

INTERNATIONAL JOURNAL OF EMERGING ELECTRIC POWER SYSTEMS

EDITOR-IN-CHIEF

Tarlochan Sidhu,
University of Ontario Institute of Technology, Canada

ASSOCIATE EDITORS

S. A. Khaparde, Indian Institute of Technology, India
Eugeniusz Rosolowski, Wroclaw University of Technology,
Poland
Tapan Kumar Saha, University of Queensland, Australia

EDITORIAL BOARD

O. H. Abdalla, University of Helwan, Egypt
M. El Hachemi Benbouzid, University of Western Brittany,
France
I. Dudurych, EirGrid plc – Transmission System Operator,
Ireland
L. Goel, Nanyang Technological University, Singapore
G. Harrison, The University of Edinburgh, UK
M. Kaiser, Louisiana State University, USA
Y-L. Ke, Kun Shan University of Technology, Taiwan
G. Ledwich, Queensland University of Technology, Australia

P. Lopes, INESC Porto, Portugal
N. Mithulanatha, Asian Institute of Technology, Thailand
H. Nouri, University of the West of England, UK
R. Mota Palomino, National Polytechnic Institute, Mexico
A. Pahwa, Kansas State University, USA
A. G. Phadke, Virginia Tech, USA
O. R. Saavedra, Federal University of Maranhão, Brazil
M. Shahidehpour, Illinois Institute of Technology, USA
C. Singh, Texas A&M University, USA
Y. H. Song, University of Liverpool, UK
S. C. Srivastava, Indian Institute of Technology, India
E. Tag-Eldin, Cairo University, Egypt
D. Thukaram, Indian Institute of Science, India
D. Tziouvaras, Schweitzer Engineering Labs, USA
F. Wen, Zhejiang University, China
I. Zamora, ETSI de Bilbao – University of the Basque
Country, Spain

DE GRUYTER

INTERNATIONAL JOURNAL OF EMERGING ELECTRIC POWER SYSTEMS (IJEPS) publishes significant research and scholarship related to latest and up-and-coming developments in power systems. The mandate of the journal is to assemble high quality papers from the recent research and development efforts in new technologies and techniques for generation, transmission, distribution and utilization of electric power. The range of topics includes electric power generation sources; integration of unconventional sources into existing power systems; generation planning and control; new technologies and techniques for power transmission, distribution, protection, control and measurement; power system analysis, economics, operation and stability; deregulated power systems; power system communication; metering technologies; demand-side management; industrial electric power distribution and utilization systems.

ISSN 2194-5756 · e-ISSN 1553-779X

All information regarding notes for contributors, subscriptions, Open access, back volumes and orders is available online at www.degruyter.com/ijeeps.

ABSTRACTED/INDEXED IN Astrophysics Data System (ADS) · Celdes · CNKI Scholar (China National Knowledge Infrastructure) · CNPIEC · EBSCO: Academic Search; Energy & Power Source; Engineering Source; Polytechnic Studies Collection: India; TOC Premier; Discovery Service · Elsevier: Compendex; Engineering Village; SCOPUS · Google Scholar · Inspec · J-Gate · JournalTOCs · Naviga (Softweco) · Primo Central (ExLibris) · ProQuest: Advanced Technologies Database with Aerospace; Aerospace Database; Aluminium Industry Abstracts; ANTE: Abstracts in New Technologies and Engineering; Ceramic Abstracts/World Ceramics Abstracts; Civil Engineering Abstracts; Computer and Information Systems Abstracts; Copper Technical Reference Library; Corrosion Abstracts; Earthquake Engineering Abstracts; Electronics and Communications Abstracts; Engineered Materials Abstracts; Engineering Research Database; Materials Business File; Materials Research Database; Mechanical & Transportation Engineering Abstracts; METADEX (Metals Abstracts); Solid State and Superconductivity Abstracts; Technology Research Database · ReadCube · SCImago (SJR) · Summon (Serials Solutions/ProQuest) · TDOne (TDNet) · TEMA Technik und Management · Ulrich's Periodicals Directory/ulrichsweb · WorldCat (OCLC)

RESPONSIBLE EDITOR Tarlochan Sidhu, Institute of Technology, Faculty of Engineering and Applied Science, University of Ontario, 2000 Simcoe Street North, Oshawa, Ontario, Canada L1H7K4
Email: tsidhu2@uwo.ca

JOURNAL MANAGER Theresa Haney, De Gruyter, Genthiner Straße 13, 10785 Berlin, Germany.
Tel.: +49 (0)30 260 05-375, Fax: +49 (0)30 260 05-250
Email: theresa.haney@degruyter.com

RESPONSIBLE FOR ADVERTISEMENTS Heiko Schulze, De Gruyter, Genthiner Straße 13, 10785 Berlin, Germany.
Tel.: +49 (0)30 260 05-358, Fax: +49 (0)30 260 05-264
Email: anzeigen@degruyter.com

© 2015 Walter de Gruyter GmbH, Berlin/Munich/Boston

TYPESETTING Integra Software Services Pvt. Ltd., Pondicherry, India

PRINTING Franz X. Stückle Druck und Verlag e.K., Ettenheim
Printed in Germany

COVER ILLUSTRATION Jakub Pavlinec/Hemera/Getty Images



Offenlegung der Inhaber und Beteiligungsverhältnisse gem. § 7a Abs. 1 Ziff. 1, Abs. 2 Ziff. 3 des Berliner Pressegesetzes: Die Gesellschafter der Walter de Gruyter GmbH sind: Cram, Gisela, Rentnerin, Berlin; Cram, Elsbeth, Pensionärin, Rosengarten-Alvesen; Cram, Margret, Studienrätin i. R., Berlin; Cram, Dr. Georg-Martin, Unternehmens-Systemberater, Stadtbergen; Cram, Maike, Berlin; Cram, Jens, Mannheim; Cram, Ingrid, Betriebsleiterin, Tuxpan / Michoacan (Mexiko); Cram, Sabina, Mexico, DF (Mexiko); Cram, Silke, Wissenschaftlerin, Mexico DF (Mexiko); Cram, Björn, Aachen; Cram, Ella Anita, Rentnerin, Berlin; Cram, Berit, Greifswald; Cram-Gomez, Susanne, Mexico DF (Mexiko); Cram-Heydrich, Walter, Mexico DF (Mexiko); Cram-Heydrich, Kurt, Angestellter, Mexico DF (Mexiko); Duvenbeck, Brigitta, Oberstudienrätin i. R., Bad Homburg; Fund, Dr. Sven, Berlin; Gädeke, Gudula, M. A., Atemtherapeutin/Lehrerin, Tübingen; Gädeke, Martin, Einzelunternehmer, Würzburg; Lubasch, Dr. Annette, Ärztin, Berlin; Schütz, Dr. Christa, Ärztin, Mannheim; Schütz, Sonja, Berlin; Schütz, Juliane, Berlin; Schütz, Antje, Berlin; Schütz, Valentin, Berlin; Seils, Dorothee, Apothekerin, Stuttgart; Seils, Gabriele, Journalistin, Berlin; Seils, Dr. Clara-Eugenie, Oberstudienrätin i. R., Reppenstedt; Seils, Christoph, Journalist, Berlin; Siebert, John-Walter, Pfarrer, Oberstenfeld.

Contents

Jia Cao, Zheng Yan, Xiang Fan, Xiaoyuan Xu,
Jianhua Li and Lu Cao

**AC/DC Power Flow Computation Based on Improved
Levenberg–Marquardt Method — 1**

B. Chitti Babu, Suresh Gurjar and Ashish Meher

**Analysis of Photovoltaic (PV) Module during Partial
Shading based on Simplified Two-Diode Model — 15**

Chen Xiao-qiang and Qiu Hao

**Zigzag Connected Autotransformer-Based 24-pulse
AC-DC Converter — 23**

Athbel Joe and S. Krishna

**An Underfrequency Load Shedding Scheme with Minimal
Knowledge of System Parameters — 33**

Manas Kumar Jena and S. R. Samantaray

**Synchrophasors-Assisted IPII-Based Intelligent Relaying
for Transmission Lines Including UPFC — 47**

Tsubasa Shimoji, Hayato Tahara, Hidehito Matayoshi,
Atsushi Yona and Tomonobu Senjyu

**Comparison and Validation of Operational Cost in Smart
Houses with the Introduction of a Heat Pump or a Gas
Engine — 59**

Yagang Zhang and Zengping Wang

**MAP Fault Localization Based on Wide Area Synchronous
Phasor Measurement Information — 75**