Editors:
Professor José Mª Zamanillo Sáinz de la Maza, University of Cantabria, Spain
Professor Pablo Luis López Espí, Universidad de Alcalá, Spain
Professor Aida Bulucea, University of Craiova, Romania

HOSTS and SPONSORS:

University of Cantabria
Plaza de la Ciencia s/n.
39005 Santander, Spain

University of Alcala
Campus Universitario
28805 Alcala de Henares, Spain

POWER SYSTEMS AND POWER TECHNOLOGY

Proceedings of the 8th WSEAS International Conference on POWER SYSTEMS (PS'08)

Santander, Cantabria, Spain, September 23-25, 2008

Recent Advances in Electrical Engineering
A series of Reference Books and Textbooks

ISBN: 978-960-474-006-2
ISSN 1790-5117

Published by WSEAS Press
www.wseas.org

POWER SYSTEMS and POWER TECHNOLOGY

Proceedings of the 8th WSEAS International Conference on POWER SYSTEMS (PS 2008)

Santander, Cantabria, Spain, September 23-25, 2008

HOSTS and SPONSORS:

University of Cantabria
Plaza de la Ciencia s/n.
39005 Santander, Spain

University of Alcala
Campus Universitario
28805 Alcala de Henares, Spain

Recent Advances in Electrical Engineering
A series of Reference Books and Textbooks

Published by WSEAS Press
www.wseas.org

ISSN: 1790-5117
ISBN: 978-960-474-006-2

POWER SYSTEMS and POWER TECHNOLOGY

Proceedings of the 8th WSEAS International Conference on POWER SYSTEMS (PS 2008)

Santander, Cantabria, Spain, September 23-25, 2008

HOSTS and SPONSORS:

University of Alcala
Campus Universitario
28805 Alcala de Henares,
Spain

University of Cantabria
Plaza de la Ciencia s/n.
39005 Santander, Spain

Recent Advances in Electrical Engineering
A series of Reference Books and Textbooks

Published by WSEAS Press
www.wseas.org

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: 978-960-474-006-2

World Scientific and Engineering Academy and Society

POWER SYSTEMS and POWER TECHNOLOGY

Proceedings of the 8th WSEAS International Conference on POWER SYSTEMS (PS 2008)

Santander, Cantabria, Spain, September 23-25, 2008

HOSTS and SPONSORS:

University of Cantabria
Plaza de la Ciencia s/n.
39005 Santander, Spain

University of Alcala
Campus Universitario
28805 Alcala de Henares, Spain

Editors:

Professor José Mª Zamanillo Sáinz de la Maza, University of Cantabria, Spain
Professor Pablo Luis López Espí, Universidad de Alcalá, Spain
Professor Aida Bulucea, University of Craiova, Romania

International Program Committee Members:

Irwin W. Sandberg, USA
Asad A. Abidi, USA
Andreas Antoniou, USA
Antonio Cantoni, AUSTRALIA
Lotfi Zadeh, USA
George Szentirmai, USA
Michael Peter Kennedy, IRELAND
Paresh C. Sen, CANADA
Michel Gevers, BELGIUM
James S. Thorp, USA
Armen H. Zemanian, USA
Guanrong Chen, HONG KONG
Edgar Sαnchez-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
John V. McCanny, UK
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

Shabiul Islam, MALAYSIA
Gangyi Jiang, CHINA
Ahad Kazemi, IRAN
Cheong Kim, KOREA
Thanatchai Kulworawanichpong, THAILAND
Suwat Kuntanapreeda, THAILAND
Marek Kurzynski, POLAND
Yangwon Kwon, KOREA
Heungjae Lee, KOREA
Tsang-Hsiung Lee, TAIWAN
Xiaolu Li, CHINA
Hengwuli Li, CHINA
Robert Lis, POLAND
Hongzhe Liu, CHINA
Jia-Jiunn Lo, TAIWAN
Ana-Ramona Lupu, ROMANIA
Ramezanali Mahdavinejad, IRAN
Nashat Mansour, LEBANON
Boonruang Marungsri, THAILAND
Nikos Mastorakis, GREECE
Tetsushi Miki, JAPAN
Mohammad reza Mollahoseini, IRAN
Dan El Montoya, VENEZUELA
Francesco Moschella, ITALY
Francesco Muzi, ITALY
Fumio Nishiyama, JAPAN
Anant Oonsivilai, THAILAND
Andrey Osipov, RUSSIA
Padej Pao-la-or, THAILAND
Suraj Pardeshi, INDIA
Sanda Victorinne Paturca, ROMANIA
Carlos Pedreira, BRAZIL
Edward Puchala, POLAND
Pallikonda Ravi Babu, INDIA
Carolina Regoli, VENEZUELA
Chen Rong-Chang, TAIWAN
Ahmet Sezer, TURKEY
Shiva Shavandi, IRAN
Miguel Strefezza, VENEZUELA
Sueo Sugimoto, JAPAN
Supaporn Suwannarongsri, THAILAND
Kiyoharu Tagawa, JAPAN
Tsuyoshi Takayama, JAPAN
Sun-Yen Tan, TAIWAN
Shu bin Tan, CHINA
Sejid Teγnjak, CROATIA (HRVATSKA)
Michael Theodoridis, GREECE
Dat Tran, AUSTRALIA
Sirirut Vanichayobon, THAILAND
Xun Wang, CHINA
En-Rong Wang, CHINA
Ning Wang, CHINA
Shugang Wei, JAPAN
Riyu Wei, AUSTRALIA
Wiphada Wettayaprasit, THAILAND
Khoi Loon Wong, AUSTRALIA
Chi-Jui Wu, TAIWAN
Fuli Wu, CHINA
Peng Wu, CHINA
Li Xiao, CHINA
Weiwei Xing, CHINA
Zhiguang Xu, UNITED STATES
Likang Yang, SWEDEN
Liu Yongqi, CHINA
Haslinda Zabiri, MALAYSIA
Mohamed Zahran, EGYPT
Chao Zhang, CANADA
Xingping Zhang, CHINA
Yanlei Zhao, CHINA
Jin Zhu, KOREA

Preface

This book contains the proceedings of the 8th WSEAS International Conference on POWER SYSTEMS (PS 2008) which was held in Santander, Cantabria, Spain, September 23-25, 2008. This conference aims to disseminate the latest research and applications in Power System Planning and Management, Portable Power Systems, Power Factor Compensation and Conditioning, Control strategies and other relevant topics and applications.

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**

The contents of this Book are also published in the CD-ROM Proceedings of the Conference. Both will be sent to the WSEAS collaborating indices after the conference: **www.worldses.org/indexes**

In addition, papers of this book are permanently available to all the scientific community via the WSEAS E-Library.

Expanded and enhanced versions of papers published in this 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.

Table of Contents

Plenary Lecture I

Sustainability Issues for Electric Transportation Systems

Professor Cornelia Aida Bulucea
Electrical Machines and Environment Engineering Department
Faculty of Engineering in Electromechanics and Environment
University of Craiova
ROMANIA

E-mail: abulucea@gmail.com

Abstract: The Universe Powers let us discover a part of their laws. We can not change the Nature laws but we must know and respect them. The human engineering actions and the living nature can not anymore be separated because the future survival of the society is strongly depending on physical, environmental and human resources. Scientists and public authorities around the world are realizing that human actions have to be responsable regarding not only the social and economic matters, but also the environment issues. The environmental problems are mainly consequences from a too strong belief in traditional engineering and economic growth as the solution. The first human intelligence step against ignorance would be to understand that the real world processes involving energy and matter need to be linked both to the engineering design and operation, and to the environment issues. For the moment, our correct activities must be referred into the frame of Sustainable Development that is encompassing three general areas, concerning the economical development, the environmental issues and the social protection problems. On a broader front, an utmost human world priority should be the improvement of public transportation systems. The merit of an electric transportation system is based not only on technical performance, safety, energy efficiency, economic acceptance but also on sustainability and exergy efficiency. This study emphasizes a number of sustainability-based concepts, such achieved energy, embodied energy and exergy, related as tools in order to describe, analyse and optimize the energy conversion in the electric transportation systems. Costs should reflect value and value is not associated with energy but with exergy and sustainability. Hence, the main aim of this investigation is to assess the sustainability of modern electric transportation systems, based both on electrical engineering analysis and on further alternative knowledge. An Electric Railway System should be considered a component of the Sustainable Development architecture if it meets certain criteria: a strong train operation safety, a high reliability of the electric supply and an increased exergy efficiency of the transportation system. In the paper only the urban railway vehicles with electric motors at wheels, operating in traction and electric brake regimes are taken into account. This study aimed at examining an underground railway train viewed as a system where different energy forms occur, so that the successive energy conversion chain is emphasized and the energy and exergy efficiencies, respectively, are compared. The exergy dynamic approach in that case study assessed interesting results concerning the electric trains sustainability in traction and electric brake regimes, emphasizing the negative effects of exergy destruction and the corresponding longterm environmental impact.

Brief Biography of the Speaker: Cornelia Aida Bulucea is currently an Associate Professor in Electrotechnics, Electrical Machines and Environment Electrical Equipments in the Faculty of Engineering in Electromechanics and Environment, University of Craiova, Romania. She is graduate from the Faculty of Electrical Engineering Craiova and she received the Ph.D degree from Bucharest Polytechnic Institute. In Publishing House she is author of four books in electrical engineering area. Research work is focused on improved solutions for electrical networks on basis of new electric equipments and environmental impact of energy and electric transportation systems. She has extensive experience in both experimental and theoretical research work, certified by over 40 journal and conference

research papers and 11 research projects from industry. She has held in the Association for Environment Protection OLTENIA and she is a regular invited keynote lecture for environmental engineering symposia organized by Chamber of Commerce OLTENIA. Due to WSEAS recognition as high scientific Forum she partcipated in three WSEAS International Conferences, presenting papers and chairing sessions. She is very proud of her two papers published in WSEAS TRANSACTIONS on ENVIRONMENT and DEVELOPMENT August 2007 and March 2008, respectively.

Plenary Lecture II

Switching Transient Phenomena in Power Systems at the 400 KV High Voltage Unloaded Line

Professor Petre Tusaliu
Electrical Faculty, University of Craiova
ROMANIA

E-mail: ptusaliu@elth.ucv.ro

Abstract: In this paper, there are evaluated the transient phenomena in power systems at the 400 kV high voltage operations, which appear at the unloaded line switching. In point of news, the paper presents the modelling and simulation of an unloaded three-phase line switching effect in Power System, using PSCAD Program and MathCAD Program. There were obtained the transient recovery voltages (TRV), the overcurrents (OC) in the 400 kV network and the electrical field (EF), according with the overvoltages (OV) at 400 kV. After that, a comparatively analyse of results is made. The paper presents the electrical field values, according to modelled and simulated disturbances. The simulation was performed using the EMTDC/PSCAD software package, in order to obtain the electromagnetic disturbances in the transmission line and in the busbars. The proposed simulation is applied for an unload transmission line connected between KEPEZ and YATAGAN in 380 kV Turkish National Power Transmission Systems. Also, in the paper are presented modelling, simulations, measurements and experiments performed for determination of switching overvoltages at the 400 kV unloaded lines switching in a Romanian Network (Tintareni-Sibiu). After that, a comparative analysis of results regarding switching overvoltages determined through modelling and experiments is made and conclusions about admissible limits recommended by the CIGRE and IEEE international norms are established.

Brief Biography of the Speaker: Petre Tusaliu is full professor at University of Craiova, Romania and President of the “High Voltages Engineering, Environment & Life” Scientific Professional Association. He is doctor in “switching transient phenomena”. His Research activity is in area: high voltages engineering, transient phenomena, power systems, electromagnetic compatibility. He is author and joint author of over 150 works of their area, has 7 invention and innovation patents, 9 works for Education and 4 books published. He is Editor al “CHALLENGES IN POWER, HIGH VOLTAGES and MACHINES”, published by WSEAS Press, Venice, Italy, November, 2007. He was CIGRE member (5 years) and their Curriculum vitae and activity have been included in "The International Directory of Distinguished Leadership, 1997", edited by "American Biographical Institute". Also, he have received the title “Man of the Year-1997”, awarded by “American Biographical Institute-North Carolina-USA”. He was specialising in Germany and, in last years, he has effectuated three International scientific research grants, in co-operation at the NATO Scientific Research Programmes in the European Universities. He has participated as member of many “Steering Committee”, “Editorial Board”, “Chairperson” and “Papers Reviewer” of the numerous International Conferences. He was plenary speaker at “the eighth IASTED International Conference on POWER AND ENERGY SYSTEMS, June 23-25, 2008, Corfu, Greece”.

Author Index

978-960-474-006-2