



Editor
Valeri Mladenov



Recent Advances in Electrical Engineering

Recent Advances in Electrical Engineering

- *Proceedings of the 15th International Conference on Robotics, Control and Manufacturing Technology (ROCOM '15)*
- *Proceedings of the 4th International Conference on Circuits, Systems, Communications, Computers and Applications (CSCCA '15)*

Kuala Lumpur, Malaysia, April 23-25, 2015

Scientific Sponsors



*University Kebangsaan
Malaysia*



*Universiti Teknologi
Malaysia*



*University of Naples
Federico II, Italy*



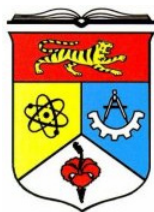
RECENT ADVANCES in ELECTRICAL ENGINEERING

**Proceedings of the 15th International Conference on Robotics, Control and
Manufacturing Technology (ROCOM '15)**

**Proceedings of the 4th International Conference on Circuits, Systems,
Communications, Computers and Applications (CSCCA '15)**

**Kuala Lumpur, Malaysia
April 23-25, 2015**

Scientific Sponsors



University Kebangsaan
Malaysia



Universiti Teknologi
Malaysia



University of Naples Federico II
Italy

RECENT ADVANCES in ELECTRICAL ENGINEERING

Proceedings of the 15th International Conference on Robotics, Control and Manufacturing Technology (ROCOM '15)

Proceedings of the 4th International Conference on Circuits, Systems, Communications, Computers and Applications (CSCCA '15)

**Kuala Lumpur, Malaysia
April 23-25, 2015**

Published by WSEAS Press
www.wseas.org

Copyright © 2015, 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 no less than two independent reviewers. Acceptance was granted when both reviewers' recommendations were positive.

ISSN: 1790-5117
ISBN: 978-1-61804-299-6

RECENT ADVANCES in ELECTRICAL ENGINEERING

**Proceedings of the 15th International Conference on Robotics, Control and
Manufacturing Technology (ROCOM '15)**

**Proceedings of the 4th International Conference on Circuits, Systems,
Communications, Computers and Applications (CSCCA '15)**

**Kuala Lumpur, Malaysia
April 23-25, 2015**

Editor:

Prof. Valeri Mladenov, Technical University of Sofia, Bulgaria

Committee Members-Reviewers:

Noordin Mohd Yusof
Hishamuddin Jamaluddin
Mohamed Hussein
Intan Zaurah Mat Darus
Robiah Ahmad
Izman Sudin
Janusz Kacprzyk
Sidney Burrus
Biswa N. Datta
Mihai Putinar
Wlodzislaw Duch
Michael N. Katehakis
Dimitri Kazakos
Ronald Yager
Argyris Varonides
Alexey L Sadvovskii
Ryszard S. Choras
Remi Leandre
Alexander Grebennikov
Guennadi A. Kouzaev
Weilian Su
Jiri Klima
Bimal Kumar Bose
Wasfy B. Mikhael
Pierre Borne
Yuriy S. Shmaliy
Tadeusz Kaczorek
Irwin Sandberg
Narsingh Deo
George Vachtsevanos
Panagiotis Agathoklis
Imre J. Rudas
Jiri Hrebicek
Gen Qi Xu
Brett Nener
Branimir Reljin
Ronald Tetzlaff
Peter Szolgay
Xiang Bai
Alexander Gegov
Jan Awrejcewicz
Carla Pinto
Hung-Yuan Chung
Elbrous M. Jafarov
Dimitrios A. Karras
Sorinel Oprisan
Lotfi Zadeh
Leon Chua
Michio Sugeno
Dimitri Bertsekas
Demetri Terzopoulos
Georgios B. Giannakis
Brian Barsky
Aggelos Katsaggelos
Leonid Kazovsky
Steven Collicott
Nikolaos G. Bourbakis
Michael Sebek
Hashem Akbari
Lei Xu
M. Pelikan
Patrick Wang
Sunil Das
Panos Pardalos
Nikolaos D. Katopodes
Mihai Timis
Fernando Reinaldo Ribeiro
Yi-Chao Wu
Sumanth Yenduri
Sergio Lopes
Amjad Mahmood
Muhammad Zakarya
David Nicoleta
Claudia-Georgeta Carstea
Waqas Bangyal
Marius Marcu
Menaka Sivakumar
Ismail Rakip Karas
Mohd Helmy Abd Wahab
Wan Hussain Wan Ishak
Cornelia Gyorodi
Emmanuel Lopez-Neri
Chandrasekaran Manoharan
Hassan Chizari
Vipin Balyan
Sawtantar Singh Khurmi
Perumal Pitchandi
Chenwen Zheng
George Mavrommatis
Eustache Muteba Ayumba
Noraida Haji Ali
Shaikh Abdul Hannan
Hung-Jen Yang
Santoso Wibowo
Saeed Saqib

Table of Contents

<u>Plenary Lecture 1: Inherent Characteristics of Control Systems Featured by Smart Material Actuators</u>	9
<i>Seung-Bok Choi</i>	
<u>On Cognitive Learning Methodologies for Cognitive Robotics</u>	11
<i>Yingxu Wang</i>	
<u>Dynamic Model of Hand-Held Assistive Writing Device for Hand Tremor</u>	20
<i>Z. M. Yusop, M. Z. Md. Zain, M. Hussein</i>	
<u>Tuning Technique for Vector Controlled Permanent Magnet Synchronous Motor in Position Servo Drive System</u>	26
<i>Dmitry V. Lukichev, Galina L. Demidova</i>	
<u>Design and Implementation of Real Time Monitoring and Control System for Robot Arms Used in Industrial Applications</u>	33
<i>Mehmet Fatih Işik, Mustafa Reşit Haboğlu</i>	
<u>Wheeled Mobile Robot Path Control in a Complex Trajectory Using Hybrid Methods</u>	38
<i>Mohammed A. H. Ali, Musa Mailah, Wan Azhar B. Yussof, Zamzuri Bin Hamedon, Zulkili B. M. Yussof</i>	
<u>2D Feature Extraction in Sensor Coordinates for Laser Range Finder</u>	44
<i>Saif Eddine Hadji, Tang Howe Hing, M. A. Khattak, Mohamed Sultan Mohamed Ali, Suhail Kazi</i>	
<u>Fuzzy Positioning of Two Arms for Nonprehensile Manipulation of a Two Rigid Link Object</u>	51
<i>Zakarya Zyada, Yoshikazu Hayakawa, Shigeyuki Hosoe</i>	
<u>Applying Fuzzy Logic Control on Warning Sound Control System for Electric Vehicles</u>	59
<i>I. Salleh, M. Z. Md. Zain, R. I. Raja Hamzah, A. R. Musa</i>	
<u>Bio-inspired Jellyfish Robots Based on Ionic-Type Artificial Muscles</u>	69
<i>Sung-Weon Yeom, Jinhan Jeon, Heungsoo Kim, Byeng-Dong Youn, Il-Kwon Oh</i>	
<u>Application of Improved Particle Swarm Optimization for Optimal Short-term Thermal Unit Commitment with Emissions Constraints</u>	73
<i>Whei-Min Lin, Chia-Sheng Tu, Ming-Tang Tsai, Fu-Sheng Cheng</i>	
<u>Reliable Seamless Handoff Across Heterogeneous Networks Based on Location Aware M-PROMETHEE Method</u>	79
<i>Preethi Ananthachari, Chandrasekar Chellaiyah</i>	
<u>Fuzzy Automatic Detection of Landmines from Sensors Data</u>	91
<i>Zakarya Zyada, Toshio Fukuda</i>	

<u>Analysis of Direct-Sequence CDMA in Optical Transmission Using PPM Signaling</u>	101
<i>N. Alsowaidi, Tawfig Eltaif, M. R. Mokhtar, K. Alaghbari</i>	
<u>Stability Enhancement of Dynamic Loads By Using a Distribution-Level Static Synchronous Compensator</u>	104
<i>Ching-Huan Liao, Wei-Neng Chang</i>	
<u>Novel Coprocessor for DNA Sequence Alignment in Resequencing Applications</u>	111
<i>Atef Ibrahim, Hamed Elsimary, Abdullah Aljumah, Fayez Gebali</i>	
<u>Single-Phase Load Compensation with a Multi-Level Cascade Static Synchronous Compensator</u>	119
<i>Wei-Neng Chang, Ching-Huan Liao, Chih-Hao Chang, Pei-Huan Wu</i>	
<u>Robust Digital Redesign of Continuous PID Controller for Power System Using Plant-Input-Mapping</u>	125
<i>G. Shabib, Esam H. Abd-Elhameed, G. Magdy</i>	
<u>Android Development of Mobile Application for Distance Controlling of the Car Security System</u>	134
<i>Bolat Aralov, Merey Sarsengeldin, Olimzhon Baimuratov, Omarova Ulbossyn, Aitimova Ulzada</i>	
<u>How Enterprises Use the Management Tools?</u>	139
<i>Potocan V.</i>	
<u>ThinkGear™ Pattern Recognition Algorithm for Body Movements Using Relativity</u>	147
<i>Alexander B. Ginete, Cedic Rico E. Mancilla, Leonard R. Mauleon, Igan Xenon S. Roperos, Joseph Demderlee O. Tatel</i>	
<u>Vector Controlled Comparative Studies for Line Starting Performance Induction Motor of a Conveyor System</u>	153
<i>Birowo, Robiah Ahmad, Hairi Zamzuri, Agus Priyono</i>	
<u>A Queuing Model to Reduce Energy Consumption and Pollutants Production through Transportation Vehicles in Green Supply Chain Management</u>	159
<i>Amir Azizi, Yones Yarmohammadi</i>	
<u>Using Hopfield Neural Network to Improve the Performance of Multi-Rate WLANs</u>	170
<i>Qiang Ma, Abdullah Al-Dhelaan, Mznah Al-Rodhaan</i>	
<u>Mesh Simplification in Wireless Sensor Networks Using INRCDS Algorithm</u>	179
<i>Allwin Devaraj</i>	
<u>Authors Index</u>	185

Plenary Lecture 1

Inherent Characteristics of Control Systems Featured by Smart Material Actuators



Professor Seung-Bok Choi
Department of Mechanical Engineering
Inha University
Korea
E-mail: seungbok@inha.ac.kr

Abstract: In this plenary talk, current status of scientific and engineering technologies of smart material actuators; piezoelectric materials, shape memory alloys, electrorheological (ER) fluid and magnetorheological (MR) fluid is presented. Since these smart material actuators have been defined as one of academic branch in 1980s, a tremendous development of new actuating materials which can be responded by an external stimuli is made and various engineering applications are devised. A most significant merit of smart material actuators is the fast response time and reversible property in dynamic motion. These inherent features have triggered future-oriented engineering technologies in various industrial fields including automotive engineering. This plenary talk is divided into two parts. The first part emphasizes on the material characterization of the smart materials. For example, Bingham behavior featuring the field-dependent yield stress of ER and MR fluids is to be discussed in terms of microscopic and macroscopic manners. The second part of this talk concentrates on the application devices or systems utilizing smart material actuators. For example, a commercially available shock absorber for automotive vehicles using MR fluid is introduced in terms of working principle and dynamic motion on the road. In addition, an active mount system utilizing the piezostack actuators is shown by presenting its superior vibration control performance in wide frequency bandwidth. And other applications such as controllable haptic master for robotic surgery and damper system for railway vehicle to ensure high stability at high speed are presented focusing on control performance and practical feasibility. Finally, a new formula to make success business in control systems featuring smart material actuators is mentioned as a new concept in research and development for future-oriented creative things.

Brief Biography of the Speaker: Professor Seung-Bok Choi received the B.Sc. degree in mechanical engineering from Inha University, South Korea, 1979. He received the M.Sc. and the Ph.D. degrees from the Michigan State University, U.S.A in 1986 and 1990, respectively. He is currently a Distinguished Inha Fellow Professor of Mechanical Engineering at Inha University, Incheon, South Korea.

He is serving as a chief-editor of *Frontiers in Materials – Smart Materials*, and also serving as an associate editor for many international journals including *Smart Materials and Structures*, and *Journal of Intelligent Material Systems and Structures*. He has received numerous awards regarding smart materials research field including Best Paper Award from Institute of Mechanical Engineers, UK., and Distinguished Young Engineers Award from National Academy of Korea Engineers. His research interests are control applications using smart materials such as electrorheological fluids, magnetorheological fluids, piezoelectric materials and shape memory alloys. He has published more than 350 refereed international journal papers and two books in the area of smart materials and their applications; *Piezoelectric Actuators* : 1) *Control Applications of Smart Materials*(ISBN : 978-1-4398-1808-4) , April 2010, Taylor & Francis Group CRC Press, 2) *Magnetorheological Fluid Technology : Applications in Vehicle Systems* (ISBN : 978-1-4398-5673-4) , November 2012, Taylor & Francis Group CRC Press. He has also served as program committee and co-chairman for many international conferences including the SPIE Smart Structures Conference and the International Conference on ER Suspension and MR Fluid.