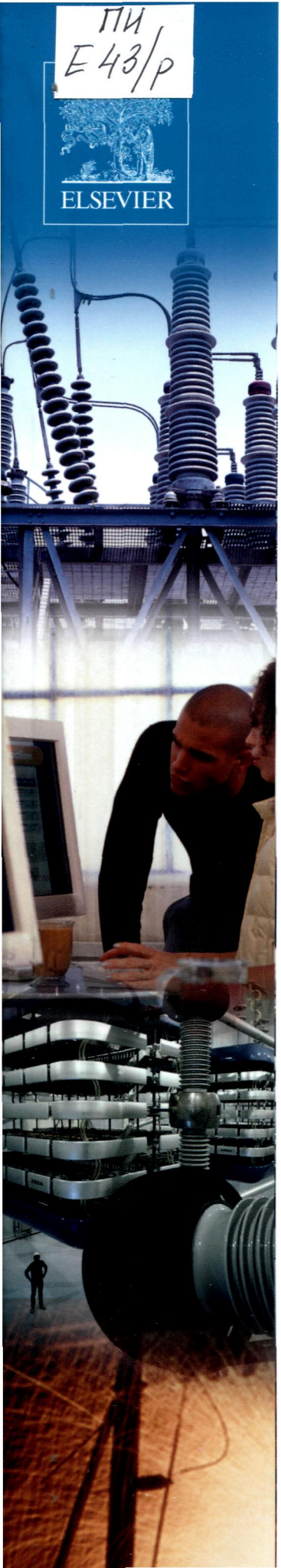
ПИ
E 43/p

ELSEVIER

VOLUME 96 MARCH 2013 ISSN 0378-7796



# ELECTRIC POWER SYSTEMS RESEARCH

Editor-in-Chief: **C.A. Nucci**
Editor: **L. Goel**
Associate Editors: **J.D. Morgan, C. Vournas**
Editor-in-Chief Emeritus: **B.D. Russell**

Available online at www.sciencedirect.com
SciVerse ScienceDirect

ELSEVIER

ELECTRIC POWER SYSTEMS RESEARCH

www.elsevier.com/locate/epsr

Volume 96 · 2013
ISSN 0378-7796

Available online at www.sciencedirect.com
SciVerse ScienceDirect

# CONTENTS

Abstracted/indexed in: Current Contents, ISI Sci Search, Ei Compendex, Ei Engineering, INSPEC, Fuel and Energy Abstracts, Environment Abstracts, PASCAL. Also covered in the abstract and citation database SciVerse SCOPUS®. Full text available on SciVerse ScienceDirect®

**Regular Papers**

Analysis and design of reduced order linear quadratic regulator control for three phase power factor correction using Cuk rectifiers ... 1
M.G. Umamaheswari, G. Uma

Impact of smart subtransmission level fault current mitigation solutions on service reliability ... 9
S. Kazemi, M. Lehtonen

Measurement and assessment of power quality characteristics for photovoltaic systems: Harmonics, flicker, unbalance, and slow voltage variations ... 23
M.J. Ortega, J.C. Hernández, O.G. García

Preventive reactive power management for improving voltage stability margin ... 36
O. Alizadeh Mousavi, M. Bozorg, R. Cherkaoui

Cooperative operation of inverters for grid-connected photovoltaic generation systems ... 47
V. Miñambres-Marcos, E. Romero-Cadaval, M.A. Guerrero-Martínez, M.I. Milanés-Montero

Optimal bidding strategy of generation station in power market using information gap decision theory (IGDT) ... 56
S. Nojavan, K. Zare, M.R. Feyzi

Approximating the loadability surface in the presence of SNB-SLL corner points ... 64
M. Perninge

Mixed distributed generation technologies in a medium voltage network ... 75
A.S. Safigianni, G.N. Koutroumpezis, V.C. Poulios

A model of photovoltaic fields in mismatching conditions featuring an improved calculation speed ... 81
J.D. Bastidas, E. Franco, G. Petrone, C.A. Ramos-Paja, G. Spagnuolo

Under voltage load shedding in power systems with wind turbine-driven doubly fed induction generators ... 91
A. Arief, Z. Dong, M.B. Nappu, M. Gallagher

Cascaded multilevel inverter using sub-multilevel cells ... 101
E. Babaei, M.F. Kangarlu, M. Sabahi, M.R.A. Pahlavani

Testing Low Voltage Ride Through capabilities of solar inverters ... 111
J.E. Carrasco, J.M. Tena, D. Ugena, J. Alonso-Martinez, D. Santos-Martin, S. Arnaltes

Effects of North-African electricity import on the European and the Italian power systems: a techno-economic analysis ... 119
C. Brancucci Martínez-Anido, A. L'Abbate, G. Migliavacca, R. Calisti, M. Soranno, G. Fulli, C. Alecu, L.J. de Vries

Real-time energy management scheme for hybrid renewable energy systems in smart grid applications ... 133
A. Mohamed, O. Mohammed

An algorithm for directional earth-fault relay with no voltage inputs ... 144
Z.N. Stojanović, M.B. Djurić

Energization of long HVAC cables in parallel – Analysis and estimation formulas ... 150
F. Faria da Silva, C.L. Bak

Indirect matrix converter with unity voltage transfer ratio for AC to AC power conversion ... 157
A. Jahangiri, A. Radan

Dynamic equivalent state estimation for multi-area power systems with synchronized phasor measurement units ... 170
A. Vahidnia, G. Ledwich, E. Palmer, A. Ghosh

Loss and reliability optimization for power distribution system operation ... 177
R.M. Vitorino, H.M. Jorge, L.P. Neves

A neural network-GARCH-based method for construction of Prediction Intervals ... 185
A. Khosravi, S. Nahavandi, D. Creighton

A high speed noncommunication protection scheme for power transmission lines based on wavelet transform ... 194
A.A. Hajjar

*(Contents continued on inside back cover)*

The publisher encourages the submission of articles in electronic form thus saving time and avoiding rekeying errors. A leaflet describing our requirements is available from the publisher upon request.

0378-7796(201303)96:1-3

*(Contents continued from outside back cover)*

Power quality and the un-decimated wavelet transform: An analytic approach for time-varying disturbances ..... 201
T. Zafar, W.G. Morsi
Thermal analysis of electrical contacts from pantograph–catenary system for power supply of electric vehicles ..... 211
C. Nituca
Phase balancing algorithms ..... 218
K. Wang, S. Skiena, T.G. Robertazzi
Detection and estimation of demagnetization faults in permanent magnet synchronous motors ..... 225
S. Chakraborty, E. Keller, A. Ray, J. Mayer
Shuffled differential evolution for large scale economic dispatch ..... 237
A. Srinivasa Reddy, K. Vaisakh
Computation of multi-parameter sensitivities of equilibrium points in electric power systems ..... 246
E.A. Zamora-Cárdenas, C.R. Fuerte-Esquivel
Dynamic sub-transmission substation expansion planning using learning automata ..... 255
S.M. Mazhari, H. Monsef
A power control strategy for flywheel doubly-fed induction machine storage system using artificial neural network ..... 267
A. Abdel-Khalik, A. Elserougi, A. Massoud, S. Ahmed
An interactive software of distance relaying for analysis of electrical events and educational use ..... 277
A. Conde
Real-time data reassurance in electrical power systems based on artificial neural networks ..... 285
S. Mousavian, J. Valenzuela, J. Wang
Comprehensive harmonic analysis of matrix converter under unbalanced/distorted conditions ..... 296
S. Barcellona, M.S. Carmeli, G. Superti-Furga

**Review Papers**

A novel technique for energy savings by dimming high pressure sodium lamps mounted with magnetic ballasts using a centralized system ..... 16
A. Burgio, D. Menniti