern Design using the Minimax Algorithm</b>	50
<i>James Jen, Meng Qian, Zekeriya Aliyazicioglu, H. K. Hwang</i>	
<b>Digital Architecture for a Median Filter of Image Based on Sorting Network</b>	56
<i>Victor Jim Enez-Fernandez, Carlos Ventura-Arizmendi, Denisse Martinez-Navarrete, Francisco Gonza Lezmartinez</i>	
<b>Responses of Semiconductor Arrays due to Photon Absorption</b>	60
<i>Ahmad Barzkar</i>	
<b>HHT-Based Time-Frequency Analysis Method for Biomedical Signal Applications</b>	65
<i>Chin-Feng Lin, Jin-De Zhu</i>	
<b>Sensorless Speed Non Linear Control of Induction Motor</b>	69
<i>Chouya Ahmed, Mansouri Abdellah, Chenafa Mohammed</i>	
<b>LabVIEW Visualization For Inductive Sensors Used In Shaping Control of A Segmented Reflector Test Bed</b>	76
<i>Alok Desai, Jessica Alvarenga, Harshit Tarsaria, Khosrow Rad, Helen R. Boussalis</i>	
<b>Ray Tracing Visualization for Precision Pointing Architecture of A Segmented Reflector Testbed Using LabVIEW</b>	81
<i>Alok Desai, Jessica Alvarenga, Harshit Tarsaria, Khosrow Rad, Helen R. Boussalis</i>	
<b>Generalized Methodology for Analog Network Optimization</b>	87
<i>Alexander Zemliak, Ricardo Pena, Eduardo Rios</i>	

<b>Analysis and Optimization of a DAR IMPATT Diode for 330 GHz</b> <i>Alexander Zemliak, Andrey Ostrovsky, Sergio Vergara, Evgeniy Machuskiy</i>	95
<b>A Design Method for USBL Systems with Skew Three-Element Arrays</b> <i>Mikhail Arkhipov</i>	102
<b>A Low Voltage and Low Power Electronically Tunable Resistor with Positive, Negative, Linear and Nonlinear I-V Characteristics</b> <i>Roshanak Alavifard, Mohammad Pooyan</i>	108
<b>Influence of the Speech Quality in Telephony on the Automated Speaker Recognition</b> <i>Robert Blatnik, Gorazd Kandus, Tomaz Sef</i>	115
<b>Digital Distance Relay Reliability Enhancement Using Real-Time Filter</b> <i>Abderrahmane Ouadi, Hamid Bentarzi, Jean Claude Maun</i>	121
<b>Authors Index</b>	127

## Authors Index

Abdellah, M.	69	Machuskiy, E.	95
Ahmed, C.	69	Martinez-Navarrete, D.	56
Alavifard, R.	108	Matin, M. A.	18
Albagul, A.	28	Maun, J. C.	121
Aliyazicioglu, Z.	50	Mehmood, N.	13
Alvarenga, J.	76, 81	Moazzem, I.	18
Arkipov, M.	102	Mohammed, C.	69
Asseni, A.	28	Ogniewski, J.	13
Barzkar, A.	60	Ostrovsky, A.	95
Bentarzi, H.	121	Ouadi, A.	121
Blatnik, R.	115	Pena, R.	87
Boussalis, H. R.	76, 81	Pooyan, M.	108
Brtnik, B.	33	Qian, M.	50
Desai, A.	76, 81	Rad, K.	76, 81
Ehsandoust, B.	38, 42	Rahman, S.	18
Enez-Fernandez, V. J.	56	Ravinath, V.	13
Ghaemmaghami, D. S.	38	Rezazadeh, A.	38, 42
Hwang, H. K.	50	Rios, E.	87
Jen, J.	50	Sef, T.	115
Kandus, G.	115	Tarsaria, H.	76, 81
Kase, W.	22	Ventura-Arizmendi, C.	56
Kazemi, R.	38, 42	Vergara, S.	95
Khalifa, O.	28	Zemliak, A.	87, 95
Lezmartinez, F. G.	56	Zhu, J.-D.	65
Lin, C.-F.	65		