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RECENT ADVANCES IN SYSTEMS, COMMUNICATIONS & COMPUTERS

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Selected Papers from the WSEAS Conferences in Hangzhou, China, April 6-8, 2008:
7th WSEAS Int. Conf. on APPLIED COMPUTER and APPLIED COMPUTATIONAL SCIENCE (ACACOS '08)
7th WSEAS Int. Conf. on INSTRUMENTATION, MEASUREMENT, CIRCUITS and SYSTEMS (INCAS'08)
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8th WSEAS Int. Conf. on MULTIMEDIA SYSTEMS & SIGNAL PROCESSING (MUSP '08)

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Preface

This book contains selected papers from: 1) 7th WSEAS Int. Conf. on APPLIED COMPUTER and APPLIED COMPUTATIONAL SCIENCE (ACACOS '08), 2) 7th WSEAS Int. Conf. on INSTRUMENTATION, MEASUREMENT, CIRCUITS and SYSTEMS (IMCAS'08), 3) 8th WSEAS Int. Conf. on ROBOTICS, CONTROL and MANUFACTURING TECHNOLOGY (ROCOM'08) and 4) 8th WSEAS Int. Conf. on MULTIMEDIA SYSTEMS & SIGNAL PROCESSING (MUSP '08). These conferences were held in Hangzhou, China, April 6-8, 2008. These selected papers aim to disseminate the latest research and applications in the systems, communications and computers.

We thank the China Jiliang University for the sponsorship . 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**

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Expanded and enhanced versions of papers published in these 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) 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.

We are sure that this volume will be source of knowledge and inspiration for other academicians, scholars, advisors and industrial practitioners and will be considered as one more brilliant edition of the WSEAS related with a brilliant conference sponsored by China Jiliang University.

RECENT ADVANCES IN SYSTEMS, COMMUNICATIONS & COMPUTERS

Table of Contents

Plenary Lecture I: Inverse Acoustic and Electromagnetic Obstacle Scattering: Theory and Numerics 13
Jun Zou

Plenary Lecture II: Fractal Time Series and Tele-Traffic 14
Ming Li

Plenary Lecture III: Multimedia system – 3d Interactive Model Web (3DIMW) 15
Rong-Jyue Fang

Plenary Lecture IV: Analytical Synthesis Method:A New Circuit Design Method for Arbitrary Requirements 16
Chun-Ming Chang

Plenary Lecture V: Real-time In vivo and In situ Cellular Image Processing and Characterization: Challenges and Solutions 17
LIN Feng

Plenary Lecture VI: Obstacle Avoidance for Kinematically Redundant Manipulators Based on an Improved Problem Formulation and Two Recurrent Neural Networks 18
Jun Wang

Person-Following using Fuzzy Inference 19
Samir Shaker, Jean J. Saade, Daniel Asmar

Closed-Loop DMM Calibration 26
Vladislav Slavov,Tasho Tashev

Protocol-Based Classification for Intrusion Detection 29
Kun-Ming Yu, Ming-Feng Wu, Wai-Tak Wong

Random Weighting Approximate of NA Sample Mean 35
Yuren Li,Shesheng Gao,Haiwei Wang

Experimental Analysis of Pattern Similarity between Bessel Kernel and Born-Jordan Kernel 41
Ming Li, Xue-Kang Gu, Wei Zhao

Performance Comparison between Backpropagation Algorithms Applied to Intrusion Detection in Computer Network Systems 47
Iftikhar Ahmad, M.A Ansari, Sajjad Mohsin

Increased Input Voltage Range for Signal Transmission through Nonlinear Compensation in Analog Optical Fiber Links 53
Joaquín Rodríguez, José Velázquez, Julio Montero, Raul Garduno

Fuzzy Agent for Elearner Profile Construction 61
Aboubekeur Hamdi-Cherif, Chafia Hamdi-Cherif, Ayedh Khalaf Rasheedi, Abdulaziz Saud Rasheedi

Production of Nano powder of aluminum nitride by Pulsd Power method **75**
M. M. Daemi Attaran, A. Erfanian, P. Ghassemi Kian

Generalized predictive controller design for AC motors **78**
Bektache Abdeldjebar, Benmahammed Khier

Computing exact symmetries of dynamical systems from their reduced system of equations can be interesting **83**
Festus Irimisose Arunaye

Fuzzy multiple modeling and fuzzy predictive control of a tubular heat exchanger system **93**
Amir Hooshang Mazinan and Nasser Sadati

Modified MUF and EDF Algorithms for Overloaded Soft Real Time Systems **99**
Sandeep Agrawal, Pankaj Bhatt and K K Shukla

The Efficient Search Method for High Risk Events of Power Systems Caused by Natural Disasters **105**
Tetsushi Miki

Study of Surface Acoustic Waves under Periodic Grating Structures **111**
Cheng-Liang Hsu, Chi-Yen Shen, Ming-Yau Su And Rume-Tze Tsai

Crossover operation engine considering character inheritance **117**
Masaya Yoshikawa, Kentarou Otsuka, Hidekazu Terai

An efficient hardware design of a system for highly nonstationary signals filtering **123**
Veselin N. Ivanovic, Srdjan Jovanovski

Universal Active Current Filter Using Single Second-Generation Current Controlled Conveyor **129**
Chun-Ming Chang, Tzu-Hao Huang, Shu-Hui Tu, Chun-Li Hou, And Jiun-Wei Horng

A Speed and Mechanical Torque Observer Based on WLSVR **134**
Zhang Guixiang, Chen Hongwei

Study on Bushing Cooling with Ferrofluids and On-Line Monitoring **141**
Silvius-Dorel Nedelcut, Victor Proca, Dorina-Mioara Purcaru

Universal Active Current Filter Using Single Differential Voltage Current Conveyor **147**
Chun-Ming Chang, Jen Hung Lo, Li-Der Jeng, Shu-Hui Tu, Chun-Li Hou, and Jiun-Wei Horng

Linear Time Varying Systems: Theory and Identification of Model Parameters **153**
Kyarash Shahriari , Stanislaw Tarasiewicz, Olivier Adrot

Universal Active Current Filter Using Single Third-Generation Current Conveyor **163**
Chun-Ming Chang, Ruei-Hsuan Yang, Shu-Hui Tu, Chun-Li Hou, and Jiun-Wei Horng

Universal Active Current Filter Using Single Operational Transconductance Amplifier **169**

Chun-Ming Chang, Ching-Han Chen, Shu-Hui Tu, Chun-Li Hou, and Jiun-Wei Horng

Distribution lines Overload Control to Increase Reliability and Power Loss Reduction **176**
Shrirang Karandikar, Ashok Ghatol

Universal Active Voltage Filter Using Single Minus-Type Current Feedback Amplifier **182**
Chun-Ming Chang, Yi-Chuan Lin, Shu-Hui Tu, Chun-Li Hou, and Jiun-Wei Horng

A Dual Gauss-Sedel Iteration Method in Calculation of Cost Tree of Power Project Budget **188**
Chen Yuchen, Cao Minnian, Liu Haishan

A hybrid noise canceling structure with secondary path estimation **194**
Andres Romero, Mariko Nakano-Miyatake, Hector Perez-Meana

View Generation for Free Viewpoint Video System **200**
Gangyi Jiang, Liangzhong Fan, Mei Yu, Feng Shao

A Client Driven Interactive Free-Viewpoint Video System **206**
You Yang, Mei Yu, Gangyi Jiang, Zongju Peng

Mechanical Fault Detector in Power Transmission Lines **213**
Joaquin Rodriguez, Carlos Tello

Basic Consideration for SIL Calculation in Safety Systems **219**
Peter Holub, Börcsök J.

Consideration of Common Cause Failures in Safety Systems **228**
Peter Holub, Börcsök J.

Automatic Identification of Weapons from Images of the Cartridge Case Head **236**
Alejandro Legra,Enrique Marañon,Hebert Perez-Roses,Lisandro De La Torre,Arturo Quintana, Ricardo Quiros

A heuristic algorithm for the scheduling problem of parallel machines with mold constraints **242**
Tzung-Pei Hong , Pei-Chen Sun and Shin-Dai Li

Flexible Hardware-Software Cooperation System with HwModule Board and Co-Design Framework by ET **248**
Hiroshi Yoshikawa, Kiyoshi Akama, Hiroshi Mabuchi, Rika Satoh

Analytical Comparison of Distributed Object components **254**
Usha Batra, Deepak Dahiya, and Sachin Bhardwaj

E-Government and its application in the Republic of Croatia **260**
Mario Spremić,Hrvoje Brzica

The threshold voltage of MOSFET and its influence on digital circuits **266**
Milaim Zabeli, Nebi Caka, Myzafere Limani, Qamil Kabashi

Video and Infrared Camera Localization Method using Information Fusion **272**
Cornel Barna

Discrete Model of a TCSC for Automation and Planning Studies of the Electrical Transmission System in Colombia **276**
Jorge. W. Gonzalez, Hugo Cardona, Idi Isaac, Gabriel Lopez, E. Ruiz

A Search Agent for a Max-2sat Memetic Algorithm Approach **284**
Markus Borschbach and Andre Exeler

(DSP-FPGA) Based Multiple Motors Control System **290**
Omar Al-Ayasrah

EEG Feature Extraction for Classifying Emotions using FCM and FKM **299**
M Murugappan, M Rizon, R Nagarajan, S Yaacob

Integration method and Runge-Kuuta method **305**
Maitree Podisuk, Wannaporn Sanprasert and Ungsana Chundang

Smoothing curve by orthogonal polynomial(2) **311**
Wichuta Pispeng, Sutisa Kameesak, Piyapong Sujarakittikul, Terdkwan Changpuak And Maitree Podisuk

Normal contact of elastic solids (Hertzian contact) by MathCAD method **318**
Enescu Ioan, Vlase Sorin

Simulation of the roughing process **321**
Enescu Ioan

Theoretical and Applicative Contributions to Flexibility of Technology at Turning on CNC Machine Tools **325**
Badea Lepadatescu, Adela-Eliza Dumitraşcu, Constantin Buzatu, Simona Duicu, Ioan Enescu

Self-Tuning Fuzzy Sliding-Mode Control for Time-Delay Chaotic Systems **330**
Lon-Chen Hung, Yeong-Chin Chen, Shuh-Han Chao, Jsung-Ta Tsai

Mathematical Programming Applied in the Optimal Power Flow Problem DC: Case Studies of Market Needs **336**
Emerson Eustáquio Costa, Luiz Danilo Barbosa Terra, George Leal Jamil

A Complete Electrical Equivalent Circuit Model For Biological Cell **343**
Mohammad Amin, Pradip Peter Dey and Hassan Badkoobehi

GEOTOOL: A Tool to Manage Polygonal Meshes and Build Multiresolution Models **349**
Francisco Ramos, Miguel Chover, Jesus Gumbau, Ricardo Quiros

Object-Oriented Programming Application in Automotive Door control Performance **353**
Abbasali Taghipour, Ehsan Taheripour

Plenary Lecture I

Inverse Acoustic and Electromagnetic Obstacle Scattering: Theory and Numerics

Professor Jun Zou
Department of Mathematics
The Chinese University of Hong Kong

Abstract: In this talk we shall present some breakthroughs that have been achieved in the past few years on inverse acoustic and electromagnetic obstacle scattering problems. Both theory and numerical simulations will be discussed. This is a joint work with Dr. Hongyu Liu (Washington University, Seattle) and supported by Hong Kong RGC grants (Project 404105 and Project 404606).

Brief Biography of the Speaker: Jun ZOU is a Professor in Department of Mathematics of The Chinese University of Hong Kong. Before taking up his current position in Hong Kong, he had worked two years (93-95) in University of California at Los Angeles (USA) as a post-doctoral fellow and a CAM Assistant Professor, worked two and a half years (91-93) in Technical University of Munich as a Visiting Assistant Professor and an Alexander von Humboldt Research Fellow (Germany), and worked two years (89-91) in Chinese Academy of Sciences (Beijing) as an Assistant Professor. His research areas include numerical solutions of electromagnetic Maxwell systems, interface problems, ill-posed Problems and inverse Problems. He has about 70 publications in the refereed international journals.

Plenary Lecture II

Fractal Time Series and Tele-Traffic

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Personal URL: http://www.freewebs.com/mingli/

Abstract: Fractal time series gains applications in various fields of sciences and technologies ranging from financial engineering to network traffic. The speech will describe several models of fractal time series, such as fractional Gaussian noise, the generalized Cauchy process, and so on. Possible applications of fractal time series to networking will be discussed.

Short Biography of the Speaker: Ming Li, Ph.D., is a professor in electronic communications and information systems, as well as computer science at East China Normal University, PR. China. He was with the School of Computing, National University of Singapore, before joining East China Normal University in 2004. His research areas relate to applied statistics and signal processing with the recent interests in fractal time series and time-frequency analysis, computer science currently focusing on network traffic modeling and network security, and measurement & control in the aspects of error analysis and optimal control. He has published over refereed 60 papers in international journals and international conferences in those areas.

Plenary Lecture III

Multimedia system – 3d Interactive Model Web (3DIMW)

Professor Rong-Jyue Fang
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College of Management, STUT,
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Abstract: Based on the functions of theoretical foundations and related literature analysis, study group develop a multimedia system named: 3D Interactive Model Web (3DIMW). The original purpose of research work targeting on constructing a learning platform for three-dimensional computer animation. The feasibility was based on the evaluated functions of 3-D animation techniques and the prototype constructed. Platform derived from three-dimensional computer animation technique associated with ASP.NET and SQL Database. After the completion of platform, consequent procedures were applied to examine the usefulness of it. Graphic science and drawing course was the object comes up with first choice. Later a Turbulence Phenomena simulation and nano sized physical representation showed that it is a good tool for learning complicated image description and maneuvering sophisticated micro-devices.

Brief Biography of the Speaker: Dr. Rong-Jyue Fang – 1984 graduated from The Pennsylvania State University IED Department PhD program. He had been Director of Computation Center, Department Chair of Industrial Technology, and Dean of R&D Office in National Kaohsiung Normal University, later, been a President of National Taitung (East Taiwan) University. In 2005, he moves to Southern Taiwan University of Technology as a Chair Professor. He concentrates his research on multimedia hardware, software, and system development for more than twenty years and gain more than twenty years financial support from Taiwan's National Science Council. In recent years, he works mostly on 3D Interactive Model Web.

Plenary Lecture IV

Analytical Synthesis Method:A New Circuit Design Method for Arbitrary Requirements

Professor Chun-Ming Chang
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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-offs.

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..

Plenary Lecture V

Real-time In vivo and In situ Cellular Image Processing and Characterization: Challenges and Solutions

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Abstract: We study the feasibility of 3D virtual histology through real-time in vivo and in situ cellular imaging. A prototype system has been developed based on photodynamic fluorescence signals, confocal endomicroscopy, and FPGA image processing and characterization computing. Experiments in its clinical applications have been conducted, mainly for diagnosis of early-stage mucous cancer. With the fine-grained parallel imaging programs mapped on the FPGA, a stream of focused optical sections of microstructures in the subsurface layers up to 300μm in depth, can be processed online and the extracted features can be visualized seamlessly with the endomicroscopy settings.

Brief Biography of the Speaker: Lin Feng, PhD, is an Associate Professor in School of Computer Engineering, Nanyang Technological University, Singapore. His research interests include bioinformatics, bioimaging and visualization, and high-performance computing. He has published about one hundred technical papers in journals, conferences and books, and served in several editorial boards and conference organization committees.

Plenary Lecture IV

Obstacle Avoidance for Kinematically Redundant Manipulators Based on an Improved Problem Formulation and Two Recurrent Neural Networks

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Abstract: With the wide deployment of kinematically redundant manipulators in industrial applications, obstacle avoidance emerges as an important issue to be addressed in robotic motion planning. In this talk, we show the formulation of the inverse kinematic control of redundant manipulators with obstacle avoidance task as a convex quadratic programming problem with both equality and inequality constraints. Compared with our previous formulation, the new problem formulation is more favorable with better solutions or bigger solution set to the problem. To solve this time-varying quadratic programming problem in real time, two recurrent neural networks are applied to compute inverse-kinematic solutions with obstacle avoidance capability in real time. The effectiveness of the proposed approach is demonstrated by using simulation results based on the Mitsubishi PA10-7C

AUTHOR INDEX

Abdeldjebar, B. 78
Adrot, O. 153
Agrawal, S. 99
Ahmad, I. 47
Akama, K. 248
Al-Ayasrah, O. 290
Amin, M. 343
Ansari, M.A. 47
Arunaye, F.I. 83
Ashok Ghatol, A. 176
Asmar, D. 19
Attaran, M.M.D. 75
Badkoobehi, H. 343
Barna, C. 272
Batra, U. 254
BHARDWAJ, S. 254
Bhatt, P. 99
Börcsök, J. 219, 228
Borschbach, M. 284
Buzatu, C. 325
Caka, N. 266
Cardona, H. 276
Chang, C.-M. 129, 147, 163, 169, 182
Changpuak, T. 311
Chao, S.-H. 330
Chen, Y.-C. 330
Chover, M. 349
Chundang, U. 305
Costa, E.E. 336
Dahiya, D. 254
Dey, P.P. 343
Duicu, S. 325
Dumitraşcu, A.-E. 325
Enescu, I. 325
Erfanian, A. 75
Exeler, A. 284
Fan, L. 200
Gao, S. 35
Garduno, R. 53
Gonzalez, J.W. 276
Gu, X.-K. 41
Guixiang, Z. 134
Gumbau, J. 349
Haishan, L. 188
Hamdi-Cherif, A. 61
Hamdi-Cherif, C. 61
Holub, P. 219, 228
Hong, T.-P. 242
Hongwei, C. 134
Horng, J.-L. 182
Horng, J.-W. 129, 147, 163, 169
Hou, C.-L. 111, 129, 147, 163, 169, 182
Huang, T.-H. 129
Hung, L.-C. 330
Ioan, E. 318, 321
Isaac, I. 276
Ivanovic, V.N. 123
Jamil, G.L. 336
Jeng, L.-D. 147
Jiang, G. 200, 206
Jovanovski, S. 123
Kabashi, Q. 266
Kameesak, S. 311
Karandikar, S. 176
Khier, B. 78
Kian, P.G. 75
La Torre, L.D. 236
Legra, A. 236
Lepadatescu ,B. 325
Li, M. 41
Li, S.-D. 242
Li, Y. 35
Limani, M. 266
Lin, Y.-C. 182
Lo, J.H. 147
Lopez, G. 276
Mabuchi, H. 248
Marañon, E. 236
Mazinan, A.H. 93
Minnian, C. 188
Mohsin, S. 47
Montero, J. 53
Murugappan, M. 299
Nagarajan, R. 299
Nakano-Miyatake, M. 194
Nedelcut, S.-D. 141

Otsuka, K. 117
Peng, Z. 206
Perez-Meana, H. 194
Perez-Roses, H. 236
Pispeng, W. 311
Podisuk, M. 305, 311
Proca, V. 141
Purcaru, D.-M. 141
Quintana, A. 236
Quiros, R. 236, 349
Ramos, F. 349
Rasheedi, A.K. 61
Rasheedi, A.S. 61
Rizon, M. 299
Rodríguez, J. 53, 213
Romero, A. 194
Ruiz, E. 276
Saade, J.J. 19
Sadati, N. 93
Sanprasert, W. 305
Satoh, R. 248
Shahriari, K. 153
Shaker, S. 19
Shao, F. 200
Shen, C.-Y. 111
Shukla, K.K. 99
Slavov, V. 26
Sorin, V. 318
Spremić, M. 260
Su, M.-Y. 111
Sujarakittikul, P. 311
Sun, P.-C. 242
Taghipour, A. 353
Taheripour, E. 353
Tarasiewicz, S. 153
Tashev, T. 26
Tello, C. 213
Terai, H. 117
Terra, L.D.B. 336
Tetsushi Miki 105
Tsai, J.-T. 330
Tsai, R.-T. 111
Tu, S.-H. 129, 147, 163, 169, 182
Velázquez, J. 53
Wang, H. 35
Wong, W.-T. 29
Wu, M.-F. 29
Yaacob, S. 299
Yang, R.-H. 163, 169
Yang, Y. 206
Yoshikawa, H. 248
Yoshikawa, M. 117
Yu, K.-M. 29
Yu, M. 200, 206
Yuchen, C. 188
Zabeli, M. 266
Zhao, W. 41