



**Editors:**

Prof. Leon Trilling, Massachusetts Institute of Technology (MIT), USA  
Prof. D. Perkins, Harvard University, USA  
Prof. Dionysios (Dion) D. Dionysiou, University of Cincinnati, USA  
Prof. Leonid Perlovsky, Harvard University, USA  
Prof. Kent Davey, IEEE Fellow, Editor IEEE Trans. on Magnetics, Austin, TX, USA  
Prof. David Landgrebe, Purdue University, USA  
Prof. Miguel A. Marino, Distinguished Professor of Hydrology, Civil & Environmental Eng.,  
and Biological & Agricultural Engineering, University of California, CA, USA  
Prof. D. L. Russell, Professor of Mathematics, Virginia Tech, USA  
Prof. Steven H. Collicott, School of Aeronautics and Astronautics, Univ. West Lafayette, USA  
Prof. Marco Céccarelli, (IFTToMM President elect 2008-2011), University of Cassino, IT  
Prof. John W. Lund, PE, Professor Emeritus of Civil Engineering,  
Past President of the Intern. Geothermal Association, Oregon Institute of Technology, USA

# **RECENT ADVANCES in ELECTRONICS, HARDWARE, WIRELESS and OPTICAL COMMUNICATIONS**

Cambridge, UK, February 21-23, 2009

Proceedings of the 8th WSEAS International Conference on  
ELECTRONICS, HARDWARE, WIRELESS and OPTICAL COMMUNICATIONS (EHAC '09)

Mathematics and Computers in Science and Engineering  
A Series of Reference Books and Textbooks

ISBN: 978-960-474-053-6  
ISSN: 1790-5117

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

**RECENT ADVANCES in ELECTRONICS, HARDWARE, WIRELESS and OPTICAL COMMUNICATIONS**



# **RECENT ADVANCES in ELECTRONICS, HARDWARE, WIRELESS and OPTICAL COMMUNICATIONS**

**Proceedings of the 8th WSEAS International Conference on  
ELECTRONICS, HARDWARE, WIRELESS and OPTICAL  
COMMUNICATIONS (EHAC '09)**

**Cambridge, UK  
February 21-23, 2009**

Mathematics and Computers in Science and Engineering  
A Series of Reference Books and Textbooks

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

ISSN: 1790-5117  
ISBN: 978-960-474-053-6

# **RECENT ADVANCES in ELECTRONICS, HARDWARE, WIRELESS and OPTICAL COMMUNICATIONS**

**Proceedings of the 8th WSEAS International Conference on  
ELECTRONICS, HARDWARE, WIRELESS and OPTICAL  
COMMUNICATIONS (EHAC '09)**

**Cambridge, UK  
February 21-23, 2009**

Mathematics and Computers in Science and Engineering  
A Series of Reference Books and Textbooks

Published by WSEAS Press

[www.wseas.org](http://www.wseas.org)

Copyright © 2009, 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: 1790-5117

ISBN: 978-960-474-053-6



World Scientific and Engineering Academy and Society

# **RECENT ADVANCES in ELECTRONICS, HARDWARE, WIRELESS and OPTICAL COMMUNICATIONS**

**Proceedings of the 8th WSEAS International Conference on  
ELECTRONICS, HARDWARE, WIRELESS and OPTICAL  
COMMUNICATIONS (EHAC '09)**

**Cambridge, UK  
February 21-23, 2009**

**Editors:**

Prof. Leon Trilling, Massachusetts Institute of Technology (MIT), USA  
Prof. D. Perkins, Harvard University, USA  
Prof. Dionysios (Dion) D. Dionysiou, University of Cincinnati, USA  
Prof. Leonid Perlovsky, Harvard University, USA  
Prof. Kent Davey, IEEE Fellow, Editor IEEE Trans. on Magnetics, Austin, TX, USA  
Prof. David Landgrebe, Purdue University, USA  
Prof. Miguel A. Marino, Distinguished Professor of Hydrology, Civil & Environmental Engineering, and Biological & Agricultural Engineering, University of California, CA, USA  
Prof. D. L. Russell, Professor of Mathematics, Virginia Tech, USA  
Prof. Steven H. Collicott, School of Aeronautics and Astronautics, Univ. West Lafayette, USA  
Prof. Marco Ceccarelli, (IFTToMM President elect 2008-2011), University of Cassino, IT  
Prof. John W. Lund, PE, Professor Emeritus of Civil Engineering, Past President of the Intern. Geothermal Association, Oregon Institute of Technology, USA

**International Program Committee Members:**

Cuauhtemoc Rodriguez, UK  
Gehan A.J. Amaratunga, UK  
C. W. Solomon, USA  
Demterios Kazakos, USA  
Ioannis Pountourakis, GREECE  
Nikos E. Mastorakis, GREECE  
Milan Stork, CZECH REPUBLIC  
Sesh Commuri, USA  
Pelin Yildiz, TURKEY  
Dalibor Biolek, CZECH REPUBLIC  
Metin Demiralp, TURKEY  
Vincenzo Niola, ITALY  
Aydin Akan, TURKEY  
Valeri Mladenov, BULGARIA  
Zoran S. Bojkovic, SERBIA  
G. Stavrakakis, GREECE  
Weilian Su, USA  
Arie Maharshak, ISRAEL  
Ioannis Gonos, GREECE  
Elena Niculescu, ROMANIA  
A. Andreatos, GREECE  
Kuo-hung Tseng, TAIWAN  
Simona Lache, ROMANIA  
H. T. Duru, TURKEY  
Nabil Moussa, EGYPT  
S. A. Selouani, CANADA  
Irina Zheliazkova, BULGARIA  
Toly Chen, TAIWAN  
Vir Brslica, CZECH REPUBLIC  
Anping Xu, CHINA  
Victor-Emil Neagoe, ROMANIA

## **Preface**

This year the 8th WSEAS International Conference on ELECTRONICS, HARDWARE, WIRELESS and OPTICAL COMMUNICATIONS (EHAC '09) was held in the University of Cambridge. The Conference remains faithful to its original idea of providing a platform to discuss theoretical and applicative aspects of electronics, nanostructures and nanotechnologies, silicon devices, optoelectronic devices, fuzzy logic and circuits design, high-data rate wireless channels, stratospheric station systems, wireless networks, broadband access networks, microwaves, antennas, radar 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.

During this last year we witnessed the growth of the European Union interest in Wireless Communications. This is an additional proof that it is seen not only as an exciting research area but also as technologies that may solve current European citizens' concerns with several practical problems.

For a discipline which is central to research and also to industry and which generates interests not only among academicians but also among large companies and government departments and agencies, it is important to look at the market and at its movements.

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>Plenary Lecture: Analytical Synthesis Method - A New Circuit Design Method for the Challenge without Trade-off</b> <i>Chun-Ming Chang</i>	9
<b>Improving ACK Reply of DSR Protocol for Mobile Ad Hoc Network</b> <i>Qi Han, Abdullah Gani, Nor Badrul Anuar, Omar Zakaria</i>	11
<b>Different Wideband Direction of Arrival (DOA) Estimation methods: An Overview</b> <i>Sandeep Santosh, O. P. Sahu, Monika Aggarwal</i>	17
<b>A Low Voltage Low Power CMOS based 4GHz VCO for RF Applications</b> <i>Manisha Pattanaik, Deepak Singhal</i>	26
<b>Prediction in Electronics based on Limited Information</b> <i>Jelena Milojkovic, Vanco Litovski</i>	33
<b>Utilizing Satellite Systems for Mobile Communications: An Emerging Approach</b> <i>Basil M. Al-Kasasbeh, Rafa E. Al-Qutaish, Mohammad I. Muhairat</i>	39
<b>Genetic Approach Based Design of Dispersion-Free Optical Fiber</b> <i>Maan M. Shaker, Mahmood Sh. Majeed, Raid W. Daoud</i>	45
<b>Location Privacy in Mobile IPv6 Distributed Authentication Protocol Using Mobile Home Agents</b> <i>Andrew Georgiades, Yuan Luo, Aboubaker Lasebae, Richard Comley</i>	51
<b>A Development of Wireless Interoper-mobile Application for Outdoor Operation Management</b> <i>Jiri F. Urbanek, Jaroslav Prucha</i>	57
<b>Novel Direct Digital Frequency Synthesis With Direct Analog Output Architecture Based On Artificial Neural Networks</b> <i>Khosro Rajabpour Moghaddam</i>	65
<b>Machine Efficiency and Man Power Utilization on Production Lines</b> <i>S. K. Subramaniam, S. H. Husin, Y. Yusop, A. H. Hamidon</i>	70
<b>The Impact of M-Commerce in Global Perspectives - A SWOT Analysis</b> <i>J. Felicitta, J. Gnana Jayanthi</i>	76
<b>Development Program for Heat Balance Analysis Fuel to Steam Efficiency Boiler And Data Wireless Transfer</b> <i>Nattapong Phanthuna, Warunee Srisongkram, Sunya Pasuk, Thaweesak Trongtirakul</i>	81
<b>Tunable Linear Conductance by Two MOSFETs and its Application to Analogue-Mixed VLSI for Mobile Communications and Biologically Plausible Neuromorphic Hardware</b> <i>Woojoon Han, Ilsong Han</i>	86
<b>Aero-Pilot Concentration Monitoring and Alert system using Correlation and ZIGBEE</b> <i>S. Rajasekar, A. H. Syed Sulthan Alaudeen</i>	94
<b>Design and Implementation of a STANAG 5066 Data Rate Change Algorithm for High Data Rate Autobaud Waveforms</b> <i>Stephan Schulze, Gerhard P. Hancke</i>	98



<b>24 GHz Active Phased Array Antenna for Microwave Sensors</b>	108
<i>S. I. Mitu Sheikh, S. M. Al-Shahrani, U. Johar</i>	
<b>Analysis and Comparison of Optimized Multipump Distributed Raman Amplifiers in Different Fiber Medias</b>	112
<i>M. Katebi Jahromi, F. Emami</i>	
<b>Forming Text in PDAs for Special Education Students</b>	116
<i>Umit Girgin, H. Ferhan Odabasi, M. Cem Girgin</i>	
<b>Analysis of Low Noise and Gain Flattened Distributed Raman Amplifiers Using Different Fibers</b>	119
<i>Farzin Emami, Amir H. Jafari</i>	
<b>Evaluation of mLearning in Special Education Context</b>	124
<i>Cem Cuhadar, H. Ferhan Odabasi, Abdullah Kuzu</i>	
<b>Analytical Modelling: An Investigation into the Effect of Absorption Processes on the Performance of a Waveguide-based Biosensor</b>	129
<i>H. J. Kadim</i>	
<b>Design and Implementation of Embedded Fuzzy Controllers Based on Fourier computation of Membership Functions</b>	133
<i>V. O. S. Olunloyo, A. M. Ajofoyinbo, O. Ibidapo-Obe</i>	
<b>Higher Education Provision for the Hearing Impaired and Internet Based Education in Anadolu University- ANAPOD</b>	143
<i>M. Cem Girgin, Hakan Senel</i>	
<b>Remote Water Quality Monitoring System using Wireless Sensors</b>	148
<i>Nazleeni Samiha Haron, Mohd Khuzaimi Mahamad, Izzatdin Abdul Aziz, Mazlina Mehat</i>	
<b>Overvoltage Protective Device and Method of Overvoltage Protection</b>	155
<i>Hitoshi Kijima</i>	
<b>Analysis of Routing Metrics for Providing Better Link Utilization in WiMAX Using Soft Computing</b>	161
<i>Arianit Maraj</i>	
<b>Analysis of Call Scenario in NGN Network</b>	167
<i>Skender Rugova, Arianit Maraj</i>	
<b>Implementing Lightweight Reservation Protocol for Mobile Network Using Crossover Router &amp; Pointer Forwarding Scheme</b>	173
<i>Lina Yang, Abdullah Gani, Omar Zakaria, Nor Badrul Anuar</i>	
<b>Secure Efficient Geocast Protocol for Sensor Networks with Malicious Nodes</b>	179
<i>Young-Chul Shim</i>	
<b>Comparison of Rectangular and T-Shaped Microstrip Antenna</b>	185
<i>Mohamed Ismaeel, T. Jayanthi, S. Sathyamurthy</i>	

## Plenary Lecture

### Analytical Synthesis Method - A New Circuit Design Method for the Challenge without Trade-off



**Professor Chun-Ming Chang**

Dept. of Electrical Engineering, Chung Yuan Christian University

Chung-Li, Taiwan 32023, R. O. CHINA

Email: [chunming@dec.ee.cycu.edu.tw](mailto:chunming@dec.ee.cycu.edu.tw)

**Abstract:** Analytical Synthesis Method (ASM) has been presented in several papers published in the IEEE Transactions on Circuits and Systems since 2003. It is one of the powerful design methods in the field of analog circuit design. It is the method using a succession of innovative algebra manipulation operations to decompose a complicated transfer function representing the relationship between the output and the input signals of a design project into many simple equations feasible by using the corresponding simple sub-circuitries. The simple sub-circuitries can be constructed by the desired configuration of the element such as the single-ended-input operational transconductance amplifiers (OTAs) and the grounded capacitors, both of which are used for absorbing and reducing the shunt parasitic capacitance and lead to have more precise output responses. In addition to this, the ASM can control the number of the terms in the complicated decomposition process such that the number of both active and passive components used in the circuit is the least compared to the previously reported ones. Then, the ASM is the only one method which can simultaneously achieve the three important criteria for the design of OTA-C circuits without trade-off.

Due to the flexibility of the ASM, the simple sub-circuitries used in the circuit design can be changed and chosen according to different necessities for the target of the circuit design. For example, if the reduction of the number of the active and passive components used in the circuit is more important than the type of the element configurations like single-ended-input/differential-input OTAs and grounded/floating capacitors due to the consideration about power consumption, chip area, noise, and total parasitics....., etc., the minimum component OTA-C circuit can also be investigated and developed successfully using the ASMs. The fully flexible characteristic and the real demonstration in the literature of the ASM may make it be one of the most prospective methods in the field of analog circuit design in the near future.

**Brief Biography of the Speaker:** Chun-Ming Chang received the B.S.E.E. and M.S.E.E. degrees from National Cheng Kung University, Tainan, Taiwan, R. O. C. in 1975 and 1977, respectively, and the Ph.D. degree from the University of Southampton, Southampton, U.K., in 2004.

In 1979, he joined the Department of Electrical Engineering, Taipei Institute of Technology, Taipei, Taiwan, R. O. C., as a Lecturer. After one year, he transferred to the Department of Electronic Engineering, Fu Jen Catholic University, Taipei Hsien, Taiwan, R.O.C. In 1982, he joined the Department of Electrical Engineering, Chung Yuan Christian University, Chung-Li, Taiwan, R.O.C., where he became an Associate Professor and a Full Professor in 1985 and 1991, respectively. He is currently a Professor of Electrical Engineering and leader of the Electronic Circuits Group in the Department of Electrical Engineering, Chung Yuan Christian University. He is also a departmental teacher promotion committee member and a college teacher promotion committee member. He was the chairman of the Department of Electrical Engineering of Chung Yuan Christian University from 1995 to 1999. His research interests are divided into two parts: network synthesis and analog circuit design before and after 1991, respectively. The improvement for the approach technique to factorize a paramount matrix used in network synthesis and proposed by Professor I. Cederbaum let him be promoted to a Full Professor in 1991. He has published over 70 SCI papers, in which the most famous is the invention of a new analytical synthesis method for the design of analog circuits which can, for the first time, simultaneously achieve three important criteria for the design of OTA-C filters without trade-offs. Using a succession of innovative algebra manipulation operations, a complicated nth-order transfer function can be decomposed into a set of simple equations feasible using the single-ended-input OTAs and grounded capacitors. Several IEEE Transaction papers on Circuits and Systems with analytical synthesis method have been published in the literature since 2003. He is in the process of writing his professional textbook: "Analog Circuit Design---Analytical Synthesis Method".

Prof. Chang is a senior member of the IEEE Circuits and Systems Society.

## Authors Index

Abdul Aziz, I.	148	Husin, S. H.	70	Olunloyo, V. O.	133
Aggarwal, M.	17	Ibidapo-Obe, O. I.	133	Pasuk, S.	81
Ajofoyinbo, A. M.	133	Ismaeel, M.	185	Pattanaik, M.	26
Alaudeen, A. H.	94	Jafari, A.	119	Phanthuna , N.	81
Al-Kasasbeh, B. M.	39	Jahromi, M. K.	112	Prucha, J.	57
Al-Qutaish, R. E.	39	Jayanthi, J.	76	Rajasekar, S.	94
Al-Shahrani, S. M.	108	Jayanthi, T.	185	Rugova, S.	167
Anuar, N. B.	11, 173	Johar, U.	108	Sahu, O. P.	17
Comley, R.	51	Kadim, H. J	129	Santosh, S.	17
Cuhadar, C.	124	Kijima, H.	155	Sathyamurthy, S.	185
Daoud, R. W.	45	Kuzu, A.	124	Schulze, S.	98
Emami, F.	112, 119	Lasebae, A.	51	Senel, H.	143
Felicitta, J.	76	Litovski, V.	33	Shaker, M. M.	45
Gani , A.	11, 173	Luo, Y.	51	Shim, Y. C.	179
Georgiades, A.	51	Mahamad, M. K.	148	Singhal, D.	26
Girgin, M. C.	116, 143	Majeed, M. S.	45	Srisongkram, W.	81
Girgin, U.	116	Maraj, A.	161, 167	Subramaniam, S. K.	70
Hamidon, A. H.	70	Mehat, M.	148	Trongtirakul, T.	81
Han, I.	86	Milojkovic, J.	33	Urbanek, J. F.	57
Han, Q.	11	Mitu Sheikh, S. I.	108	Yang, L.	173
Han, W.	86	Moghaddam, K. R.	65	Yusop, Y.	70
Hancke, G. P.	98	Muhairat, M. I.	39	Zakaria, O.	11, 173
Haron, N. S.	148	Odabasi, H. F.	116, 124		