

2016 IEEE Electrical Power and Energy Conference (EPEC 2016)

**Ottawa, Ontario, Canada
12-14 October 2016**



**IEEE Catalog Number: CFP16EPE-POD
ISBN: 978-1-5090-1920-5**

**Copyright © 2016 by the Institute of Electrical and Electronics Engineers, Inc
All Rights Reserved**

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

******This publication is a representation of what appears in the IEEE Digital Libraries. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP16EPE-POD
ISBN (Print-On-Demand):	978-1-5090-1920-5
ISBN (Online):	978-1-5090-1919-9
ISSN:	2381-2842

Additional Copies of This Publication Are Available From:

Curran Associates, Inc
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: (845) 758-0400
Fax: (845) 758-2633
E-mail: curran@proceedings.com
Web: www.proceedings.com

CURRAN ASSOCIATES INC.
proceedings
.com

TABLE OF CONTENTS

INTEGRATED SIMULATION MODEL OF POWER SYSTEM PROTECTION SCHEMES AND PROCESS BUS COMMUNICATION NETWORKS	1
<i>Andre Dos Santos ; Bruno Soares ; Fan Chen ; Martijn Kuipers ; Sergio Sabino ; Antonio Grilo ; Paulo Pereira ; Mario Nunes ; Augusto Casaca</i>	
ANTI-ISLANDING PROTECTION RELAY FOR MEDIUM VOLTAGE FEEDER WITH DISTRIBUTED GENERATOR	8
<i>Huafeng Xiao ; Zhijian Fang ; Chushan Li ; David Xu ; Bala Venkatesh ; Birendra N. Singh</i>	
RF CHARACTERIZATION OF SUBSTATIONS: PARAMETERS FOR IMPULSIVE NOISE MODELS BASED ON THE EQUIPMENT VOLTAGE	14
<i>Fabien Sacuto ; Fabrice Labeau ; Basile L. Agba</i>	
ROBUST MPC-BASED OPTIMAL SIZING AND ENERGY MANAGEMENT OF A HYBRID SOURCE FOR REMOTE COMMUNITIES	20
<i>Mohamed S. Taha ; Yasser A. -R. I. Mohamed</i>	
ROBUST MPC-BASED ENERGY MANAGEMENT SYSTEM OF A HYBRID ENERGY SOURCE FOR REMOTE COMMUNITIES	26
<i>Mohamed S. Taha ; Yasser A. -R. I. Mohamed</i>	
REAL-TIME IMPLEMENTATION & EVALUATION OF GRID-CONNECTED MICROGRID ENERGY MANAGEMENT SYSTEMS	32
<i>Carlos Mauricio Rangel ; Diego Mascarella ; Geza Joos</i>	
A HIGH-SPEED DIGITAL CURRENT DIFFERENTIAL PROTECTION ALGORITHM FOR POWER TRANSMISSION LINES IN SMART GRIDS	38
<i>Adel Aktaibi ; Glyn George ; M. A. Rahman</i>	
A CONTROL TECHNIQUE FOR OPERATION OF SINGLE-PHASE CONVERTERS IN STAND-ALONE OPERATING MODE	44
<i>S. K. Hosseini ; M. Mehrasa ; S. Taheri ; M. Rezanejad ; E. Pouresmaeil ; J. P. S. Catalao</i>	
IMPACT OF IEC 61850 GOOSE COMMUNICATION QUALITY ON DECENTRALIZED REACTIVE POWER CONTROL IN SMART DISTRIBUTION GRIDS — A CO-SIMULATION STUDY	50
<i>Thijs Peirelinck ; Antoneta Iuliana Bratcu ; Yvon Besanger</i>	
OPTIMAL COORDINATION OF DIRECTIONAL OVERCURRENT RELAYS USING HYBRID BBO/DE ALGORITHM AND CONSIDERING DOUBLE PRIMARY RELAYS STRATEGY	56
<i>Ali R. Al-Roomi ; Mohamed E. El-Hawary</i>	
AN APPLICATION OF A CENTRALIZED MODEL PREDICTIVE CONTROL ON MICROGRIDS	63
<i>Khaled Hajar ; Ahmad Hably ; Seddik Bacha ; Ahmad Elrafhi ; Ziad Obeid</i>	
IMPROVED REACTIVE POWER SHARING WITH ADAPTIVE DROOP CONTROL IN ISLANDED MICROGRIDS	69
<i>Javad Fattahi ; Joan E. Haysom ; John Cook ; Karin Hinzer ; Henry Schriemer</i>	
POWER FLOW ANALYSIS OF AC/DC HYBRID MICROGRIDS	75
<i>A. A. Ejajal ; Mohamed A. Abdelwahed ; E. F. El-Saadany ; K. Ponnambalam</i>	
EDUCATIONAL MICROGRID — A MICROGRID TRAINING PLATFORM AND EMULATOR	81
<i>Clinton Murtagh ; Omar Mihirig ; Ygor Gonzalez ; Ali Palizban ; Kathy Manson</i>	
THE TRANSIENT BEHAVIOR OF THE VOLT/VAR CONTROL OF PHOTOVOLTAIC SYSTEMS FOR SOLAR IRRADIATION VARIATIONS	86
<i>Insu Kim ; Ronald G. Harley</i>	
AN ADAPTIVE NEURO-FUZZY INFERENCE SYSTEM-BASED MPPT CONTROLLER FOR PHOTOVOLTAIC ARRAYS	91
<i>Farhad Khosrojerdi ; Shamsodin Taheri ; Ana-Maria Cretu</i>	
TILT ANGLE OPTIMIZATION FOR MAXIMUM SOLAR POWER GENERATION OF A SOLAR POWER PLANT WITH MIRRORS	97
<i>Isuru Vidanalage ; Kaamran Raahemifar</i>	
SENSITIVITY ANALYSIS OF A CURRENT-SOURCE INVERTER-BASED THREE-PHASE GRID-CONNECTED PHOTOVOLTAIC SYSTEM	102
<i>Prajna Paramita Dash ; Mehrdad Kazerani</i>	
IMPACT OF SYSTEMS COST INCENTIVES ON THE ECONOMICS OF DISTRIBUTED SOLAR POWER IN CANADA	110
<i>Hillary Macdougall ; Steve Tomosk ; David Wright</i>	

DESIGN OF RENEWABLE ENERGY SYSTEM FOR A REMOTE MOBILE OFFICE IN NEWFOUNDLAND	115
<i>Emadeddin A. A. Hussein ; M. T. Iqbal</i>	
OPTIMAL SIZING OF A STAND-ALONE HYBRID ENERGY SYSTEM FOR WATER PUMPING IN SIRTE, LIBYA	121
<i>Faisal Alkarrami ; Tariq Iqbal ; Kevin Pope</i>	
COMPARISON OF MICROGRID SOLUTIONS FOR REMOTE AREAS	126
<i>Mark Markovic ; Zorica Nedic ; Andrew Nafalski</i>	
RENEWABLE ENERGY ASSISTED BASE STATION COLLABORATION AS MICRO GRID	131
<i>Faran Ahmed ; Muhammad Naeem ; Muhammad Iqbal ; Alagan Anpalagan</i>	
EQUAL POWER SHARING IN ISLANDED AC/DC HYBRID MICROGRIDS	137
<i>A. A. Ejajal ; E. F. El-Saadany ; K. Ponnambalam</i>	
POWER INTEGRATION FOR SOLAR APPLICATIONS	143
<i>Tanya K. Gachovska ; Tudor Lipan ; Gabriel Scarlatescu ; Chris Gerolami ; Nikolay Radimov ; Mihai Varlan</i>	
MODELED ESTIMATES OF SOLAR DIRECT NORMAL IRRADIANCE IN AL-HANAKIYAH, SAUDI ARABIA AND BOULDER, USA	149
<i>Emad Abyad ; Christopher E. Valdivia ; Joan Haysom ; Ahmad Atieh ; Karin Hinzer</i>	
DESIGN AND APPLICATION OF A PHOTOVOLTAIC POWERED DOMESTIC SOLAR WATER HEATING SYSTEM IN REGINA, SK., CANADA	155
<i>Somkene Mbakwe</i>	
POWER VARIABILITY ANALYSIS OF MEGAWATT-SCALE SOLAR PHOTOVOLTAIC INSTALLATIONS	163
<i>Mark Mitchell ; Michael Campbell ; Kathryn Klement ; Mohammad Sedighy</i>	
A PREDICTIVE DIRECT POWER CONTROL TECHNIQUE FOR TRANSFORMERLESS GRID CONNECTED PV SYSTEMS APPLICATION	167
<i>Nima Safari ; Osama Aslam Ansari ; C. Y. Chung</i>	
COMPARING BISECTION NUMERICAL ALGORITHM WITH FRACTIONAL SHORT CIRCUIT CURRENT AND OPEN CIRCUIT VOLTAGE METHODS FOR MPPT PHOTOVOLTAIC SYSTEMS	173
<i>Muamer M. Shebani ; Tariq Iqbal ; John E. Quaicoe</i>	
A STUDY ON POWER-FLOW AND SHORT-CIRCUIT ALGORITHMS CAPABLE OF ANALYZING THE EFFECT OF LOAD CURRENT ON FAULT CURRENT USING THE BUS IMPEDANCE MATRIX	178
<i>Insu Kim ; Ronald G. Harley</i>	
MATLAB/SIMULINK MODELLING AND EXPERIMENTAL RESULTS OF A PEM ELECTROLYZER POWERED BY A SOLAR PANEL	181
<i>Mohamed Albarghot ; Luc Rolland</i>	
ANALYSIS OF TRANSIENTS IN A MICRO-GRID USING WAVELET TRANSFORMATION	187
<i>Yunqi Wang ; Jayashri Ravishankar ; Phu Ngoc Le ; Toan Phung</i>	
A DUMP LOAD-LESS STANDALONE WIND ENERGY CONVERSION SYSTEM SUPPLYING A GENERIC LOAD	192
<i>Z. Alnasir ; M. Kazerani</i>	
DYNAMIC FREQUENCY SUPPORT WITH DFIG WIND TURBINES — A SYSTEM STUDY	199
<i>Denis Mende ; Tobias Hennig ; Alev Akbulut ; Holger Becker ; Lutz Hofmann</i>	
INERTIA SUPPORT DURING VARIABLE WIND CONDITIONS	206
<i>Mattias Persson ; Peiyuan Chen ; Ola Carlson</i>	
LOW VOLTAGE RIDE-THROUGH ENHANCEMENT IN DFIG-BASED WIND TURBINE	212
<i>Ehsan Gatavi ; Ali Hellany ; Mahmood Nagrial ; Jamal Rizk</i>	
INTERACTION OF DEMAND RESPONSE AND VOLTAGE STABILITY IN SMART GRIDS	218
<i>Masoud Esmaili ; Ali Vedadi</i>	
MITIGATING OVERVOLTAGE SCENARIOS CAUSED BY LARGE PENETRATION OF DISTRIBUTED ENERGY RESOURCES	224
<i>Alexandre Nassif ; Xun Long</i>	
GRID VOLTAGE LEVEL SPANNING OPERATIONAL STRATEGIES FOR BATTERY ENERGY STORAGE SYSTEMS IN DISTRIBUTION GRIDS	229
<i>Lorenz Viernstein ; Rolf Witzmann ; Joachim Przibylla</i>	
COMPARATIVE EVALUATIONS OF REGENERATIVE AND ELECTRO-DYNAMIC BRAKING AND POWER SUBSTATIONS ALONG GRADED SECTION OF A JAPANESE SUBURBAN RAIL LINE	235
<i>K. Kumagai ; T. Fujita ; M. Nakahira ; Y. Mizuguchi ; H. Sonoda</i>	

COMPARISON OF ARTIFICIAL INTELLIGENCE TECHNIQUES FOR ENERGY CONSUMPTION ESTIMATION	241
<i>Oludolapo Akanni Olanrewaju ; Charles Mbohwa</i>	
PARAMETER SELECTION OF MULTI-CLASS SVM WITH EVOLUTIONARY OPTIMIZATION METHODS FOR STATIC SECURITY EVALUATION IN POWER SYSTEMS	246
<i>Samin Rastgoufard ; Dimitrios Charalampidis</i>	
ENSEMBLE REGRESSION MODEL-BASED ANOMALY DETECTION FOR CYBER-PHYSICAL INTRUSION DETECTION IN SMART GRIDS.....	252
<i>Anna Magdalena Kosek ; Oliver Gehrke</i>	
A STUDY OF RESOURCE-CONSTRAINED CYBER SECURITY PLANNING FOR SMART GRID NETWORKS.....	259
<i>Md. Mahmud Hasan ; Hussein T. Mouftah</i>	
STATISTICAL EVALUATION STUDY FOR DIFFERENT WIND SPEED DISTRIBUTION FUNCTIONS USING GOODNESS OF FIT TESTS.....	265
<i>A. Almutairi ; M. E. Nassar ; M. M. A. Salama</i>	
EFFECT OF WIND TURBINE PARAMETERS ON OPTIMAL DG PLACEMENT IN POWER DISTRIBUTION SYSTEMS	269
<i>Majed Alotaibi ; Abdulaziz Almutairi ; M. M. A. Salama</i>	
COMPARISON OF WIND TURBINE PROBABILISTIC MODEL WITH NEGATIVE MODEL IN ECONOMIC DISPATCH PROBLEM USING DIFFERENTIAL EVOLUTION (DE)	273
<i>Zakareya Hasan ; M. E. El-Hawary</i>	
UNIT COMMITMENT INCORPORATING WIND ENERGY BY BBO AND GA.....	278
<i>Zakareya Hasan ; M. E. El-Hawary</i>	
ESTIMATED ECONOMIC LOAD DISPATCH BASED ON REAL OPERATION LOGBOOK	285
<i>Ali R. Al-Roomi ; Mohamed E. El-Hawary</i>	
THE IMPACT OF ESSENTIALS OF APPLICATION ENGINEERING ON CONSERVATION AND ENERGY EFFICIENCY PROJECTS.....	291
<i>Constantin Pitis</i>	
EVALUATING FACTORS RESPONSIBLE FOR ENERGY CONSUMPTION: CONNECTION WEIGHT APPROACH.....	297
<i>Oludolapo Akanni Olanrewaju ; Charles Mbohwa</i>	
MULTI-MARKET BIDDING STRATEGY CONSIDERING PROBABILISTIC REAL TIME ANCILLARY SERVICE DEPLOYMENT	302
<i>Jie Li ; Zuyi Li</i>	
ANOMALY DETECTION IN A SMART GRID USING WAVELET TRANSFORM, VARIANCE FRACTAL DIMENSION AND AN ARTIFICIAL NEURAL NETWORK.....	310
<i>Maryam Ghanbari ; Witold Kinsner ; Ken Ferens</i>	
INCREMENTAL MINING OF FREQUENT POWER CONSUMPTION PATTERNS FROM SMART METERS BIG DATA.....	316
<i>Shailendra Singh ; Abdulsalam Yassine ; Shervin Shirmohammadi</i>	
SUPERVISED HOUSEHOLD'S LOADS PATTERN RECOGNITION.....	322
<i>Maher Azaza ; Fredrik Wallin</i>	
DYNAMIC THRESHOLD ALGORITHM WITH SIMPLIFIED APPLIANCE IDENTIFICATION FOR SMART METER PRIVACY.....	327
<i>Yang Zhao ; Hany E. Farag ; Yong Lian</i>	
TRACKING TECHNIQUES FOR THE PEMFC IN PORTABLE APPLICATIONS	333
<i>Venkataraghavan Karunamurthy Kumaraswamy ; John E. Quaicoe</i>	
USE OF ACTIVE POWER FILTERS TO REDUCE THE EFFECTS OF HARMONICS IN SOLID OXIDE FUEL CELLS	339
<i>Aparna Biswas ; John. E. Quaicoe</i>	
POWER FLOW MANAGEMENT STRATEGY FOR RENEWABLE HYBRID ENERGY SYSTEM.....	345
<i>H. Hosni ; S. Benhamed ; H. Ibrahim ; M. Ghandour ; A. Ilinca ; K. Belmokhtar</i>	
SAFETY STUDY OF THREE TYPES OF LITHIUM ION BATTERIES	351
<i>Rui Zhao ; Sijie Zhang ; Junjie Gu ; Jie Liu</i>	
MODELING THE IMPACT OF ELECTRICAL ENERGY STORAGE SYSTEMS ON FUTURE POWER SYSTEMS.....	358
<i>Marco Pruckner</i>	
FUZZY PREDICTIVE FILTERING IN NONLINEAR ECONOMIC MODEL PREDICTIVE CONTROL FOR DEMAND RESPONSE	365
<i>Rui Mirra Santos ; Yi Zong ; Joao M. C. Sousa ; Luís Mendonça ; Shi You ; Lucian Mihet-Popa</i>	

TRANSMISSION EXPANSION FOR PROFIT MAXIMIZATION OF GENERATORS IN A DECENTRALISED MARKET STRUCTURE.....	371
<i>Harivina Gunnaasankaraan ; Aparna Viswanath ; Kaushik Mahata</i>	
A REVIEW OF THE MEXICAN POWER SYSTEM MARKET POLICIES FOR COMPETITIVENESS AND A MORE DIVERSE GENERATION PORTFOLIO.....	377
<i>P. Hernandez</i>	
THE SMART GRID IMPACT ON THE DANISH DSOS' BUSINESS MODEL	383
<i>Zheng Ma ; Simon Sommer ; Bo Norregaard Jorgensen</i>	
INTELLIGENT MANAGEMENT OF BASEBOARD HEATERS TO LEVEL PEAK DEMAND.....	388
<i>Ajit Pardasani ; Marianne Armstrong ; Guy Newsham ; Brody Hanson</i>	
IMPROVING DYNAMIC PERFORMANCE OF FIVE TYPES OF DQCDSC-PLL USING DIGITAL PHASE-LEAD COMPENSATOR	394
<i>Menxi Xie ; Canyon Zhu ; Yong Yang</i>	
A NOVEL AXIAL FLUX SWITCHED RELUCTANCE MOTOR WITH MULTI-LEVEL AIR GAP GEOMETRY	399
<i>Jianing Lin ; Tim Lambert ; Yinye Yang ; Berker Bilgin ; Rob Lankin ; Ali Emadi</i>	
IMPROVING ELECTROMAGNETIC COMPATIBILITY OF INTEGRATED SWITCHING CONVERTERS FOR HYBRID/ELECTRIC VEHICLES	407
<i>Sergio Saponara ; Gabriele Ciampi ; Carlo Mattaliano ; Luca Fanucci ; Voicu Groza</i>	
SWITCHING FREQUENCY SELECTION FOR AEROSPACE POWER CONVERTER SYSTEM CONSIDERING THE DESIGN OF OUTPUT LC FILTER INDUCTOR OPTIMIZING WEIGHT AND POWER LOSS	413
<i>Tharmini Thavaratnam ; Chushan Li ; David Xu</i>	
D-Q FRAME OPTIMAL CONTROL OF SINGLE PHASE GRID CONNECTED INVERTER WITH LCL FILTER.....	418
<i>Naima Arab ; Bachir Kedjar ; Kamal Al-Haddad</i>	
AUTOMATIC RESTORATION IN DISTRIBUTION SYSTEMS CONSIDERING DG TRANSFER AND ISLANDED MICROGRIDS	424
<i>M. Zaki El-Sharafy ; H. E. Farag</i>	
OPTIMAL POWER FLOW WITH DEMAND PARTICIPATION OF RESS.....	430
<i>Mutlu Yilmaz ; M. E. El-Hawary</i>	
APPLYING MACHINE LEARNING TECHNIQUES FOR FORECASTING FLEXIBILITY OF VIRTUAL POWER PLANTS	438
<i>Pamela Macdougall ; Anna Magdalena Kosek ; Hendrik Bindner ; Geert Deconinck</i>	
CALCULATION OF LINE LOSS IN LOW-VOLTAGE TRANSFORMER DISTRICT BASED ON BP NETWORK MODEL OPTIMIZED BY LM ALGORITHM.....	444
<i>Li-Ping Liu ; Bai-Qing Li ; Ya Li ; Jun Yi ; Jian Zhang ; Qi Wang</i>	
CURRENT MODULATED MESSAGES GENERATED BY PFC CIRCUITS FOR ALLOCATING APPLIANCES WITH MANAGEMENT SYSTEMS IN SMART GRID APPLICATIONS	450
<i>C. Aldejohann ; T. Wohlfahrt ; C. Rehtanz ; J. Myrzik</i>	
NEW APPROACH ON ENERGY CONSERVATION MEASURES TYPES APPLIED IN MINING INDUSTRY	456
<i>Constantin Pitis</i>	
THE IMPACT OF INTERMITTENT RENEWABLES ON THE RESOURCE ADEQUACY IN ELECTRICITY MARKETS	462
<i>Hamid Aghaie</i>	
ECONOMIC DISPATCH AT PEAK LOAD USING LOAD REDUCTION FOR SMART GRID NETWORK.....	467
<i>Zakareya Hasan ; M. E. El-Hawary</i>	
A REVIEW OF DEMAND RESPONSE TECHNIQUES IN SMART GRIDS	472
<i>Anam Malik ; Jayashri Ravishankar</i>	
RESIDENTIAL ENERGY MANAGEMENT IN SMART GRID CONSIDERING RENEWABLE ENERGY SOURCES AND VEHICLE-TO-GRID INTEGRATION	478
<i>Fady Y. Melhem ; Nazih Moubayed ; Olivier Grunder</i>	
COMPARISON OF SI AND GAN-FETS IN A VAR COMPENSATION APPLICATION.....	484
<i>Tanya K. Gachovska ; Chris Gerolami</i>	
RESEARCH ON OPTIMAL ALLOCATION OF REACTIVE POWER COMPENSATORS IN SUBSTATION	487
<i>Zhichang Yuan ; Jiao Fu ; Yinguo Yang ; Jianxi Lin</i>	
VIRTUAL DC MACHINE CONTROL STRATEGY OF ENERGY STORAGE CONVERTER IN DC MICROGRID.....	492
<i>Tan Shucheng ; Dong Ge ; Zhang Hui ; Zhi Na ; Xiao Xi</i>	

STRAY CAPACITANCE OF HVDC KEY DEVICES AND ITS IMPACT ON HARMONIC DISTRIBUTION.....	497
<i>Yunchao Wang ; Zhanqing Yu ; Xiao Zhang ; Jun Hu ; Jinliang He ; Shuiming Chen</i>	
POWER QUALITY IMPROVEMENT IN INDUCTION FURNACE USING ELEVEN LEVEL CASCADED INVERTER BASED DSTATCOM.....	503
<i>Tejinder Singh Saggu ; Lakhwinder Singh ; Bob Gill</i>	
DESIGN OF SYNCHROPHASOR ESTIMATION SYSTEMS WITH CONVEX SEMI-INFINITE PROGRAMMING.....	509
<i>Francisco Messina ; Pablo Marchi ; Leonardo Rey Vega ; Cecilia G. Galarza</i>	
RECURSIVE ESTIMATION OF N-LINE PARAMETERS FOR ELECTRIC POWER DISTRIBUTION GRIDS.....	515
<i>Alexander Prostejovsky ; Oliver Gehrke ; Anna M. Kosek ; Thomas Strasser</i>	
SIMULATION PLATFORM DEVELOPED TO STUDY AND IDENTIFY CRITICAL CASES IN A FUTURE SMART GRID.....	521
<i>Lucian Mihet-Popa ; Yi Zong ; Shi You ; Voicu Groza</i>	
DYNAMIC MODELING OF DIESEL GENERATOR BASED ON ELECTRICAL AND MECHANICAL ASPECTS.....	529
<i>S. Benhamed ; H. Ibrahim ; K. Belmokhtar ; H. Hosni ; A. Ilinca ; D. Rousse ; A. Chandra ; D. Ramdenee</i>	
EFFICIENT RECTENNA WITH WIDE DYNAMIC INPUT POWER RANGE FOR 900 MHZ WIRELESS POWER TRANSFER APPLICATIONS.....	535
<i>A. M. Almohaimed ; M. C. E. Yagoub ; R. E. Amaya</i>	
ASSESSMENT OF A SELF-SUSTAINING FUEL CYCLE OPTION FOR A PRESSURE-TUBE HEAVY WATER NUCLEAR REACTOR.....	539
<i>Sourena Golesorkhi ; Blair P. Bromley ; Ashlea V. Colton ; Matthew H. Kaye</i>	
UNCERTAINTY MODELING IN TRANSMISSION UNDERGROUND CABLE ASSET RENEWAL PROJECTS.....	545
<i>Kings Wong</i>	
OPTIMAL HARMONIC FILTER TOPOLOGY APPLIED IN HV AND EHV NETWORKS USING PARTICLE SWARM OPTIMIZATION.....	550
<i>Reynaldo Ramos ; Gregory A. Franklin</i>	
SVD-BASED REDUCED-ORDER RATIONAL APPROXIMATION FOR EMT ANALYSIS.....	556
<i>Edgar Medina ; Abner Ramirez</i>	
NON-INTRUSIVE LOAD MONITORING USING WAVELET DESIGN AND CO-TESTING OF MACHINE LEARNING CLASSIFIERS.....	562
<i>J. Chung ; J. M. Gillis ; W. G. Morsi</i>	
A SINGLE-PHASE DYNAMIC PHASOR ESTIMATION SYSTEM: ANALYSIS OF PERFORMANCE AND COMPUTATIONAL COST.....	568
<i>Pablo Marchi ; Francisco Messina ; Leonardo Rey Vega ; Cecilia G. Galarza</i>	
POWER SYSTEM TRACKING STATE ESTIMATION BASED ON STOCHASTIC FRACTAL SEARCH TECHNIQUE UNDER BAD MEASUREMENTS CONDITIONS.....	574
<i>Hossam Mosbah ; M. E. El-Hawary</i>	
MITIGATION OF FERRORESONANCE IN LINE COMMUTATED HVDC CONVERTER INTERCONNECTED WITH SERIES COMPENSATED OVERHEAD LINE TRANSMISSION SYSTEM.....	580
<i>Jwala Laxmi Narasimha Rao ; Gaurav Bansal ; Soubhik Auddy ; Thomas Tulkiewicz ; Magnus Ohrstrom</i>	
A NEW COORDINATED DESIGN OF UPFC CONTROLLER AND PSS FOR IMPROVMENT OF POWER SYSTEM STABILITY USING CPCE ALGORITHM.....	586
<i>Mohammad Reza Esmaili ; Amin Khodabakhshian ; Mosayeb Bornapour</i>	
COMPARISON OF PHASE SHIFTING TRANSFORMER AND UNIFIED POWER FLOW CONTROL BASED INTERPHASE POWER CONTROLLERS.....	592
<i>K. Elamari ; L. A. C. Lopes</i>	
COMPARISON OF MODERN STATCOM AND SYNCHRONOUS CONDENSER FOR POWER TRANSMISSION SYSTEMS.....	598
<i>Sergey Kynev ; Georg Pilz ; Heino Schmitt</i>	
EVALUATION OF WIND TURBINE CHARACTERISTICS BUILT-IN MODEL IN MATLAB SIMULINK.....	604
<i>Abobkr Hamida Abobkr ; M. E. El-Hawary</i>	
NEURAL NETWORK BACKPROPAGATION ALGORITHM CONTROL FOR PEM FUEL CELL IN RESIDENTIAL APPLICATIONS.....	608
<i>Mohamed Chemsı ; Kodjo Agbossou ; Alben Cardenas</i>	

AN APPROACH TO PRECISE MODELING OF PHOTOVOLTAIC MODULES UNDER CHANGING ENVIRONMENTAL CONDITIONS	614
<i>Seyedkazem Hosseini ; Shamsodin Taheri ; Masoud Farzaneh ; Hamed Taheri</i>	
ON OPTIMIZATION OF SVMs KERNELS AND PARAMETERS FOR ELECTRICITY PRICE FORECASTING.....	620
<i>Abdussalam Mohamed ; M. E. El-Hawary</i>	
IN-SITU TEST ASSESSMENT OF THYRISTOR LEVEL IN THE CONVERTER VALVE OF HVDC POWER TRANSMISSION	626
<i>Longchen Liu ; Ke Yue</i>	
SELF-SYNCHRONISATION OF WIND FARM IN MMC-BASED HVDC SYSTEM.....	631
<i>Mohammad Amin ; Marta Molinas</i>	
PLANNING AND DESIGN OF A EUROPEAN HVDC GRID DIVIDED INTO FEASIBLE PROTECTION ZONES	637
<i>S. Weck ; J. Hanson ; S. Wenig ; T. Leibfried ; T. Bongers ; A. Moser</i>	
DROOP GAINS SELECTION METHODOLOGY FOR OFFSHORE MULTI-TERMINAL HVDC NETWORKS.....	643
<i>Mohamed A. Abdelwahed ; Ehab F. El-Saadany</i>	
DYNAMIC PERFORMANCE CONTROL OF MODULAR MULTILEVEL CONVERTERS IN HVDC TRANSMISSION SYSTEMS	648
<i>M. Mehrasa ; S. K. Hosseini ; S. Taheri ; E. Pouresmaeil ; J. P. S. Catalao</i>	
A NOVEL FEATURE FITTING SIMULATION ALGORITHM FOR ESTIMATING ELECTRIC VEHICLE DEMAND	654
<i>Shahzada M Shahrukh ; Kankar Bhattacharya</i>	
PROPAGATION OF ELECTRICAL DISTURBANCES TO AUTOMOTIVE BATTERIES IN VEHICLE-TO-GRID CONTEXT	661
<i>Ken Darcovich ; Steven Recoskie ; Fleurine Pincet ; Marie Guillet ; Amaury Foissac ; Xiaoyu Wang ; Zhijun Wang ; Hajo Ribberink</i>	
FUNDING AN ELECTRIC VEHICLE CHARGING INFRASTRUCTURE FROM ASSOCIATED HEALTH BENEFITS	667
<i>Mitchell House ; David Wright</i>	
THE EFFECT OF PEV UNCONTROLLED AND SMART CHARGING ON DISTRIBUTION SYSTEM PLANNING.....	672
<i>Abdullah S. Bin Humayd ; Badr Lami ; Kankar Bhattacharya</i>	
INTEGRATION OF ELECTRIC VEHICLES INTO A SMART POWER GRID: A TECHNICAL REVIEW	678
<i>Farhad Khosrojerdi ; Shamsodin Taheri ; Hamed Taheri ; Edris Pouresmaeil</i>	
A NEGATIVE-SEQUENCE BASED METHOD FOR FAULT PASSAGE IDENTIFICATION	684
<i>Alexandre Nassif ; Robby Gill ; Chris Loo ; Eric Peng Ge</i>	
ACCELERATING RENEWABLE CONNECTIONS THROUGH COUPLING DEMAND AND DISTRIBUTED GENERATION.....	690
<i>Milana Plecas ; Simon Gill ; Ivana Kockar</i>	
MULTI-OBJECTIVE OPTIMIZATION FOR VOLTAGE REGULATION IN DISTRIBUTION SYSTEMS WITH DISTRIBUTED GENERATORS	697
<i>Vahid Asgharian ; V. M. Istemihan Genc</i>	
RESEARCH ON DYNAMIC FREQUENCY BIAS COEFFICIENT AND RELEVANT EVALUATION CRITERION IN THE SETTING OF UHV.....	703
<i>Xingyu Liu ; Yunhai Zhou ; Hang Dong ; Xianzhuang Liu ; Wei Xu ; Faqi Yan ; Hongyi Lai</i>	

ADDITIONAL PAPER

AN AC POWER FLOW LINEARIZATION FOR POWER SYSTEM OPTIMIZATION USING LINEAR PROGRAMMING	709
<i>Torsten Sowa ; Alexander Stroband ; Wilhelm Cramer ; Simon Koopmann ; Armin Schnettler</i>	

Author Index