

2021 IEEE Power & Energy Society General Meeting (PESGM 2021)

**Washington, DC, USA
26-29 July 2021**

Pages 1-624



**IEEE Catalog Number: CFP21POW-POD
ISBN: 978-1-6654-4630-3**

**Copyright © 2021 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 is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP21POW-POD
ISBN (Print-On-Demand):	978-1-6654-4630-3
ISBN (Online):	978-1-6654-0507-2
ISSN:	1944-9925

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

PROBABILISTIC HOSTING CAPACITY ANALYSIS VIA BAYESIAN OPTIMIZATION <i>Xinbo Geng, Lang Tong, Anirban Bhattacharya, Bani Mallick, Le Xie</i>	1
INTEGRATING NET BENEFITS TEST FOR DEMAND RESPONSE INTO OPTIMAL POWER FLOW FORMULATION..... <i>Jessie Ma, Bala Venkatesh</i>	6
SYMMETRICAL COMPONENTS BASED STATE ESTIMATOR FOR POWER DISTRIBUTION SYSTEMS <i>Thiago Ramos Fernandes, Madson Cortes De Almeida, Bala Venkatesh</i>	7
DOMESTIC BATTERY POWER MANAGEMENT STRATEGIES TO MAXIMIZE THE PROFITABILITY AND SUPPORT THE NETWORK..... <i>Ahmed A. Raouf Mohamed, Robert J. Best, Xueqin Liu, D. John Morrow</i>	8
DOMAIN RANDOMIZATION FOR DEMAND RESPONSE OF AN ELECTRIC WATER HEATER <i>Thijs Peirelinck, Chris Hermans, Fred Spiessens, Geert Deconinck</i>	13
AN OPENAI-OPENDSS FRAMEWORK FOR REINFORCEMENT LEARNING ON DISTRIBUTION-LEVEL MICROGRIDS <i>Kevin Moy, Christian Tae, Yubo Wang, Gonzague Henri, Nicholas Bambos, Ram Rajagopal</i>	14
DSP IMPLEMENTATION OF A NOVEL RECURRENT NEURAL NETWORK CONTROLLER INTO A TI SOLAR MICROINVERTER <i>Wanjau Waithaka, Xingang Fu, Abdullah Al Hadi, Rajab Chaloo, Shuhui Li</i>	19
DISTRIBUTIONALLY ROBUST OPERATION FOR ISLANDED MULTI-ENERGY MICRO- GRIDS CONSIDERING THERMAL COMFORT AND SYSTEM FREQUENCY DEVIATIONS..... <i>Cuo Zhang, Zhao Yang Dong</i>	24
CALCULATE CENTER-OF-INERTIA FREQUENCY AND SYSTEM ROCOF USING PMU DATA..... <i>Shutang You, Hongyu Li, Shengyuan Liu, Kaiqi Sun, Weikang Wang, Wei Qiu, Yilu Liu</i>	29
PRICING AND SETTLEMENT APPROACHES OF REGIONAL ELECTRICITY MARKETS IN MULTI-AREA POWER SYSTEMS CONSIDERING LOOP FLOW EFFECTS <i>Hao Liu, Ye Guo, Hongbin Sun</i>	34
NON-TECHNICAL LOSS IDENTIFICATION BY USING DATA ANALYTICS AND CUSTOMER SMART METERS <i>Livia Raggi, Fernanda Trindade, Vinicius Cunha, Walmir Freitas</i>	39
MODELLING CONDUCTOR LIFE EXPECTANCY FOR HTLS CONDUCTORS <i>Haoji Liu, Konstantinos Kopsidas, Mohammed Al Aqil</i>	40
DISTRIBUTION NETWORK FAULT LOCATION ALGORITHM CONSIDERING DISTRIBUTED CAPACITANCE CURRENT..... <i>Jiang Li, Ming Gao, Bo Liu, Fan Gao, Jikai Chen</i>	45
OPTIMAL DAILY SCHEDULING OF DISTRIBUTED BATTERY ENERGY STORAGE SYSTEMS CONSIDERING BATTERY DEGRADATION COST <i>Qingmian Chai, Cuo Zhang, Zhaoyang Dong, Wen Chen</i>	46

AN INDUCTIVELY POWERED LINE-MOUNTED TIME-SYNCHRONIZED MICRO POINT-ON-WAVE RECORDER.....	51
<i>John Patterson, Anamitra Pal</i>	
EXPLOITING THE OPERATIONAL FLEXIBILITY OF WIND INTEGRATED HYBRID AC/DC POWER SYSTEMS	56
<i>Hanyan Huang, Ming Zhou, Shiyi Zhang, Lijun Zhang, Gengyin Li, Yikai Sun</i>	
MAXIMUM HOSTING CAPACITY EVALUATION METHOD OF SOLAR ENERGY IN INTEGRATED ENERGY DISTRIBUTION SYSTEM BASED ON ENHANCED-SOCP	57
<i>Fengzhang Luo, Zheng Jiao, Wei Wei</i>	
IMPACT OF EXTREME WEATHER ON NORTH AMERICAN TRANSMISSION SYSTEM OUTAGES	62
<i>Svetlana Ekisheva, Rachel Rieder, Jack Norris, Mark Lauby, Ian Dobson</i>	
ANCILLARY SERVICE REQUIREMENTS ANALYSIS WITH INCREASING SOLAR GENERATION IN THE ERCOT INTERCONNECTION	67
<i>Manuel Navarro Catalan, Pengwei Du, Nitika Mago, Emmanuel Gonzalez, Raymund Lee, Weifeng Li, Santiago Peñate Vera</i>	
MAXIMUM POWER REFERENCE TRACKING ALGORITHM FOR POWER CURTAILMENT OF PHOTOVOLTAIC SYSTEMS	72
<i>Victor Paduani, Lidong Song, Bei Xu, Ning Lu</i>	
A FULLY PARALLEL NESTED BBDF METHOD FOR POWER SYSTEM TRANSIENT STABILITY SIMULATIONS	77
<i>Tannan Xiao, Weilin Tong, Jianquan Wang, Ying Chen</i>	
AN ACCURATE METHOD OF DETERMINING CONDUCTOR SHORT CIRCUIT WITHSTAND CAPABILITY.....	82
<i>Lucas Cook</i>	
AN OPTIMAL SCHEDULING BASED ON CARBON-EMBEDDED LOCATIONAL MARGINAL PRICE FOR INTEGRATED ELECTRICITY AND GAS SYSTEMS	86
<i>Yunqi Wang, Jing Qiu, Hengrong Zhang, Yuechuan Tao, Xiao Han, Wei Shen</i>	
A SURROGATE-ENHANCED SCHEME IN DECISION MAKING UNDER UNCERTAINTY IN POWER SYSTEMS.....	91
<i>Yijun Xu, Lamine Mili, Mert Korkali, Xiao Chen, Jaber Valinejad, Long Peng</i>	
DISTRIBUTED REDUNDANT INTEGRATION OF DATA CENTER BATTERY STORAGE WITH THE GRID FOR REGULATION SERVICES.....	96
<i>Baosen Zhang, Ehsan Nasr Senior</i>	
CYBER-PHYSICAL EVENT EMULATION-BASED TRANSMISSION-AND-DISTRIBUTION CO-SIMULATION FOR SITUATIONAL AWARENESS OF GRID ANOMALIES (SAGA)	101
<i>Xin Fang, Mengmeng Cai, Anthony Florita</i>	
PARTITIONING AND SELF-ORGANIZATION OF DISTRIBUTED GENERATION IN LARGE DISTRIBUTION NETWORKS	106
<i>Badr Al Faiya, Stephen McArthur, Ivana Kockar</i>	
PREVENTIVE DISPATCH FOR TRANSMISSION DE-ICING	111
<i>Fatemehalsadat Jafarishiadeh, Farshad Mohammadi, Mostafa Sahraei-Ardakani</i>	

IMPACT OF DISTRIBUTED ENERGY RESOURCE INTEGRATION ON REAL-TIME ENERGY MARKET OSCILLATION.....	112
<i>Kunyu Zuo, Yikui Liu, Jiarong Xia, Yafei Yang, Lei Wu, Yonghong Chen</i>	
DATA-DRIVEN GLOBAL SENSITIVITY ANALYSIS OF THREE- PHASE DISTRIBUTION SYSTEM WITH PVS.....	117
<i>Ketian Ye, Junbo Zhao, Can Huang, Nan Duan, Fei Ding, Rui Yang</i>	
A NOVEL LINKING-DOMAIN EXTRACTION DECOMPOSITION METHOD FOR PARALLEL ELECTROMAGNETIC TRANSIENT SIMULATION OF LARGE-SCALE AC/DC NETWORKS.....	122
<i>Tong Duan, Venkata Dinavahi</i>	
A ZONAL VOLT/VAR CONTROL MECHANISM FOR HIGH PV PENETRATION DISTRIBUTION SYSTEMS	123
<i>Asmaa Alrushoud, Catie McEntee, Ning Lu</i>	
FLEXIBLE FORM FACTOR DIGITAL OPTICAL CURRENT SENSOR WITH TRIPLE REDUNDANCY.....	128
<i>Fahmida Ferdous, Manicka K. Pari, Allen H. Rose</i>	
A DEEP LEARNING FORECASTER WITH EXOGENOUS VARIABLES FOR DAY-AHEAD LOCAL MARGINAL PRICE.....	133
<i>Dipanwita Saha, Felipe Lopez</i>	
ANDERSON-ACCELERATION-BASED POWER FLOW METHOD FOR INTEGRATED TRANSMISSION AND DISTRIBUTION NETWORKS	138
<i>Yifeng Chen, Kunjie Tang, Hangyin Mao, Shufeng Dong</i>	
HIERARCHICAL MULTI-TIMESCALE FRAMEWORK FOR OPERATION OF DYNAMIC COMMUNITY MICROGRID	143
<i>Ashwin Shirsat, Valliappan Muthukaruppan, Rongxing Hu, Ning Lu, Mesut Baran, David Lubkeman, Wenyan Tang</i>	
CHARACTERIZATION OF CYCLING PROFILES FOR LI-ION BATTERIES FOR BESS APPLICATIONS.....	148
<i>Javier Urquiza, Pritpal Singh</i>	
NETWORK ALLOCATION AND OPTIMAL SIZING OF BESS FOR RESILIENCE ENHANCEMENT ON POWER DISTRIBUTION SYSTEMS AGAINST VOLCANIC ERUPTION	153
<i>M. Aguirre-Velasco, M. Saltos-Rodriguez, A. Velasquez-Lozano, D. Ortiz-Villalba, A. Villamarin-Jacome</i>	
PARALLEL-LEVENBERG-MARQUARDT-METHOD-BASED POWER FLOW ALGORITHM FOR LARGE-SCALE ILL-CONDITIONED SYSTEMS WITH GPU-CPU FRAMEWORK	158
<i>Kunjie Tang, Shufeng Dong, Hangyin Mao, Yifeng Chen, Bin Nan</i>	
A DATA-DRIVEN STORAGE CONTROL FRAMEWORK FOR DYNAMIC PRICING	163
<i>Jiaman Wu, Zhiqi Wang, Chenye Wu, Kui Wang, Yang Yu</i>	
CONICOPF: CONIC RELAXATIONS FOR AC OPTIMAL POWER FLOW COMPUTATIONS	164
<i>Christian Bingane, Miguel F. Anjos, Sebastien Le Digabel</i>	
TIGHT-AND-CHEAP CONIC RELAXATION FOR THE OPTIMAL REACTIVE POWER DISPATCH PROBLEM.....	169
<i>Christian Bingane, Miguel F. Anjos, Sebastien Le Digabel</i>	

ACCURACY AND APPLICATION SCOPE ANALYSIS FOR LINEARIZED BRANCH FLOW MODEL IN RADIAL DISTRIBUTION SYSTEMS	170
<i>Hanyang Lin, Xinwei Shen, Qinglai Guo, Hongbin Sun</i>	
HARMONIC STATE-SPACE MODEL OF SECOND-ORDER GENERALIZED INTEGRATOR PHASE-LOCKED LOOP	175
<i>Ratik Mittal, Lingling Fan, Zhixin Miao</i>	
SEPARABLE ESTIMATION OF AMBIENT NOISE SPECTRUM IN SYNCHROPHASOR MEASUREMENTS IN PRESENCE OF FORCED OSCILLATIONS	180
<i>Md. Arif Khan, John Pierre</i>	
MITIGATION OF SUBSYNCHRONOUS INTERACTIONS IN HYBRID AC/DC GRID WITH RENEWABLE ENERGY USING FASTER-THAN-REAL-TIME DYNAMIC SIMULATION.....	181
<i>Shiqi Cao, Ning Lin, Venkata Dinavahi</i>	
AGGREGATION AND DISAGGREGATION OF SECOND-LIFE BATTERIES TO MATCH NEW BATTERY PERFORMANCE	182
<i>Ming Cheng, Xuan Zhang, Pengbo Nie, Aihua Ran, Zhenlong Li, Guodan Wei, Hongbin Sun</i>	
HETEROGENEOUS REAL-TIME CO-EMULATION FOR COMMUNICATION-ENABLED GLOBAL CONTROL OF AC/DC GRID INTEGRATED WITH RENEWABLE ENERGY	187
<i>Tong Duan, Tianshi Cheng, Venkata Dinavahi</i>	
PARALLEL-IN-TIME OBJECT-ORIENTED ELECTROMAGNETIC TRANSIENT SIMULATION OF POWER SYSTEMS	188
<i>Tianshi Cheng, Tong Duan, Venkata Dinavahi</i>	
SEMI-SUPERVISED FALSE DATA DETECTION USING GATED RECURRENT UNITS AND THRESHOLD SCORING ALGORITHM.....	189
<i>Ali Parizad, Constantine Hatziaodoniu</i>	
REAL-TIME HIERARCHICAL NEURAL NETWORK BASED FAULT DETECTION AND ISOLATION FOR HIGH-SPEED RAILWAY SYSTEM UNDER HYBRID AC/DC GRID	194
<i>Qin Liu, Tian Liang, Venkata Dinavahi</i>	
ADAPTIVE REAL-TIME HYBRID NEURAL NETWORK-BASED DEVICE-LEVEL MODELING FOR DC TRACTION HIL APPLICATION.....	195
<i>Tian Liang, Zhen Huang, Venkata Dinavahi</i>	
MULTI TIME-SCALE IMPUTATION AIDED STATE ESTIMATION IN DISTRIBUTION SYSTEM.....	196
<i>Shweta Dahale, Balasubramaniam Natarajan</i>	
TIME SYNCHRONIZED STATE ESTIMATION FOR INCOMPLETELY OBSERVED DISTRIBUTION SYSTEMS USING DEEP LEARNING CONSIDERING REALISTIC MEASUREMENT NOISE.....	201
<i>B. Azimian, R. Sen Biswas, A. Pal, Lang Tong</i>	
PEER-TO-PEER ENERGY COOPERATION IN BUILDING COMMUNITY OVER A LOSSY NETWORK.....	206
<i>Cheng Lyu, Youwei Jia, Zhao Xu</i>	
SMALL-SIGNAL STABILITY ANALYSIS OF A DC SHIPBOARD MICROGRID WITH DROOP-CONTROLLED BATTERIES AND CONSTANT POWER RESOURCES.....	211
<i>F. Conte, F. D'Agostino, S. Massucco, F. Silvestro, S. Grillo</i>	

CONTINUOUS PARTIAL DISCHARGES ANALYSIS DURING AUTOMATED THERMAL CYCLE AGING EXPERIMENT	216
<i>Mateus Santos, Gerson Braulio, Jose Bernardes, Credson Salles, Jose Milanez, Edson Bortoni, Guilherme Bastos</i>	
ACCURATE TIME-DOMAIN FAULT LOCATION METHOD ON PRACTICALLY TRANPOSED TRANSMISSION LINES.....	217
<i>Dayou Lu, Yu Liu, Binglin Wang, Lihui Yi, Xiaodong Zheng</i>	
TOPOLOGY-FREE OPTIMAL POWER DISPATCH FOR DISTRIBUTION NETWORK CONSIDERING SECURITY CONSTRAINTS AND FLEXIBLE BUILDING THERMAL INERTIA.....	222
<i>Ge Chen, Hongcai Zhang, Ningyi Dai, Yonghua Song</i>	
REAL-TIME ENERGY DISAGGREGATION AT SUBSTATIONS WITH BEHIND-THE-METER SOLAR GENERATION.....	227
<i>Wenting Li, Ming Yi, Meng Wang, Yishen Wang, Di Shi, Zhiwei Wang</i>	
SELF-ADAPTIVE EVALUATION OF HYBRID AC/DC DISTRIBUTION NETWORKS WITH MULTI-ENERGY COMPLEMENTARY SYSTEMS	228
<i>Leijiao Ge, Yuanliang Li, Jun Yan, Yao Wang, Feng Niu</i>	
EVALUATION OF ENERGY STORAGE PROVIDING VIRTUAL TRANSMISSION CAPACITY	234
<i>Tu A. Nguyen, Raymond H. Byrne</i>	
FEEDERGAN: SYNTHETIC FEEDER GENERATION VIA DEEP GRAPH ADVERSARIAL NETS.....	239
<i>Ming Liang, Yao Meng, Jiyu Wang, David Lubkeman, Ning Lu</i>	
IMPACT OF LOAD ALLOCATION AND HIGH PENETRATION PV MODELING ON QSTS-BASED CURTAILMENT STUDIES	240
<i>Joseph A. Azzolini, Matthew J. Reno</i>	
LOCATIONAL MARGINAL PRICE FORECASTING USING CONVOLUTIONAL LONG-SHORT TERM MEMORY-BASED GENERATIVE ADVERSARIAL NETWORK.....	245
<i>Zhongxia Zhang, Meng Wu</i>	
MULTISTEP FREQUENCY RESPONSE OPTIMIZED INTEGRATORS AND THEIR APPLICATION TO ACCELERATING A POWER SYSTEM TRANSIENT SIMULATION SCHEME.....	250
<i>Sheng Lei, Alexander Flueck</i>	
TRANSFORMER ACTIVE PROTECTION METHOD BASED ON MULTI-PARAMETER FUSION	255
<i>Shaoyong Yao, Zhiguo Hao, Jianan Si, Yucheng Zhang, Boyu Li, Zhongxin Xue</i>	
AN ENERGY SHARING GAME WITH GENERALIZED DEMAND BIDDING: MODEL AND PROPERTIES	259
<i>Yue Chen, Shengwei Mei, Fengyu Zhou, Steven Low, Wei Wei, Feng Liu</i>	
ADAPTIVE WIND SPEED FORECASTING BASED ON OPTIMIZED ENSEMBLE NUMERICAL WEATHER PREDICTION AND TEMPORAL FEATURE SELECTION.....	260
<i>Chenyu Liu, Xuemin Zhang, Shengwei Mei</i>	

VOLTAGE STABILITY MONITORING BASED ON DISAGREEMENT-BASED DEEP LEARNING IN A TIME-VARYING ENVIRONMENT	265
<i>Tong Wu, Ying Jun Zhang, He Wen</i>	
PHIL STUDY AND STABILITY ANALYSIS OF VARIABLE SPEED DIESEL GENERATOR WITH SUPERCAPACITOR.....	266
<i>U. Manandhar, X. Zhang, H. B. Gooi</i>	
STUDY ON AC VOLTAGE RANGE OF VSC-HVDC SYSTEMS IN STEADY-STATE OPERATION CONDITIONS BASED ON A POINT-BY-POINT SCANNING METHOD.....	271
<i>Hao Qi, Yanjie Hu, Hanwen Gu, Zaibin Jiao, Yini Xu, Lijing Sun, Rui Li</i>	
MISSING DATA RECOVERY IN LARGE POWER SYSTEMS USING NETWORK EMBEDDING.....	276
<i>Tong Wu, Ying Jun Zhang, Yang Liu, Wing Cheong Lau, Huanle Xu</i>	
CLOUD ENERGY STORAGE IN MULTI ENERGY SYSTEMS: OPTIMAL SCHEDULING AND PROFIT-SHARING APPROACHES.....	277
<i>Yaowang Li, Jingjie Xue, Jiayu Bian, Haiyang Jiang, Ning Zhang, Chongqing Kang</i>	
A DYNAMIZED POWER FLOW METHOD BASED ON DIFFERENTIAL TRANSFORMATION	282
<i>Yang Liu, Kai Sun, Jiaojiao Dong</i>	
ASSESSMENT OF THE POTENTIAL SHORE TO SHIP LOAD DEMAND: THE ITALIAN SCENARIO	283
<i>F. D'Agostino, D. Kaza, G. P. Schiapparelli, F. Silvestro, C. L. Bossi, F. Colzi</i>	
WASSERSTEIN DISTRIBUTIONALLY ROBUST LOOK-AHEAD ECONOMIC DISPATCH.....	288
<i>Bala Kameshwar Poolla, Ashish Hota, Saverio Bolognani, Duncan Callaway, Ashish Cherukuri</i>	
ROBUST NONLINEAR CONTROLLER FOR WIND TURBINE GENERATOR DRIVETRAIN TORSIONAL OSCILLATION UNDER LARGE DISTURBANCES	289
<i>Bi Liu, Junbo Zhao, Qi Huang, Federico Milano, Bendong Tan, Weihao Hu</i>	
ONLINE APPLICATION OF LOCAL OOS PROTECTION AND GRAPH THEORY FOR CONTROLLED ISLANDING.....	294
<i>Nripesh Ayer, Ramakrishna Gokaraju</i>	
ON IMPROVING EFFICIENCY OF ELECTRICITY MARKET CLEARING SOFTWARE WITH A CONCURRENT HIGH PERFORMANCE COMPUTER BASED SECURITY CONSTRAINED UNIT COMMITMENT SOLVER	295
<i>Yonghong Chen, Feng Pan, Jesse Holzer, Arun Veeramany, Zhongyu Wu</i>	
FIELD ASSESSMENT OF RESIDENTIAL SMART ELECTRIC BASEBOARD DR STRATEGIES ON LOAD AND COMFORT	300
<i>Vahid Raissi Dehkordi, Louis-Philippe Proulx, Steven Wong, Veronique Delisle</i>	
POWER SYSTEM TRANSIENT MODELING AND SIMULATION USING INTEGRATED CIRCUIT.....	305
<i>Xiang Zhang, Renchang Dai, Peng Wei, Yijing Liu, Guangyi Liu, Zhiwei Wang</i>	
STABILITY ANALYSIS OF VSC SYSTEMS USING 3×3 ADMITTANCE MEASUREMENTS	310
<i>Ali Aljumah, Zhixin Miao, Lingling Fan</i>	

DIFFERENTIAL PRIVACY IN CONSUMER BEHAVIOR ANALYSIS	315
<i>Haoxiang Wang, Xun Luo, Chenye Wu</i>	
A REINFORCEMENT LEARNING METHOD FOR POWER SUPPLIERS' STRATEGIC BIDDING WITH INSUFFICIENT INFORMATION	320
<i>Qiangang Jia, Zhaoyu Hu, Yiyang Li, Zheng Yan, Sijie Chen</i>	
ROOT-MEAN SQUARE MODEL OF THREE-PHASE PHOTOVOLTAIC INVERTER FOR UNBALANCED FAULT	325
<i>Hayato Satoh, Koji Yamashita, Keisuke Shirasaki, Yoshihiro Kitauchi</i>	
ELECTROMECHANICAL MODE ESTIMATION IN THE PRESENCE OF PERIODIC FORCED OSCILLATIONS	326
<i>Urmila Agrawal, Jim Follum, John Pierre, Dongliang Duan</i>	
MILITARY DIESEL MICROGRIDS: DESIGN, OPERATIONAL CHALLENGES, ENERGY STORAGE INTEGRATION	327
<i>Nicholas G. Barry, Surya Santoso</i>	
MULTIDIMENSIONAL SCENARIO SELECTION FOR POWER SYSTEMS WITH STOCHASTIC FAILURES	332
<i>Farshad Mohammadi, Mostafa Sahraei-Ardakani</i>	
RESILIENCE-CONSTRAINED UNIT COMMITMENT CONSIDERING DEMAND RESPONSE	333
<i>Omid Hajimiri, Abbas Rabiee, Seyed Masoud Mohseni-Bonab, Innocent Kamwa</i>	
A CONTROL SCHEME OF SMOOTH TRANSITION FOR ACTIVE DISTRIBUTION NETWORKS DURING UNINTENTIONAL ISLANDING	338
<i>J. Wang, W. T. Huang, N. L. Tai, Moduo Yu, Z. J. Ma, Y. Wang</i>	
VALUE STACKING OF A BEHIND-THE-METER UTILITY-SCALE BATTERY FOR DEMAND RESPONSE MARKETS AND DEMAND CHARGE MANAGEMENT: REAL- WORLD OPERATION ON THE UC SAN DIEGO CAMPUS	343
<i>Yi-An Chen, Ryan Greenough, Mike Ferry, Kelsey Johnson, Jan Kleissl</i>	
COORDINATED MARKET CLEARING FOR COMBINED THERMAL AND ELECTRIC DISTRIBUTION GRID OPERATION	349
<i>Sebastian Troitzsch, Kai Zhang, Tobias Massier, Thomas Hamacher</i>	
SYNERGISTIC FREQUENCY REGULATION CONTROL MECHANISM FOR DFIG WIND TURBINES WITH OPTIMAL PITCH DYNAMICS	354
<i>Rashmi Prasad, Narayana Prasad Padhy</i>	
RISK-AVERSE COORDINATED ECONOMIC DISPATCHING AND VOLTAGE REGULATION IN ADNS WITH ON-SITE RENEWABLES AND SOFT OPEN POINTS	355
<i>Xiaodong Yang, Chongbo Xu, Junjie Lu, Jinyu Wen, Youbing Zhang</i>	
PRIMARY FREQUENCY REGULATION USING HVDC TERMINALS CONTROLLING VOLTAGE DEPENDENT LOADS	360
<i>Marius Langwasser, Giovanni De Carne, Marco Liserre, Matthias Biskoping</i>	
PROBABILISTIC BEHAVIORAL MODELING OF LOAD PROFILES FOR LOW VOLTAGE COMMERCIAL CUSTOMERS	361
<i>Bruna R. Lopes, Fernanda C. L. Trindade, Tiago R. Ricciardi, Rafael Augusto Rosolen, Tuo Ji, Xinjian Chen, Jiyong Chai</i>	

IMPLEMENTATION AND HARDWARE-IN-THE-LOOP TESTING OF A WIDE-AREA DAMPING CONTROLLER BASED ON MEASUREMENT-DRIVEN MODELS	366
<i>Chengwen Zhang, Yi Zhao, Lin Zhu, Yilu Liu, Evangelos Farantatos, Mahendra Patel, Hossein Hooshyar, Cosimo Pisani, Roberto Zaottini, Giorgio Giannuzzi</i>	
A MACHINE LEARNING-BASED METHOD TO ESTIMATE TRANSFORMER PRIMARY-SIDE VOLTAGES WITH LIMITED CUSTOMER-SIDE AMI MEASUREMENTS.....	371
<i>Jiyu Wang, Harsha Padullaparti, Santosh Veda, Murali Baggu, Martha Symko-Davies, Amin Salmani, Tom Bialek</i>	
TRANSIENT PERFORMANCE IMPROVEMENT OF POWER SYSTEMS USING FUZZY LOGIC CONTROLLED CAPACITIVE-BRIDGE TYPE FAULT CURRENT LIMITER	376
<i>Mohammad Sadi, Ahmed Abuhussein, Md Asaduzzaman Shoeb</i>	
AN APPLICATION FOR VALIDATION OF POWER DISTRIBUTION SYSTEM MODELS IN AN ADMS ENVIRONMENT.....	377
<i>Shiva Poudel, Gary D. Black, Andrew P. Reiman</i>	
DISTRIBUTION SYSTEM BAD DATA DETECTION USING GRAPH SIGNAL PROCESSING	382
<i>Osten Anderson, Nanpeng Yu</i>	
AN OPTIMIZED DECENTRALIZED POWER SHARING STRATEGY FOR WIND FARM DELOADING.....	387
<i>Xinkai Fan, Emanuele Crisostomi, Dimitri Thomopoulos, Baohui Zhang, Robert Shorten, Songhao Yang</i>	
DC FAULT ANALYSIS AND TRANSIENT AVERAGE CURRENT BASED FAULT DETECTION FOR RADIAL MTDC SYSTEM.....	388
<i>Jiapeng Li, Yujun Li, Liansong Xiong, Ke Jia, Guobing Song</i>	
PROPERTIES OF THE INTER-AREA MODES OF THE U.S. EASTERN INTERCONNECTION SYSTEM	389
<i>Urmila Agrawal, Xiaoyuan Fan, Renke Huang, Sanjay Hosur</i>	
IMPACT OF UNCERTAINTY ON ENERGY STORAGE OPERATION DECISIONS: MOTIVATION AND FRAMEWORK	394
<i>Sarmad Hanif, Vanshika Fotedar, Alasdair Crawford, M. J. E. Alam</i>	
INCREASING GRID AND ASSET RESILIENCE: AN AUTOMATIC AND UNSUPERVISED APPROACH TO PARTIAL DISCHARGE MONITORING IN CABLES	399
<i>Riddhi Ghosh, Gian Carlo Montanari, Paolo Seri</i>	
ISLANDED OPERATION OF OFFSHORE WIND POWER PLANT USING IBESS.....	403
<i>Sanjay K. Chaudhary, Remus Teodorescu, Jan R. Svensson, Lukasz H. Kocewiak, Philip Johnson, Bertil Berggren</i>	
TOPOLOGY LEARNING AIDED FALSE DATA INJECTION ATTACK WITHOUT PRIOR TOPOLOGY INFORMATION.....	408
<i>Martin Higgins, Jiawei Zhang, Ning Zhang, Fei Teng</i>	
A COMPUTATIONAL ATTRACTIVE INTERVAL POWER FLOW APPROACH WITH CORRELATED UNCERTAIN POWER INJECTIONS	413
<i>Bi Liu, Qi Huang, Junbo Zhao, Weihao Hu</i>	
APPLICATION OF SUB/SUPER-SYNCHRONOUS POWER FOR IDENTIFYING THE SOURCE OF SUBSYNCHRONOUS CONTROL INTERACTION	414
<i>Yue Ma, Qi Huang, Dongsheng Cai, Zhenyuan Zhang</i>	

LOADING MARGIN IMPROVEMENT THROUGH ADJUSTEMENT OF THE WIND FARMS POWER FACTOR	419
<i>Victor Neumann, Roman Kuiava, Rodrigo A. Ramos, Ahda Pavani, Livia Alburguetti</i>	
CORRELATIONS OF SHOCKS AND STRESSES WITH DISTRIBUTION NETWORK OUTAGES	424
<i>Matthias Noebels, Mathaios Panteli</i>	
PJM SYSTEM STABILITY ASSESSMENT USING DYNAMIC LOAD MODELS.....	429
<i>Xiaokang Xu, Reza Yousefian, Jie Tang, Mohamed Elkhatib, Byoungkon Choi, Lin Huang, Yiming Mao, Aaron Berner</i>	
DA-AFM FOR ULTRA PV AND WIND ENERGY INTEGRATION.....	434
<i>Wenfeng Wan, Mikhail A. Bragin, Peter B. Luh, Peng Zhang</i>	
ADVERSARIAL ATTACK FOR DEEP REINFORCEMENT LEARNING BASED DEMAND RESPONSE.....	439
<i>Zhiqiang Wan, Hepeng Li, Hang Shuai, Yan Lindsay Sun, Haibo He</i>	
PSS/E TO RSCAD MODEL CONVERSION FOR LARGE POWER GRIDS: CHALLENGES AND SOLUTIONS	444
<i>Michael Abdelmalak, Md Kamruzzaman, Hossein Hooshyar, Evangelos Farantatos, George Stefopoulos, Rahul Kadavil, Mohammed Benidris</i>	
A MARKOV DECISION PROCESS TO ENHANCE POWER SYSTEM OPERATION RESILIENCE DURING HURRICANES	449
<i>Michael Abdelmalak, Mohammed Benidris</i>	
TRANSACTIVE IMPLEMENTATION OF DECENTRALIZED ELECTRICITY MARKET FOR GRID-EDGE SYSTEMS	454
<i>Monish Mukherjee, Trevor Hardy, Jason Fuller, Anjan Bose</i>	
SIMPLIFIED TRANSACTIVE DISTRIBUTION GRIDS FOR BULK POWER SYSTEM MECHANISM DEVELOPMENT	459
<i>Sarmad Hanif, Laurentiu Marinovici, Mitch Pelton, Trevor Hardy, Thomas E. McDermott</i>	
ON THE COMPUTATION OF THE LOCALLY CLOSEST BIFURCATION POINT CONSIDERING LOADING UNCERTAINTIES AND REACTIVE POWER LIMITS	464
<i>Lucas Neves, Luis Alberto</i>	
A BENCHMARK CASE FOR THE GRID SURVIVABILITY ANALYSIS	465
<i>Svetlana V. Poroseva, Keith R. Soules, S M Shafiul Alam, Mayank Panwar, Rob Hovsapian</i>	
SOLVING BERNOULLI BANDIT PROBLEMS FOR WEATHER-RELATIVE OVERHEAD DISTRIBUTION LINE FAILURES FORECASTING.....	470
<i>Shengyi Wang, Hongbo Sun, Kyeong Jin Kim, Jianlin Guo, Daniel Nikovski</i>	
EVALUATION OF AC OPTIMAL POWER FLOW ON GRAPHICAL PROCESSING UNITS	475
<i>Shrirang Abhyankar, Slaven Peles, Robert Rutherford, Asher Mancinelli</i>	
COMPREHENSIVE MODELING OF LARGE PHOTOVOLTAIC SYSTEMS FOR HETEROGENEOUS PARALLEL TRANSIENT SIMULATION OF INTEGRATED AC/DC GRID	480
<i>Ning Lin, Shiqi Cao, Venkata Dinavahi</i>	

FLEXIBLE TIME-STEPPING DYNAMIC EMULATION OF AC/DC GRID FOR FASTER-THAN-SCADA APPLICATIONS.....	481
<i>Shiqi Cao, Ning Lin, Venkata Dinavahi</i>	
CHANCE-CONSTRAINED ENERGY MANAGEMENT FOR PUMPED STORAGE HYDROPOWER PLANT TO COMPENSATE FOR WIND POWER UNCERTAINTIES.....	482
<i>Yang Li, Feng Wu, Jingyan Li, Yiwu Yin, Zhiyi Li, Lan Ai</i>	
GRAPH PROPAGATION AND DISTRIBUTED STATE ESTIMATION BASED ON LOCAL MODELING.....	487
<i>Aleksandar A. Saric, Alex M. Stankovic</i>	
DECENTRALIZED PROVISION OF RENEWABLE PREDICTIONS WITHIN A VIRTUAL POWER PLANT	492
<i>Yue Chen, Tongxin Li, Changhong Zhao, Wei Wei</i>	
POWER FLOW MODEL SELECTION METHOD OF DISTRIBUTION NETWORK ANALYSIS AND OPTIMIZATION.....	493
<i>Jun Xiao, Zhenyu Bao, Chenhui Song, Zeikai Qiu, Heng Jiao</i>	
ON THE FEASIBILITY OF AC AND DC OPTIMAL POWER FLOW MODELS: ANALYTICS AND COMPARISON	498
<i>Zhi-Yuan Wang, Hsiao-Dong Chiang</i>	
POWER SYSTEM INERTIA MONITORING USING RECURSIVE WEIGHTED LEAST SQUARE ALGORITHM UNDER AMBIENT CONDITIONS	503
<i>Fanhong Zeng, Junbo Zhang, Siwei Huang</i>	
TOWARD CHARACTERIZATION OF THE FEASIBLE INJECTION REGION OF DISTRIBUTED GENERATIONS WITH DIFFERENT CONTROL MODES.....	508
<i>Yan-Di Wang, Hsiao-Dong Chiang</i>	
APPLICATION OF DETECTABILITY ANALYSIS FOR POWER SYSTEM DYNAMIC STATE ESTIMATION.....	513
<i>Ning Zhou, Shaobu Wang, Junbo Zhao, Zhenyu Huang</i>	
COORDINATED TRANSITION PLANS FOR POWER AND URBAN HEATING: ANALYSIS ON THREE PROVINCES IN NORTH CHINA.....	514
<i>Yisha Lin, Ying Qiao, Zongxiang Lu, Yong Zhang</i>	
IMPROVING THE FREQUENCY RESPONSE OF DERS THROUGH VOLTAGE FEEDBACK.....	519
<i>Georgios Tzounas, Federico Milano</i>	
A SHORT-TERM DYNAMIC ELECTRICITY MARKET MODEL WITH MEMORY EFFECT.....	524
<i>Taulant Kërçi, Georgios Tzounas, Ioannis Dassios, Mohammed Ahsan Adib Murad, Federico Milano</i>	
CPS TESTBED ARCHITECTURES FOR WAMPAC USING INDUSTRIAL SUBSTATION AND CONTROL CENTER PLATFORMS AND ATTACK-DEFENSE EVALUATION	529
<i>Gelli Ravikumar, Burhan Hyder, Jeyanth Rajan Babu, Kush Khanna, Manimaran Govindarasu, Manu Parashar</i>	
DYNAMIC PERFORMANCE OF TYPE-4 WIND WITH SYNCHRONOUS CONDENSER DURING WEAK GRIDS AND FAULTS	534
<i>Rahul Halugudde Ramakrishna, Zhixin Miao, Lingling Fan</i>	

SEQUENCE IMPEDANCE MODELING OF GRID-FORMING INVERTERS.....	539
<i>Weihang Yan, Shahil Shah, Vahan Gevorgian, David Wenzhong Gao</i>	
IMPACTS OF TIME-OF-USE RATE CHANGES ON THE ELECTRICITY BILLS OF COMMERCIAL CONSUMERS.....	544
<i>Lane D. Smith, Daniel S. Kirschen</i>	
OPTIMIZATION-BASED CALIBRATION OF AGGREGATED DYNAMIC MODELS FOR DISTRIBUTED ENERGY RESOURCES.....	549
<i>Chih-Che Sun, Mert Korkali, Emma M. Stewart, Vaibhav Donde, Matthew J. Reno</i>	
TOWARD USER-PREFERENCE ENABLING STATE ESTIMATION: THEORY AND METHOD.....	554
<i>Wei Tian, Hsiao-Dong Chiang</i>	
MULTI-DIMENSIONAL OUTPUT-ORIENTED POWER SYSTEM RESILIENCE BASED ON DEGRADED FUNCTIONALITY.....	559
<i>Jaber Valinejad, Lamine Mili, C. Natalie Van Der Wal, Michael Von Spakovsky, Yijun Xu</i>	
A POWER FLOW METHOD FOR POWER DISTRIBUTION SYSTEMS BASED ON A SINUSOIDAL TRANSFORMATION TO A CONVEX QUADRATIC FORM.....	564
<i>Jaber Valinejad, Lamine Mili, Yijun Xu</i>	
GRID-FORMING CONTROL FOR SOLAR PV SYSTEMS WITH REAL-TIME MPP ESTIMATION.....	569
<i>Bandopant Pawar, Saikat Chakrabarti, Efstratios I. Batzelis, Bikash C. Pal</i>	
A SMART METER MEASUREMENT TIME ERROR IDENTIFICATION AND CORRECTION METHOD BASED ON TESM AND CORRELATION ANALYSIS.....	574
<i>Xiaopeng Zhang, Xiangyu Kong, Ning Wang</i>	
SHARING DISTRIBUTED ENERGY STORAGES WITH VIRTUAL POWER PLANTS.....	579
<i>Wenjun Tang, Ye Guo, Hongbin Sun</i>	
A HYBRID MODEL-DRIVEN AND DATA-DRIVEN APPROACH FOR SATURATION CORRECTION OF CURRENT TRANSFORMER.....	584
<i>Yubo Zhang, Songhao Yang, Zhiguo Hao, Zexuan Lin, Zhiyuan Liu</i>	
A MULTI-AGENT SYSTEM BASED HIERARCHICAL CONTROL FRAMEWORK FOR MICROGRIDS.....	589
<i>Mengxiang Liu, Zheyuan Cheng, Zhenyong Zhang, Mingyang Sun, Ruilong Deng, Peng Cheng, Mo- Yuen Chow</i>	
OPTIMAL OPERATION OF HYDROGEN ENERGY SYSTEM CONSIDERING COORDINATION OF ELECTRIC POWER AND TRANSPORTATION BASED HYDROGEN DELIVERY.....	594
<i>Chengcheng Shao, Chenjia Feng, Shen Zhang, Wenjing Dong, Xifan Wang</i>	
OPTIMAL SIZING OF AN ENERGY STORAGE PORTFOLIO CONSIDERING MULTIPLE TIMESCALES.....	599
<i>Constance Crozier, Kyri Baker</i>	
A DATA-DRIVEN ENERGY STORAGE SYSTEM-BASED ALGORITHM FOR MONITORING THE SMALL-SIGNAL STABILITY OF POWER GRIDS WITH VOLATILE WIND POWER.....	604
<i>Ilias Zenelis, Georgia Pierrou, Xiaozhe Wang</i>	

ISSUES AND MITIGATIONS IN “FUSE SAVING” PROTECTION OF HYBRID AC&DC DISTRIBUTION WITH SOLAR INTEGRATION.....	609
<i>Li Qi, Petri Hovila</i>	
ENERGY STORAGE PEAK SHAVING FEASIBILITY: CASE STUDIES IN UPSTATE NEW YORK.....	614
<i>Thomas H. Ortmeier, Tuyen Vu</i>	
COMMUNICATION-FAILURE-RESILIENT DISTRIBUTED FREQUENCY CONTROL IN SMART GRIDS: PART I: ARCHITECTURE AND DISTRIBUTED ALGORITHMS.....	619
<i>Masoud Nazari, Le Yi Wang, Santiago Grijalva, Magnus Egerstedt</i>	
FAST AC STEADY-STATE POWER GRID SIMULATION AND OPTIMIZATION USING PRIOR KNOWLEDGE.....	620
<i>Aayushya Agarwal, Amritanshu Pandey, Larry Pileggi</i>	
MULTI-OBJECTIVE OPTIMAL POWER FLOW CONSIDERING EMISSIONS AND VOLTAGE VIOLATIONS	625
<i>Jacob Kravits, Kyri Baker, Joseph Kasprzyk</i>	
PJM'S EXPERIENCES USING MULTIPLE PMU SIGNALS FOR MOD-033 DYNAMIC LOCAL EVENT VALIDATION	630
<i>Tao He, David Egan, Wenzheng Qiu</i>	
ACCELERATED PROBABILISTIC STATE ESTIMATION IN DISTRIBUTION GRIDS VIA MODEL ORDER REDUCTION	635
<i>Samuel Chevalier, Luca Schenato, Luca Daniel</i>	
REAL OPTIONS BASED OPTIMAL PLANNING FOR INTEGRATED ENERGY SYSTEMS UNDER LONG-TERM UNCERTAINTIES	640
<i>Shuang Cheng, Chenghong Gu, Xinhe Yang, Junlong Li</i>	
SMART FDI ATTACK DESIGN AND DETECTION WITH DATA TRANSMUTATION FRAMEWORK FOR SMART GRIDS.....	645
<i>Keerthiraj Nazarai, Nader Aliohani, Sheng Zou, Tierui Zou, Arturo S. Bretas, Janise McNair, Alina Zare</i>	
COMMUNICATION-FAILURE-RESILIENT DISTRIBUTED FREQUENCY CONTROL IN SMART GRIDS: PART II: ALGORITHMIC IMPLEMENTATION AND SYSTEM SIMULATIONS.....	650
<i>Masoud Nazari, Le Yi Wang, Santiago Grijalva, Magnus Egerstedt</i>	
OPTIMIZATION OF JOINT CYBER TOPOLOGY ATTACK AND FDIA IN ELECTRICITY MARKET CONSIDERING UNCERTAINTIES	651
<i>Chao Jin, Zhejing Bao, Miao Yu, Jifeng Zheng, Chuan Sha</i>	
CONTROL OF RESIDENTIAL AIR-CONDITIONING LOADS TO PROVIDE REGULATION SERVICES UNDER UNCERTAINTIES	656
<i>Gayan Lankeshwara, Rahul Sharma, Rui Feng Yan, Tapan K. Saha</i>	
ON THE USE OF SMART METER DATA TO ESTIMATE THE VOLTAGE MAGNITUDE ON THE PRIMARY SIDE OF DISTRIBUTION SERVICE TRANSFORMERS	661
<i>Marcos Netto, Jun Hao, Harsha Padullaparti, Venkat Krishnan</i>	
PEUKERT'S LAW FOR SUPERCAPACITOR PARALLEL AND SERIES MODULES WITH CONSTANT POWER LOADS.....	666
<i>Hengzhao Yang</i>	

THE INFLUENCE OF THE COAST EFFECT ON GEOMAGNETICALLY INDUCED CURRENTS: A MODELING STUDY	671
<i>Xuan Wang, Chun-Ming Liu, David Boteler, Risto Pirjola</i>	
QUANTIFYING MARKET EFFICIENCY IMPACTS OF AGGREGATED DISTRIBUTED ENERGY RESOURCES	676
<i>Khaled Alshehri, Mariola Ndrjo, Subhonmesh Bose, Tamer Basar</i>	
ANALYTICAL POWER LOSS SENSITIVITY ANALYSIS IN DISTRIBUTION SYSTEMS	677
<i>Mohammad Abujobbeh, Sai Munikoti, Balasubramaniam Natarajan</i>	
APPROXIMATE LOAD MODELS FOR CONIC OPF SOLVERS	682
<i>Firdous Ui Nazir, Bikash Pal, Rabih Jabr</i>	
VERSATILE AND ROBUST TRANSIENT STABILITY ASSESSMENT VIA INSTANCE TRANSFER LEARNING	683
<i>Seyedali Meghdadi, Guido Tack, Ariel Liebman, Nicolas Langrene, Christoph Bergmeir</i>	
MIMO REINFORCEMENT LEARNING BASED APPROACH FOR FREQUENCY SUPPORT IN MICROGRIDS WITH HIGH RENEWABLE ENERGY PENETRATION.....	688
<i>Vjatseslav Skiparev, Juri Belikov, Eduard Petlenkov</i>	
DESIGN AND ANALYSIS OF MULTI-POLE MMC-HVDC	693
<i>Ankit Yadav, S. N. Singh, S. P. Das</i>	
ON THE DYNAMIC COUPLING OF THE AUTOCORRELATION OF STOCHASTIC PROCESSES AND THE STANDARD DEVIATION OF THE TRAJECTORIES OF POWER SYSTEM VARIABLES	698
<i>Muhammad Adeen, Federico Milano</i>	
TRANSIENT MODELING AND FAULT CURRENT CALCULATION OF HYBRID MMC WHEN RIDING THROUGH DC-SIDE POLE-TO-GROUND FAULT	703
<i>Zhen He, Pingliang Zeng, Jia Liu</i>	
LONG SHORT-TERM MEMORY BASED REFINED LOAD PREDICTION UTILIZING NON INTRUSIVE LOAD MONITORING	708
<i>Yanli Liu, Junyi Wang</i>	
PREVENTION OF MALFUNCTIONING OF DISTANCE RELAY DURING SYMMETRICAL AND ASYMMETRICAL POWER SWING.....	713
<i>J. Tejeswara Rao, Bhavesh R. Bhalja</i>	
RESEARCH ON RELIABILITY IMPROVEMENT STRATEGY OF DISTRIBUTION NETWORK WITH FLEXIBLE SUBSTATION	718
<i>Xianglong Zhang, Shunwei Hu, Fangze Zhou, Hui Zhou</i>	
POWER SYSTEM FREQUENCY DOMAIN CHARACTERISTICS FOR INERTIA ESTIMATION FROM AMBIENT PMU DATA.....	724
<i>Chetan Mishra, Kevin D. Jones, Luigi Vanfretti</i>	
MODELING AND CONTROL OF AN ISLANDED CAMPUS MICROGRID WITH COORDINATED CHP AND PV SYSTEMS	729
<i>Jimiao Zhang, Jie Li</i>	
DESIGN AND IMPLEMENTATION OF A LOW-COST PMU: VALIDATION BY TESTS AND PERFORMANCE DURING 2019 ARGENTINEAN BLACKOUT	734
<i>Pablo Leibovich, Fernando Issouribehere, Juan Barbero</i>	

A SEQUENTIAL MILP STRATEGY FOR ENERGY EFFICIENT MANAGEMENT OF UNBALANCE DISTRIBUTION NETWORK.....	739
<i>Subho Paul, Rashmi Prasad, Narayana Prasad Padhy</i>	
ANALYTICAL INVERTER-BASED DISTRIBUTED GENERATOR MODEL FOR POWER FLOW ANALYSIS.....	744
<i>Naeem Turner-Bandele, Amritanshu Pandey, Larry Pileggi</i>	
EVALUATION OF EFFICIENT FREQUENCY CONTROL STRATEGIES IN A WIND-HYDRO DOMINATED POWER SYSTEM.....	749
<i>Ahmed Sunjaq, Peiyuan Chen</i>	
EXTRAPOLATION-BASED REAL-TIME PHASOR DATA COMPRESSION CONSIDERING THE TWO-WAY ROTATION CHARACTERISTICS OF SYNCHROPHASORS.....	754
<i>Zixuan Zhang, Fang Zhang, Ying Yan, Xiaojun Wang, Jinghan He</i>	
EXPLICIT RUNGE-KUTTA METHODS WITH AN EXTENDED STABILITY REGION: ACCURACY ANALYSIS AND APPLICABILITY FOR DYNAMIC SIMULATION OF LARGE POWER SYSTEMS.....	759
<i>Mikhail Y. Borodulin</i>	
MEASURABLE BANDWIDTH OF PARTIAL DISCHARGES ON MEDIUM VOLTAGE CABLES.....	764
<i>Martin Fritsch, Martin Wolter</i>	
A DERIVATIVE-FREE OBSERVABILITY ANALYSIS METHOD OF STOCHASTIC POWER SYSTEMS.....	769
<i>Zongsheng Zheng, Yijun Xu, Lamine Mili, Zhigang Liu, Mert Korkali, Yuhong Wang</i>	
A PYTHON BASED EMT MODEL QUALITY TESTING TOOL.....	774
<i>Xiaoyu Wang, Shun Hsien Huang, John Schmall, Jose Conto</i>	
OPTIMIZATION-BASED FAST-FREQUENCY ESTIMATION AND CONTROL OF LOW-INERTIA MICROGRIDS.....	779
<i>Ujjwol Tamrakar, David A. Copp, Tu Nguyen, Timothy Hansen, Reinaldo Tonkoski</i>	
COMBINING STRATEGIES TO COMPUTE THE LOADABILITY MARGIN IN DYNAMIC SECURITY ASSESSMENT OF POWER SYSTEMS.....	780
<i>Murilo E. C. Bento, Daniela A. G. Ferreira, Ahda P. Grilo-Pavani, Rodrigo A. Ramos</i>	
OPTIMAL PLANNING OF ENERGY STORAGE IN WIND INTEGRATED SYSTEMS CONSIDERING FREQUENCY STABILITY.....	785
<i>Atri Bera, Babu Chalamala, Raymond H. Byrne, Joydeep Mitra</i>	
COST ANALYSIS OF ROBUST VOLT-VAR CONTROL DESIGNS.....	790
<i>Tiago Soares Vitor, Jose Carlos M. Vieira</i>	
ENABLING UTILITY-SCALE SOLAR PV PLANTS FOR ELECTROMECHANICAL OSCILLATION DAMPING.....	795
<i>Horacio Silva-Saravia, Hector Pulgar, Leon Tolbert, David Schoenwald, Wenyun Ju</i>	
PHYSICS-BASED FEATURE EXTRACTION FROM BULK TIME-SERIES PMU DATASETS FOR EVENT DETECTION.....	796
<i>Yuhua Du, Xiaonan Lu, Shengyi Wang, Liang Du, Yubo Wang, Bruno Leao, Sindhu Suresh</i>	
DATA-DRIVEN LOAD MODELING AND FORECASTING OF RESIDENTIAL APPLIANCES.....	801
<i>Yuting Ji, Elizabeth Buechler, Ram Rajagopal</i>	

IMPACTS OF UC FORMULATION TIGHTENING ON COMPUTATION OF CONVEX HULL PRICES	802
<i>Farhan Hyder, Bing Yan, Mikhail A. Bragin, Peter B. Luh</i>	
MULTI-OBJECTIVE NON-COOPERATIVE GAME OPTIMIZATION FOR MICROGRID CLUSTERS BASED ON NSGA-II COORDINATED INTERIOR-POINT METHOD	807
<i>Yingshu Liu, Guo Cheng, Jiebei Zhu</i>	
ADAPTIVE COORDINATION OF DAMPING CONTROLLERS FOR ENHANCED POWER SYSTEM STABILITY	812
<i>Horacio Silva-Saravia, Hector Pulgar, David Schoenwald, Wenyun Ju</i>	
SAFE REINFORCEMENT LEARNING FOR EMERGENCY LOAD SHEDDING OF POWER SYSTEMS	813
<i>Thanh Long Vu, Sayak Mukherjee, Tim Yin, Renke Huang, Jie Tan, Qiuhua Huang</i>	
A MODEL PREDICTIVE APPROACH FOR VOLTAGE SUPPORT IN MICROGRIDS USING ENERGY STORAGE SYSTEMS.....	818
<i>Niranjan Bhujel, Astha Rai, Timothy M. Hansen, Reinaldo Tonkoski, Ujjwol Tamrakar</i>	
AN ANALYTICAL PROCEDURE TO EVALUATE OPTIMAL RESTORATION PATH WITH MULTIPLE BLACKSTART UNITS INCLUDING INVERTER BASED RESOURCES	823
<i>Vikas Singhvi, Deepak Ramasubramanian, Sunitha Uppalapati, Wes Baker, Evangelos Farantatos</i>	
REPRESENTATION OF GRID FORMING VIRTUAL OSCILLATOR CONTROLLER DYNAMICS WITH WECC GENERIC MODELS	828
<i>Deepak Ramasubramanian, Evangelos Farantatos</i>	
PARALLEL HOSTING CAPACITY ANALYSIS FOR INTEGRATED TRANSMISSION AND DISTRIBUTION PLANNING.....	833
<i>Nan Duan, Can Huang, Chih-Che Sun, Vaibhav Dond</i>	
DEVELOPMENT OF A HYBRID SIMULATION FOR AN OCEAN WAVE ENERGY CONVERTER.....	838
<i>J. Harris, M. Boller, T. K. A. Brekken, M. Magaña, D. Gaebele</i>	
RESTORING CRITICAL LOADS IN RESILIENT DISTRIBUTION SYSTEMS USING A CURRICULUM LEARNED CONTROLLER.....	843
<i>Xiangyu Zhang, Abinet Tesfaye Eseye, Matthew Reynolds, Bernard Knueven, Wesley Jones</i>	
IMPACT OF COVID-19 ON MOBILITY AND ELECTRIC VEHICLE CHARGING LOAD	848
<i>Alejandro Palomino, Masood Parvania, Regan Zane</i>	
USING DISTRIBUTED DYNAMIC VOLTAGE RESTORERS TO IMPROVE THE FREQUENCY STABILITY OF LOW-INERTIA NETWORKED MICROGRIDS	853
<i>Wei Du, Jing Xie, Kevin Schneider, Francis K. Tuffner, Bishnu Bhattarai, Thanh Long Vu, Greg Wiegand, Orris L. Dent</i>	
A COMPARISON OF THE DYNAMIC PERFORMANCE OF CONVENTIONAL AND ADJUSTABLE-SPEED PUMPED STORAGE HYDRO.....	858
<i>Soumyadeep Nag, Kwang. Y. Lee</i>	
PRICING CONDITIONAL VALUE AT RISK-SENSITIVE ECONOMIC DISPATCH	863
<i>Mariola Ndrio, Avinash N. Madavan, Subhonmesh Bose</i>	

DETECTION OF SMALL CHANGES IN POWER SYSTEMS WITH HARDWARE-IN-LOOP TESTING	868
<i>Sanjay Hosur, Dongliang Duan</i>	
IMPROVING LINE PARAMETER ESTIMATION USING SINGLE-PHASE SMART METER DATA.....	873
<i>Vinicius C. Cunha, Walmir Freitas, Antonio Padilha-Feltrin, Surya Santoso</i>	
QUANTIFICATION OF PEAK DEMAND REDUCTION POTENTIAL IN COMMERCIAL BUILDINGS DUE TO HVAC SET POINT AND BRIGHTNESS ADJUSTMENT	878
<i>Muhammad Usama Usman, Ashraful Haque, Md Nazmul Kabir Sikder, Mengmeng Cai, Saifur Rahman Bradley, Shikhar Pandey, Chris Kliros, Liuxi Zhang</i>	
A COMPLEX NETWORK APPROACH TO POWER SYSTEM VULNERABILITY ANALYSIS BASED ON REBALANCE BASED FLOW CENTRALITY	884
<i>Alma Ademovic Tahirovic, David Angeli, Goran Strbac</i>	
DATA-DRIVEN RELIABILITY ASSESSMENT FOR MARINE RENEWABLE ENERGY ENABLED ISLAND POWER SYSTEMS	889
<i>Vishvas Chalisehazar, Saptarshi Bhattacharya, Sarmad Hanif, Dhruv Bhatnagar, Md Jan E Alam, Bryson Robertson, Danielle Prezioso, Rebecca O'Neil</i>	
DATA-DRIVEN ADAPTIVE DAMPING CONTROLLER FOR WIND POWER PLANTS WITH DOUBLY-FED INDUCTION GENERATORS	894
<i>Pranav Sharma, Marcos Netto, Venkat Krishnan, Venkataramana Ajarapu, Umesh Vaidya</i>	
A PLATFORM FOR DEPLOYING MULTI-AGENT DEEP REINFORCEMENT LEARNING IN MICROGRID DISTRIBUTED CONTROL	899
IMPLEMENTATION OF A PMU-BASED EMS SYSTEM AT TNB	904
<i>M. K. N. M. Sarmin, N. Saadun, M. T. Azmi, S. K. S. Abdullah, N. S. N. Yusuf, Marianna M. Vaiman, Michael Y. Vaiman, Mark Povolotskiy, Mikhail Karpoukhin</i>	
DYNAMIC SECURITY OPTIMIZATION FOR N-1 SECURE OPERATION OF POWER SYSTEMS WITH 100% NON-SYNCHRONOUS GENERATION: FIRST EXPERIENCES FROM HAWAII ISLAND	909
<i>Nan Xue, Xiaofan Wu, Suat Gumussoy, Ulrich Muenz, Amer Mesanovic, Zerui Dong, Guna Bharati, Sudipta Chakraborty, Hawaiian Electric</i>	
MPC-BASED MULTI-INVERTER POWER CONTROL IN LOW-INERTIA POWER SYSTEMS	914
<i>Atinuke Ademola-idowu, Baosen Zhang</i>	
AN ONLINE DEEP REINFORCEMENT LEARNING BASED PARAMETER IDENTIFICATION METHOD FOR HVDC SYSTEM.....	919
<i>Jianxiong Hu, Qi Wang, Yi Tang</i>	
ADAPTIVE LOAD SHEDDING FOR GRID EMERGENCY CONTROL VIA DEEP REINFORCEMENT LEARNING	924
<i>Ying Zhang, Meng Yue, Jianhui Wang</i>	
TARGETED FALSE DATA INJECTION ATTACK AGAINST DC STATE ESTIMATION WITHOUT LINE PARAMETERS	929
<i>Mingqiu Du, Georgia Pierrou, Xiaozhe Wang</i>	

ONLINE SCHEDULING OF A RESIDENTIAL MICROGRID VIA MONTE-CARLO TREE SEARCH AND A LEARNED MODEL	934
<i>Hang Shuai, Haibo He</i>	
MULTI-OBJECTIVE OPTIMIZATION MODEL FOR LOAD MANAGEMENT IN ISLANDED MICROGRIDS	935
<i>Jiayu Han, Lei Yan, Runnan Xu, Zuyi Li, Shikhar Pandey, Heng Chen</i>	
PERFORMANCE EVALUATION OF DISTRIBUTED ENERGY RESOURCE MANAGEMENT ALGORITHM IN LARGE DISTRIBUTION NETWORKS	940
<i>Jing Wang, Jianqiao Huang, Xinyang Zhou</i>	
AC POWER FLOW CONVERGENCE IN CAISO OUTAGE ANALYSIS WITH SHORT-TERM LOAD FORECAST	945
<i>Mengjia Xiao, Aftab Alam, Jiankang Wang</i>	
MARKET IMPLICATIONS OF SHORT-TERM RESERVE DELIVERABILITY ENHANCEMENT.....	950
<i>Fengyu Wang, Yonghong Chen</i>	
P2P2G COORDINATED ENERGY SHARING IN GRID-INTERACTIVE TRANSACTIVE SYSTEMS.....	951
<i>Md Habib Ullah, Jae-do Park</i>	
CONFIGURABLE MICROGRID MODELLING WITH MULTIPLE DISTRIBUTED ENERGY RESOURCES FOR DYNAMIC SYSTEM ANALYSIS	956
<i>Rachid Darbali-zamora, Felipe Wilches-bernal, Brian Naughton</i>	
DATA-DRIVEN ZIP LOAD PARAMETER TRACKING WITH VARIABLE ELIMINATION USING SYNCHROPHASOR DATA	961
<i>Syed M Hur Rizvi, Sajjan K. Sadanandan, Anurag K. Srivastava</i>	
ENERGY FUNCTION-BASED ANALYSIS OF PMSG-BASED WT WITH DC VOLTAGE SYNCHRONIZATION CONTROL	966
<i>Xiaotian Yuan, Zhengchun Du, Yujun Li, Guihong Wu, Xiaofang Wu, Shuai Gao</i>	
PHASOR ESTIMATION AND DISTURBANCE DETECTION IN POWER SYSTEMS BY RAMANUJAN SUM	971
<i>Bandi Ravi Kumar, Abheejeet Mohapatra, Saikat Chakrabarti</i>	
A COOPERATIVE GAME THEORY-BASED APPROACH TO UNDER-FREQUENCY LOAD SHEDDING CONTROL.....	976
<i>Mukesh Gautam, Narayan Bhusal, Mohammed Benidris</i>	
ONLINE TUNING OF DYNAMIC EQUIVALENTS FOR LARGE-SCALE POWER SYSTEMS USING WIDE-AREA MEASUREMENTS.....	981
<i>Zhihao Jiang, Ning Tong, Lin Zhu, Yilu Liu</i>	
DETECTION OF FALSE DATA INJECTION ATTACK IN AUTOMATIC GENERATION CONTROL SYSTEM WITH ELECTRIC VEHICLES BASED ON FUZZY LONG SHORT-TERM MEMORY	986
<i>Ziyu Chen, Jizhong Zhu, Hanjiang Dong, Wanli Wu, Haohao Zhu, Chenke He</i>	
ROLLING-WINDOW MULTI-STAGE STOCHASTIC PROGRAMMING FOR A VIRTUAL POWER PLANT IN THE REAL-TIME MARKET	991
<i>Zhe Luo, Ye Guo, Hongbin Sun</i>	

IMPACT OF CONTROLLER CLOCK ERROR ON EMISSION IN SUPRAHARMONIC CAUSED BY CONVERTERS	996
<i>Qing Zhong, Ming Liang, Fuqiang Chen, Yangxin Qiu, Qingtian Luo, Chengzhong Lai</i>	
REACTIVE POWER SHARING UTILIZING LOW BANDWIDTH COMMUNICATION THROUGH POWER LINES	1000
<i>Mahmoud Alsadat, Federico Martin Ibanez</i>	
FREQUENCY COUPLINGS AND RESPONSE CHARACTERISTICS OF GRID-TIED VSC SYSTEM	1005
<i>Ruiqing Fu, Longyuan Li, Xiaoru Wang, Xiaoqin Lv</i>	
OPTIMAL INVESTMENT IN MICROGRIDS TO MITIGATE POWER OUTAGES FROM PUBLIC SAFETY POWER SHUTOFFS	1010
<i>Ryan Hanna</i>	
COMMUNICATION-FREE BASED DECOUPLED DC-VOLTAGE AND FREQUENCY CONTROL IN THE MULTI-TERMINAL HVDC (MTDC) GRIDS	1015
<i>Ancha Satish Kumar, Bibhu Prasad Padhy</i>	
MITIGATION OF GPS SPOOFING ATTACKS ON PMUS VIA MULTI-PERIOD SPARSE ERROR CORRECTION	1020
<i>Shashini De Silva, Jinsub Kim, Eduardo Cotilla-sanchez, Travis Hagan</i>	
EMERGENCY CONTROL FOR FAST FREQUENCY RESPONSE OF SYSTEM CONNECTED TO MULTIPLE VSC-HVDC BASED ON WIDE-AREA MEASUREMENT SYSTEM	1025
<i>Yuzhao Zhu, Yu Zhang, Xiaoru Wang</i>	
SMALL-SIGNAL MODELING AND STABILITY ANALYSIS OF PARALLELED GRID-FEEDING VOLTAGE SOURCE INVERTERS	1030
<i>Jack S. Bryant, Brendan McGrath, Lasantha Meegahapola, Peter Sokolowski</i>	
PEER-TO-PEER POWER TRADING WITH VOLTAGE AND CONGESTION MANAGEMENT FOR DISTRIBUTION GRIDS	1035
<i>L. P. M. I. Sampath, Amrit Paudel, Eddy Y. S. Foo, Hung D. Nguyen, H. B. Gooi</i>	
ASSESSMENT OF FRR REQUIREMENT UNDER HIGH PENETRATION OF WIND GENERATION	1040
<i>J. A. Chen, G. W. Chang, T. S. Yu, H. J. Lu, S. W. Liu, H. T. Chen</i>	
DEVELOPMENT OF A BASE MODEL IN RMS AND EMT ENVIRONMENT TO STUDY LOW INERTIA SYSTEM	1045
<i>Angel Clark, Pinaki Mitra, Nicklas Johansson, Mehrdad Ghandhari</i>	
A FEASIBLE REGION ANALYSIS METHOD FOR CONTINUOUS COMMUTATION FAILURE IN HVDC	1050
<i>Yuan Zeng, Yang Li, Yan Li, Wei Wei, Waiying Guo, Hongmei Wang</i>	
AN IMPROVED CURRENT DIFFERENTIAL PROTECTION SCHEME ON NON-HOMOGENEOUS TRANSMISSION LINES CONSIDERING FULLY DISTRIBUTED PARAMETER MODEL AND LINE ASYMMETRY	1055
<i>Binglin Wang, Yu Liu, Davou Lu, Ruiyu Pan, Junbo Zhao</i>	
VDCOL COORDINATED CONTROL STRATEGY FOR SUCCESSIVE COMMUTATION FAILURE MITIGATION IN MULTI-INFEED HVDC SYSTEMS	1060
<i>Chenyi Zheng, Yi Tang, Qi Wang</i>	

A METHOD TO ENHANCE THE ACCURACY OF DISTANCE PROTECTION MODELING IN TRANSIENT STABILITY SIMULATIONS	1065
<i>Jonas Pesente, Rodrigo A. Ramos, Ahda Grilo-pavani, Werbeston D. De Oliveira</i>	
ONLINE ESTIMATION OF SYSTEM INERTIA IN A POWER NETWORK UTILIZING SYNCHROPHASOR MEASUREMENTS.....	1070
<i>Rakesh Kumar Panda, Abheejeet Mohapatra, S.c. Srivastava</i>	
A SCENARIO-ORIENTED APPROACH FOR ENERGY-RESERVE JOINT PROCUREMENT AND PRICING	1071
<i>Jiantao Shi, Ye Guo, Lang Tong, Wenchuan Wu, Hongbin Sun</i>	
DECENTRALIZED VOLTAGE CONTROL OF LARGE-SCALE DISTRIBUTION SYSTEM WITH PVS BASED ON MADRL	1076
<i>Di Cao, Junbo Zhao, Weihao Hu, Fei Ding, Guozhou Zhang, Qi Huang, Zhe Chen</i>	
SHORT-TERM SOLAR POWER FORECASTING VIA A HYBRID MODEL COMBINED WITH PSR AND SD.....	1081
<i>Mingrui Li, Jiebei Zhu, Chaoxu Mu, Jun Zhao</i>	
ROBUST FREQUENCY CONTROL FOR RENEWABLE ENERGY POWERED EDGE COMPUTING SYSTEM.....	1086
<i>Hongxin Li, Huaying Zhang, Qing Wang, Yihong You, Haochen Hua, Yutong Li, Junwei Cao</i>	
METHODOLOGY TO DETERMINE GROUND POTENTIAL RISE IN MULTI-GROUNDED NEUTRAL DISTRIBUTION SYSTEM WITH DISTRIBUTED GENERATION	1091
<i>Sangwon Yun, Jaesung Jung</i>	
MATHEMATICAL MECHANISM OF TOTAL SUPPLY CAPABILITY CURVE FOR DISTRIBUTION NETWORKS	1096
<i>Jun Xiao, Ziyu Liang, Buxin She</i>	
ANALYSIS OF THE NEGATIVE SEQUENCE VOLTAGE TO DETECT CONDUCTOR BREAK IN DISTRIBUTION SYSTEMS.....	1101
<i>Jadiel C. Da Silva, Gabriela N. Lopes, Luiz H. P. C. Trondoli, Jose Carlos M. Vieira</i>	
DEMAND RESPONSE COOPERATIVE AND DEMAND CHARGE.....	1106
<i>Ayman Elkasrawy, Bala Venkatesh</i>	
THE FLEXIBILITY TEST SYSTEM FOR STUDIES OF VARIABLE RENEWABLE ENERGY RESOURCES.....	1107
<i>Hao Li, Zongxiang Lu, Ying Qiao, Baosen Zhang, Yisha Lin</i>	
ROBUST OPTIMIZATION METHODOLOGY FOR GENERATION SIZING OF A MICROGRID	1108
<i>Shikhar Pandey, Jiayu Han, Heng Chen, Paul M. Pabst, Niroj Gurung, Zuyi Li, Liuxi Zhang, Amin Khodaei</i>	
A NOVEL METHOD FOR DESPIKING SPECTRA FROM SYNCHROPHASOR MEASUREMENTS	1113
<i>Marcelo De Castro, Chetan Mishra, Luigi Vanfretti, Kevin D. Jones</i>	
CONCURRENT OPTIMAL RE/ACTIVE POWER CONTROL FOR WIND FARMS UNDER LOW-VOLTAGE-RIDE-THROUGH OPERATION	1118
<i>Xue Lyu, Youwei Jia</i>	

USING BRANCH CURRENT MEASUREMENTS FOR PARAMETER IDENTIFICATION IN EXTENDED KALMAN FILTER BASED DISTRIBUTION SYSTEM STATE ESTIMATION	1119
<i>Dragan Cetenovic, Aleksandar Rankovic, Junbo Zhao, Vladimir Terzija, Can Huang</i>	
A NOVEL RETROSPECT-INSPIRED REGIME FOR MICROGRID REAL-TIME ENERGY SCHEDULING WITH HETEROGENEOUS SOURCES	1124
<i>Youwei Jia, Xue Lyu, Peng Xie, Zhao Xu, Minghua Chen</i>	
AUTOMATED DESIGN OF REALISTIC CONTINGENCIES FOR BIG DATA GENERATION	1125
<i>Tetiana Bogodorova, Denis Osipov, Luigi Vanfretti</i>	
PRIVACY PRESERVING IN NON-INTRUSIVE LOAD MONITORING: A DIFFERENTIAL PRIVACY PERSPECTIVE.....	1126
<i>Haoxiang Wang, Jiasheng Zhang, Chenbei Lu, Chenye Wu</i>	
PMU MISSING DATA RECOVERY USING TENSOR DECOMPOSITION.....	1127
<i>Denis Osipov, Joe Chow</i>	
LSTM-BASED APPROACH TO DETECT CYBER ATTACKS ON MARKET-BASED CONGESTION MANAGEMENT METHODS.....	1128
<i>Omniyah Gul M Khan, Amr Youssef, Ehab El-saadany, Magdy Salama</i>	
A DATA-DRIVEN PIVOT-POINT-BASED TIME-SERIES FEEDER LOAD DISAGGREGATION METHOD.....	1133
<i>Jiyu Wang, Xiangqi Zhu, Ming Liang, Yao Meng, Andrew Kling, David Lubkeman, Ning Lu</i>	
A SYNCHROPHASOR MEASUREMENT BASED APPROACH FOR DYNAMIC AVAILABLE TRANSFER CAPABILITY EVALUATION	1134
<i>Saurabh Keshewani, Abheejeet Mohapatra, S.c. Srivastava</i>	
RADIALITY CONSTRAINTS FOR RESILIENT RECONFIGURATION OF DISTRIBUTION SYSTEMS: FORMULATION AND APPLICATION TO MICROGRID FORMATION.....	1139
<i>Shunbo Lei, Chen Chen, Yue Song, Yunhe Hou</i>	
SYNTHETIC TIME-SERIES LOAD DATA VIA CONDITIONAL GENERATIVE ADVERSARIAL NETWORKS.....	1140
<i>Andrea Pinceti, Lalitha Sankar, Oliver Kosut</i>	
DISCRETE EMPIRICAL INTERPOLATION METHOD BASED DYNAMIC LOAD MODEL REDUCTION.....	1145
<i>Nan Duan, Junbo Zhao, Xiao Chen, Bin Wang, Song Wang</i>	
A WLAV-BASED ROBUST HYBRID STATE ESTIMATION USING CIRCUIT-THEORETIC APPROACH.....	1150
<i>Shimiao Li, Amritanshu Pandey, Larry Pileggi</i>	
COMPONENT-LEVEL RELIABILITY EVALUATION MODEL FOR CYBER POWER DEVICES	1155
<i>Thanatheepan Balachandran, Arunkarthick Manoharan, Visvakumar Aravinthan, Chanan Singh</i>	
DECENTRALIZED HIGH - RELIABILITY ENERGY MANAGEMENT REGIME FOR SMART BUILDING.....	1156
<i>Peng Xie, Youwei Jia, Hongkun Chen, Jun Wu, Han Wang, Mengge Shi</i>	

GLOBAL POWER FLOW FOR MICROGRIDS	1161
<i>Paulo T. De Godoy, Adriano B. De Almeida, Antonio Carlos Zambroni De Souza, Bala Venkatesh</i>	
DERIVING IEEE STD 1547™ SETTINGS THAT BENEFIT TRANSMISSION SYSTEM DYNAMIC BEHAVIOR	1166
<i>Deepak Ramasubramanian, Maryclaire Peterson, Jayanth Ramamurthy, Venkat Kolluri, Jens C. Boemer</i>	
INTEGRATION OF STORAGE IN THE DC LINK OF A FULL CONVERTER-BASED DISTRIBUTED WIND TURBINE.....	1171
<i>Ram Poudel, Venkat Krishnan, James Reilly, Przemyslaw Koralewicz, Ian Baring-gould</i>	
MEASURING SYSTEMIC RISK OF SWITCHING ATTACKS BASED ON CYBERSECURITY TECHNOLOGIES IN SUBSTATIONS.....	1176
<i>Koji Yamashita, Chee-wooi Ten, Yeonwoo Rho, Lingfeng Wang, Wei Wei, Andrew Ginter</i>	
IMPLEMENTATION AND BENCHMARKING OF A NEW GENERATOR DYNAMIC MODEL FOR POWER SYSTEM STABILITY ANALYSIS	1177
<i>Mohamed Elkhatib, Xiaokang Xu, Song Wang, Quincy Y. Wang</i>	
OVEREXCITATION AND VOLTS/HERTZ LIMITER STRUCTURES FOR OPERATION UNDER UNBALANCED LOAD CONDITIONS.....	1182
<i>Matheus B. Do Carmo, Artur B. Piardi, A. P. Grilo-pavani, Romeu Reginatto, Rodrigo A. Ramos</i>	
UTILITY-DRIVEN DISPATCHABLE & NON-DISPATCHABLE DERS' SIZING ALGORITHMS IN DISTRIBUTION NETWORKS.....	1187
<i>Farzam Nejabatkhah, Francis Therrien, Patrick Jacques, Guillaume Hebert</i>	
IMPLICIT - INTEGRATION DYNAMICS SIMULATION WITH THE GRIDPACK FRAMEWORK.....	1192
<i>Shrirang Abhyankar, Renke Huang, Shuangshuang Jin, Bruce Palmer, William Perkins, Yousu Chen</i>	
A DISTRIBUTIONALLY ROBUST OPTIMIZATION APPROACH TO UNIT COMMITMENT IN MICROGRIDS.....	1197
<i>Ogun Yurdakul, Fikret Sivrikaya, Sahin Albayrak</i>	
REAL-TIME MARKET-TO-MARKET OSCILLATION MANAGEMENT	1202
<i>Yafei Yang, Fengyu Wang, Yonghong Chen, Lei Wu</i>	
FALSE RELAY OPERATION ATTACKS IN POWER SYSTEMS WITH HIGH RENEWABLES	1207
<i>Mohamadsaleh Jafari, Md Hassan Shahriar, Mohammad Ashiqur Rahman, Sumit Paudyal</i>	
A REVIEW OF NETWORK MODELING AND SERVICES INTEGRATION IN PEER-TO-PEER ELECTRICITY MARKETS.....	1212
<i>Irena Dukovska, Han Slootweg, Nikolaos G. Paterakis</i>	
OPTIMIZING POWER SYSTEM STABILITY MARGINS AFTER WIDE-AREA EMERGENCIES	1217
<i>Matthew J. Hoffman, April M. Nelson, Bryan Arguello, Brian J. Pierre, Ross T. Guttromson</i>	
A NEW DISTRIBUTED MODEL-FREE CONTROL STRATEGY TO DIMINISH DISTRIBUTION SYSTEM VOLTAGE VIOLATIONS.....	1222
<i>Kenan Hatipoglu, Mohammed Olama</i>	

EXACT QUANTIFICATION OF SYSTEM RELIABILITY INDEXES IN PROBABILISTIC CONTINGENCY ANALYSIS.....	1227
<i>Guilherme Larangeira, Amirthagunaraj Yogarathnam, Meng Yue, Feng Dong</i>	
DISTRIBUTION SYSTEM VOLTAGE PREDICTION FROM SMART INVERTERS USING DECENTRALIZED REGRESSION.....	1232
<i>Zachary R. Atkins, Christopher J. Vogl, Achintya Madduri, Nan Duan, Agnieszka K. Miedlar, Daniel Merl</i>	
IMPACTS OF EQUIVALENT DYNAMIC GRID IMPEDANCE ON INVERTER BASED RESOURCES PLANT	1237
<i>Himadry Shekhar Das, Shuhui Li, Bing Lu</i>	
POTENTIAL OF SOLID-STATE TRANSFORMERS TO IMPROVE GRID RESILIENCE.....	1242
<i>David A. Schoenwald, Brian J. Pierre, Karina Munoz-ramos</i>	
ASSESSMENT OF IMPACT OF AC CIRCUIT ATTRIBUTES TO OUTAGE FREQUENCY IN THE WECC SYSTEM.....	1247
<i>Svetlana Ekisheva, Milorad Papic, Mark Lauby, Matthew Elkins</i>	
ENHANCEMENT OF OPERATIONAL RESILIENCE WITH THE ONLINE WEATHER LOOK-AHEAD STUDY.....	1248
<i>Mingguo Hong, Xiaochuan Luo, Slava Maslennikov, Late Eugene Litvinov</i>	
DISTRIBUTED OPTIMIZATION FOR POWER DISTRIBUTION SYSTEMS WITH CYBER-PHYSICAL CO-SIMULATION.....	1253
<i>Rabayet Sadnan, Nathan Gray, Anamika Dubey, Anjan Bose</i>	
ASSESSING INSULATORS VULNERABILITY TO POLLUTION-INDUCED FLASHOVER FOR POWER SYSTEM RESILIENCE STUDIES.....	1258
<i>E. Ciapessoni, D. Cirio, A. Pitto, G. Pirovano</i>	
IMPACT OF DISTRIBUTED INVERTER-BASED RESOURCES ON INCREMENTAL QUANTITIES-BASED PROTECTION	1263
<i>Husam S. Samkari, Brian K. Johnson</i>	
ON THE FAIRNESS OF PV CURTAILMENT SCHEMES IN RESIDENTIAL DISTRIBUTION NETWORKS.....	1268
<i>Michael Liu, Andreas Procopiou, Kyriacos Petrou, Luis Ochoa, Tom Langstaff, Justin Harding, John Theunissen</i>	
A LOAD SWITCHING GROUP BASED FEEDER-LEVEL MICROGRID ENERGY MANAGEMENT ALGORITHM FOR SERVICE RESTORATION IN POWER DISTRIBUTION SYSTEM.....	1269
<i>Rongxing Hu, Yiyang Li, Si Zhang, Ashwin Shirsat, Valliappan Muthukaruppan, Wenyuan Tang, Mesut Baran, David Lubkeman, Ning Lu</i>	
AGGREGATING LEARNING AGENTS FOR MICROGRID ENERGY SCHEDULING DURING EXTREME WEATHER EVENTS	1274
<i>Avijit Das, Zhen Ni, Xiangnan Zhong</i>	
UNSUPERVISED HYBRID DEEP GENERATIVE MODELS FOR PHOTOVOLTAIC SYNTHETIC DATA GENERATION	1279
<i>Dan A. Rosa De Jesús, Paras Mandal, Tomonobu Senjyu, Sukumar Kamalasan</i>	

A JOINT SEQUENTIAL STATE ESTIMATION ALGORITHM FOR VSC-MTDC SYSTEMS USING VIRTUAL CONNECTIONS	1284
<i>Wei Feng, Qingxin Shi, Fangxing Li, Renchang Dai, Guangyi Liu, Can Huang, Nan Duan, Tao Ding</i>	
REDUCING PROBABILITY OF TRANSFORMER FAILURE BY MANAGING EV CHARGING IN RESIDENTIAL PARKING LOTS	1289
<i>Milad Soleimani, Mohammad Khoshjahan, Mladen Kezunovic</i>	
A FASTER ESTIMATION METHOD FOR ELECTROMECHANICAL OSCILLATION FREQUENCIES	1294
<i>Yongli Zhu, Chengxi Liu, Liangzhong Yao</i>	
A DISTRIBUTED INTELLIGENT PHASE-SWAPPING CONTROL METHOD FOR THE INTEGRATION OF IMBALANCED THREE-PHASE PLUG-IN ELECTRIC VEHICLES.....	1295
<i>Lu Yu, Shouxiang Wang, Tieliang Li</i>	
MODELING THE STRATEGIC BEHAVIOR OF AN ACTIVE DISTRIBUTION NETWORK IN THE ISO MARKETS.....	1300
<i>Abhijith Ravi, Linquan Bai, Valentina Cecch, Yaosuo Xue, Fei Ding</i>	
AN INTELLIGENT QUESTION ANSWERING SYSTEM BASED ON POWER KNOWLEDGE GRAPH	1305
<i>Yachen Tang, Haiyun Han, Xianmao Yu, Jing Zhao, Guangyi Liu, Longfei Wei</i>	
GUST RECTIFICATION AND STACKING BASED METHODOLOGY FOR POWER OUTAGE PREDICTION UNDER HURRICANES	1310
<i>Shiwen Yu, Lina He</i>	
SIGNAL SELECTION FOR OSCILLATION MONITORING WITH GUARANTEES ON DATA RECOVERY UNDER CORRUPTION	1315
<i>Kaustav Chatterjee, Nilanjan Ray Chaudhuri, George Stefopoulos</i>	
IMPROVED ADMITTANCE MATRIX ESTIMATION ON POWER NETWORKS BASED ON HYBRID MEASUREMENTS	1316
<i>Yixiong Jia, Yu Liu, Dayou Lu, Zhibo Cao</i>	
TRANSIENT SIMULATION OF GRID-FEEDING CONVERTER SYSTEM FOR STABILITY STUDIES USING FREQUENCY RESPONSE OPTIMIZED INTEGRATORS.....	1321
<i>Sheng Lei, Alexander Flueck</i>	
A NOVEL STRUCTURAL SIMILARITY BASED PILOT PROTECTION FOR RENEWABLE POWER TRANSMISSION LINE.....	1326
<i>Liming Zheng, Ke Jia, Tianshu Bi</i>	
FAULT TRANSIENT ANALYSIS OF MULTI-IIG POWER SYSTEM AT SYSTEM LEVEL.....	1327
<i>Bin Yang, Ke Jia, Tianshu Bi</i>	
DYNAMIC STATE ESTIMATION OF POWER SYSTEM BASED ON A ROBUST H- INFINITY CUBATURE KALMAN FILTER	1332
<i>Maolin Zhu, Hao Liu, Tianshu Bi</i>	
A DATA-DRIVEN SHUNT DISPATCH APPROACH TO ENHANCE POWER SYSTEM RESILIENCE AGAINST WINDSTORMS	1337
<i>Md Kamruzzaman, Michael Abdelmalak, Salem Elsaiah, Mohammed Benidris</i>	

IMPACT OF GRID STRENGTH ON SUB-CYCLE DYNAMICS IN SOLAR PV SYSTEMS	1342
<i>Almir Ekic, Blane Walberg, Manisha Maharjan, Bennett Strombeck, Guomin Ji, Di Wu</i>	
SIZING AND SCHEDULING OF THE BESS AS AN NWA SOLUTION TO THE DISTRIBUTION SYSTEM	1347
<i>Yajun Wang, Ren Liu, Xiawen Li, Augustus Johnson</i>	
ON THE ADAPTIVE SECONDARY CONTROL OF ENERGY STORAGE INVERTER FOR STABLE AND RESILIENT MICROGRID	1352
<i>Tan Zhang</i>	
OPTIMAL OPERATION OF ISLANDED AC/DC HYBRID MICROGRIDS.....	1357
<i>Arif Ahmed, Evangelos Pompodakis, Tobias Massier</i>	
A SOCP RELAXATION FOR CYCLE CONSTRAINTS IN THE OPTIMAL POWER FLOW PROBLEM	1362
<i>Arash Farokhi Soofi, Saeed D. Manshadi, Guangyi Liu, Renchang Dai</i>	
A MORE REALISTIC AC-QSS CASCADING FAILURE MODEL WITH DECENTRALIZED UVLS AND CENTRALIZED RAS	1363
<i>Sina Gharebaghi, Sai Gopal Vennelaganti, Nilanjan Ray Chaudhuri, Ting He, Thomas La Porta</i>	
TWO-STAGE MINIMAX REGRET-BASED SELF-SCHEDULING STRATEGY FOR VIRTUAL POWER PLANTS.....	1368
<i>Han Wang, Youwei Jia, Chun Sing Lai, Peng Xie, Mengge Shi</i>	
TRAJECTORY SENSITIVITY ANALYSIS OF COMPOSITE LOAD MODEL WITH AGGREGATED DISTRIBUTED ENERGY RESOURCE.....	1373
<i>Shahrokh Akhlaghi, Scott Jordan</i>	
DETERMINING LIGHTNING-CRITICAL LOCATIONS ALONG TRANSMISSION LINES USING LIDAR DATA - A BC HYDRO APPROACH.....	1378
<i>Zemeng Wang, Jahangir Khan, Mažana Armstrong</i>	
MARGINAL LOSS MODELING BASED DCOPF AND LMP CALCULATIONS FOR AN INTEGRATED AC AND MULTI-TERMINAL HVDC SYSTEM	1383
<i>Shri Ram Vaishya, Abhijit Abhyankar, Vaskar Sarkar</i>	
A CASE STUDY ON SELF HEALING OF SMART GRID WITH ISLANDING AND INVERTER VOLT-VAR FUNCTION.....	1384
<i>Sreena Sreekumar, Deepa S. Kumar, Savier J.s</i>	
ANOMALY IDENTIFICATION FOR ACTIVE DISTRIBUTION NETWORKS USING RANDOM MATRIX THEORY	1385
<i>Bihuan Li, Zhiyi Li, Ping Ju</i>	
QUASI-STATIC TIME SERIES FATIGUE SIMULATION FOR PV INVERTER SEMICONDUCTORS WITH LONG-TERM SOLAR PROFILE.....	1390
<i>Yunting Liu, Leon M. Tolbert, Paychuda Kritprajun, Qihuan Dong, Lin Zhu, Joshua C. Hambrick, Kevin Schneider, Kumaraguru Prabakar</i>	
A COMPENSATED DISTRIBUTED-PARAMETER LINE DECOUPLING APPROACH FOR REAL TIME APPLICATIONS.....	1395
<i>Abdelrahman Karrar, Babikir Ahmed, Amira Abdelgadir, Noman Saied</i>	

A DATA-DRIVEN MULTI-PERIOD IMPORTANCE SAMPLING STRATEGY FOR STOCHASTIC ECONOMIC DISPATCH.....	1396
<i>Kinshuk Panda, Ignas Satkauskas, Jonathan Maack, Devon Sigler, Matthew Reynolds, Wesley Jones</i>	
BUS BATTERY EQUALIZATION WITH NONLINEAR ENERGY EFFICIENCY AND TIME EFFICIENCY	1401
<i>Jiquan Zhao, Rui Ling, Shu Liu, Dongxue Li</i>	
THE IMPACT OF CONTROL MODES ON THE EXTERNAL CONTROL LOOP INTERACTIONS IN VSC-HVDC SYSTEMS.....	1406
<i>Fatemeh Ahmadloo, Sahar Pirooz Azad</i>	
DYNAMIC BOUNDARY COMMUNITY MICROGRIDS PLANNED FOR LONG-TERM EXPANSION	1411
<i>Shikhar Pandey, Alba Valbuena Guerra, Hamed Shakouri, Emily Chang, Farnoosh Rahmatian</i>	
SERVICE-BASED, SEGMENTED, 5G NETWORK-BASED ARCHITECTURE FOR SECURING DISTRIBUTED ENERGY RESOURCES	1416
<i>Daniel Bennett, Adarsh Hasandka, Md Touhiduzzaman, Evan Vaughan</i>	
DISTRIBUTED SMALL-SIGNAL STABILITY CONDITIONS FOR INVERTER-BASED UNBALANCED MICROGRIDS.....	1421
<i>Sai Pushpak Nandanoori, Soumya Kundu, Wei Du, Frank Tuffner, Kevin Schneider</i>	
REAL-TIME PROCESSING AND QUALITY IMPROVEMENT OF SYNCHROPHASOR DATA.....	1422
<i>Reza Pourramezan, Houshang Karimi, Jean Mahseredjian, Mario Paolone</i>	
DATA-DRIVEN INCIDENT DETECTION IN POWER DISTRIBUTION SYSTEMS.....	1423
<i>Nayara Aguiar, Vijay Gupta, Rodrigo D. Trevizan, Babu R. Chalamala, Raymond H. Byrne</i>	
A METHOD TO PREVENT DIFFERENTIAL PROTECTION FOR CONVERTER TRANSFORMER FROM INAPPROPRIATE-BLOCKING UNDER FAULT-INDUCED INRUSH CURRENT.....	1428
<i>Tao Zheng, Xiaoxiao Liu, Xinhui Yang, Rui He</i>	
INSTANTANEOUS RIPPLE ENERGY BALANCING CONTROL TO REDUCE INPUT RIPPLE CURRENT IN GRID CONNECTED BESS	1433
<i>Amir Hussain, Wajiha Shireen</i>	
EV HOSTING CAPACITY ANALYSIS ON DISTRIBUTION GRIDS	1438
<i>Priti Paudyal, Shibani Ghosh, Santosh Veda, Deepak Tiwari, Jal Desai</i>	
WAVE ENERGY CONVERTER ENERGY STORAGE SYSTEM SIZING FOR FLICKER CONSIDERATIONS	1443
<i>Ali S. Haider, Leila Ghorban Zadeh, Ted K.a. Brekken</i>	
STATISTICAL CHARACTERIZATION OF RANDOM ERRORS PRESENT IN SYNCHROPHASOR MEASUREMENTS.....	1448
<i>Demetra Salls, Jairo Ramirez Torres, Antos Cheeramban Varghese, John Patterson, Anamitra Pal</i>	
MODELING AND QUANTIFYING THE IMPACT OF WIND PENETRATION ON SLOW COHERENCY OF POWER SYSTEMS.....	1453
<i>Sayak Mukherjee, Aranya Chakraborty, Saman Babaei</i>	

MAXIMUM MARGINAL LIKELIHOOD ESTIMATION OF PHASE CONNECTIONS IN POWER DISTRIBUTION SYSTEMS	1454
<i>Wenyu Wang, Nanpeng Yu</i>	
A SYNCHRONIZED LISSAJOUS-BASED APPROACH TO ACHIEVE SITUATIONAL AWARENESS USING SYNCHRONIZED WAVEFORM MEASUREMENTS	1455
<i>Milad Izadi, Hamed Mohsenian-rad</i>	
REINFORCEMENT LEARNING-ENABLED SEAMLESS MICROGRIDS INTERCONNECTION	1460
<i>Yan Li, Zihao Xu, Kenneth B Bowes, Lingyu Ren</i>	
RESILIENCE ANALYSIS OF CYBER-PHYSICAL NETWORKED MICROGRIDS WITH COMMUNICATION LATENCY	1465
<i>Yan Li, Daning Huang, Yichen Zhang, Taofeek Orekan</i>	
A MODIFIED PUTT SCHEME FOR TRANSMISSION LINES CONNECTING DFIG-BASED WIND FARM.....	1470
<i>Xiaoyou Zhang, Sahar Pirooz Azad</i>	
STEALTHY CYBERATTACKS ON LOADS AND DISTRIBUTED GENERATION AIMED AT MULTI TRANSMISSION LINE CONGESTIONS IN SMART GRIDS.....	1475
<i>Javad Khazaei</i>	
OPTIMAL MULTI-CHANNEL OUTPUT FEEDBACK CONTROL TO DAMP POWER SYSTEM OSCILLATION	1476
<i>Roghieh Abdollahi, Pierluigi Pisu, David Schoenwald</i>	
OPTIMAL FLOW OF MVDC SHIPBOARD POWER SYSTEMS USING SECOND-ORDER CONE PROGRAMMING RELAXATION	1481
<i>Javad Khazaei</i>	
LCL FILTER DESIGN FOR SINGLE-PHASE GRID-CONNECTED PV INVERTERS WITH DOUBLE-FREQUENCY UNIPOLAR PWM SWITCHING.....	1486
<i>Sobhan Mohamadian, Mohammad Pazoki, Reza Jalilzadeh Hamidi</i>	
EQUIVALENT TIME-DOMAIN WATER-TO-WIRE MODEL OF A GENERIC TIDAL CURRENT TURBINE	1491
<i>Jahangir Khan</i>	
EVALUATION OF SIMULATION METHODS FOR ANALYSIS OF GEOMAGNETIC DISTURBANCE SYSTEM IMPACTS	1496
<i>Aboutaleb Haddadi, Reza Hassani, Jean Mahseredjian, Luc Gerin-lajoie, Afshin Rezaei-zare</i>	
HYBRID MAXIMUM POWER POINT TRACKING METHOD BASED ON ITERATIVE LEARNING CONTROL AND PERTURB & OBSERVE METHOD	1497
<i>Xibeng Zhang, Don Gamage, Benfei Wang, Abhisek Ukil</i>	
A SIMPLIFIED SOLID-STATE TRANSFORMER MODEL FOR TEACHING BASIC CONCEPTS AND IDEAS	1498
<i>Coleman W. Smith</i>	
ON THE SYNCHRONIZATION STABILITY OF CONVERTERS CONNECTED TO WEAK RESISTIVE GRIDS	1503
<i>Junru Chen, Muyang Liu, Terence O'donnell, Federico Milano</i>	

ON PEAK SHAVING AND LOAD SHIFTING IN DISTRIBUTION SYSTEMS: COST SAVING VS PEAK LOAD REDUCTION	1508
<i>Yifei Guo, Zhaoyu Wang</i>	
FEASIBLE POINT PURSUIT BASED SEQUENTIAL CONVEX APPROXIMATION OF OPTIMAL POWER FLOW	1513
<i>Anamika Tiwari, A. Mohapatra, S. R. Sahoo</i>	
CONTINUOUS-TIME COMMODITY MODEL OF ELECTRICITY WITH GENERATION CAPACITY CONSTRAINS	1518
<i>Haoyong Chen, Lijia Han, Yue Li, Aixing Tang</i>	
AGGREGATED GENERIC LOAD CURVE FOR RESIDENTIAL ELECTRIC WATER HEATERS	1523
<i>Huangjie Gong, Oluwaseun M. Akeyo, Tim Rooney, Brian Branecky, Dan M. Ionel</i>	
ADAPTIVE MODULAR MULTILEVEL CONVERTER MODEL FOR ELECTROMAGNETIC TRANSIENT SIMULATIONS	1528
<i>Anton Stepanov, Jean Mahseredjian, Ulas Karaagac, Hani Saad</i>	
3-D FDTD ANALYSIS OF LIGHTNING-INDUCED VOLTAGES IN DISTRIBUTION LINES DUE TO INCLINED LIGHTNING	1529
<i>Masashi Natsui, Akihiro Ametani, Jean Mahseredjian, Shozo Sekioka, Kazuo Yamamoto</i>	
AN EFFICIENT COMPUTATIONAL STRATEGY FOR CYBER-PHYSICAL CONTINGENCY ANALYSIS IN SMART GRIDS	1530
<i>Hamid Emadi, Joe Clanin, Burhan Hyder, Kush Khanna, Manimaran Govindarasu, Sourabh Bhattacharya</i>	
HARMONIC DISTORTION ANALYSIS IN NORTH AMERICAN RESIDENTIAL POWER DISTRIBUTION SYSTEMS	1535
<i>Surendra Bajagain, Anamika Dubey</i>	
AN ADMM-BASED DISTRIBUTED ALGORITHM FOR ECONOMIC DISPATCH IN MULTI- ENERGY SYSTEMS	1540
<i>Zhibin Wang, Shanying Zhu, Tie Ding, Tao Ding, Fangxing Li</i>	
DETECTION OF CYBER-PHYSICAL ATTACKS AIMING AT MULTI TRANSMISSION LINE CONGESTIONS USING DYNAMIC STATE-ESTIMATION	1545
<i>Javad Khazaei</i>	
AN OVERVIEW OF ISSUES RELEVANT TO PROTECTION AND RESTORATION OF PV SYSTEMS AT DISTRIBUTION LEVEL	1550
<i>N. C. Ekneligoda, R. G. Ramakumar, P. Moses, J. Jiang, D. Wu, K. Smedley, K. Prabakar</i>	
A SELF-REPORTED BASELINE DEMAND RESPONSE PROGRAM FOR MITIGATION OF BASELINE MANIPULATION	1555
<i>Xiaochu Wang, Wenyuan Tang</i>	
RESILIENCE EVALUATION OF ADVANCED DISTRIBUTION GRIDS WITH SELF- HEALING CONTROL, MICROGRID AND TRANSACTABLE REACTIVE POWER	1560
<i>Qihuan Dong, Jiaojiao Dong, Lin Zhu, Yunting Liu, Paychuda Kritprajun, Leon M. Tolbert, Stuart Laval, Kevin Schneider, Yilu Liu</i>	
TRANSACTIVE ELECTRIC VEHICLE AGENT: DESIGN AND PERFORMANCE EVALUATION	1565
<i>Ankit Singhal, Bishnu Bhattacharai, Fernando B. Dos Reis, Hayden Reeve, Robert Pratt</i>	

PLANNING FOR RESILIENT POWER DISTRIBUTION SYSTEMS USING RISK-BASED QUANTIFICATION AND Q-LEARNING	1570
<i>Shuva Paul, Anamika Dubey, Shiva Poudel</i>	
SWITCHING ANGLE PREDICTION WITH ARTIFICIAL NEURAL NETWORK FOR COMPLETE AND PARTIAL SELECTIVE HARMONIC ELIMINATION OF MULTILEVEL INVERTERS	1575
<i>Imtiaj Khan, Ali Mehrizi Sani</i>	
PREDICTING ACTIVE CONSTRAINTS SET IN SECURITY-CONSTRAINED OPTIMAL POWER FLOW VIA DEEP NEURAL NETWORK.....	1580
<i>Shudi Liu, Ye Guo, Wenjun Tang, Hongbin Sun, Wenqi Huang</i>	
A NOVEL REAL-TIME ENERGY MANAGEMENT STRATEGY FOR GRID-SUPPORTING MICROGRID: ENABLING FLEXIBLE TRADING POWER	1585
<i>Cunzhi Zhao, Xingpeng Li</i>	
OPTIMIZED MODELING PROCESS FOR AIR CORE REACTORS USING FINITE ELEMENT ANALYSIS	1590
<i>Henrique B. Zaninelli, Edson C. Bortoni</i>	
DISTRIBUTED OPTIMAL POWER FLOW FOR UNBALANCED RADIAL SYSTEMS WITH TIME-VARYING COMMUNICATION	1595
<i>Dimitra Apostolopoulou, Rahmat Poudineh, Anupama Sen</i>	
SURVEY PAPER OF DIGITAL TWINS AND THEIR INTEGRATION INTO ELECTRIC POWER SYSTEMS	1600
<i>Sabrina Nguyen, Mai Abdelhakim, Robert Kerestes</i>	
GENERALIZED PHASOR ESTIMATION METHOD BASED ON DFT WITH DC OFFSET MITIGATION	1605
<i>Dian Lu, Yu Liu, Binglin Wang, Yiqi Xing</i>	
RECURSIVE LEAST SQUARE ALGORITHM FOR FILTER APPLICATION WITHIN MMC CONTROL SYSTEMS WITH SEVERAL FORGETTING FACTORS	1610
<i>Nils Pfeifer, Simon Papenheim, Mustafa Kizilcay</i>	
POWER SYSTEM STABILITY IMPACT ASSESSMENT FOR THE CURRENT LIMITS OF GRID SUPPORTING VOLTAGE-SOURCE CONVERTERS	1615
<i>Kanakesh Vatta Kkuni, Mirza Nuhic, Guangya Yang</i>	
OPERATION PARADIGM FOR POWER SYSTEMS WITH HIGH PENETRATION OF RENEWABLES AND EFFECTS OF CLIMATE CHANGE.....	1620
<i>Denis Osipov, Joe H. Chow</i>	
ROBUST RECOVERY OF PMU SIGNALS WITH OUTLIER CHARACTERIZATION AND STOCHASTIC SUBSPACE SELECTION.....	1624
<i>Kaustav Chatterjee, Kaveri Mahapatra, Nilanjan Ray Chaudhuri</i>	
A NOVEL EDGE SECURITY GATEWAY FOR END-TO-END PROTECTION IN INDUSTRIAL INTERNET OF THINGS	1625
<i>Rafiullah Khan, Kieran McLaughlin, Boojoong Kang, David Laverty, Sakir Sezer</i>	
LOCALIZED YEARLONG POWER FLOW ESTIMATION BASED ON LIMITED DATA USING ADAPTIVE FILTERING	1630
<i>D. Montenegro, A. O'connell, J. Deboever, J. Taylor</i>	

IMPLEMENTATION OF FREQUENCY ADAPTIVE DAMPED SOGI BASED CONTROL FOR POWER QUALITY IMPROVEMENT IN WIND-SOLAR-BES BASED AC MICROGRIDS	1635
<i>Shadab Murshid, Bhim Singh, H. B. Gooi, Y. S. Eddy Foo</i>	
CONGESTION RISK ALLEVIATION IN MODERN DISTRIBUTION SYSTEMS USING ELECTRIC VEHICLES AS MOBILE ENERGY STORAGE DEVICES	1640
<i>Meisam Ansari, Mostafa Ansari, Leili Hadian Dahaj</i>	
APPROXIMATION OF THE FREQUENCY-AMPLITUDE CURVE USING THE HOMOTOPY ANALYSIS METHOD	1645
<i>Min Xiong, Xin Xu, Kai Sun, Bin Wang</i>	
A GAME THEORETIC APPROACH FOR DEMAND RESPONSE ALLOCATION AMONG STRATEGIC PROSUMERS IN REGULATED DISTRIBUTION UTILITIES	1650
<i>Sayyid Mohssen Sajjadi, Meng Wu</i>	
ATTENTION-BASED NEURAL LOAD FORECASTING: A DYNAMIC FEATURE SELECTION APPROACH	1655
<i>Jing Xiong, Pengyang Zhou, Alan Chen, Yu Zhang</i>	
OPERATION OF A CAES FACILITY UNDER PRICE UNCERTAINTIES USING ROBUST OPTIMIZATION	1660
<i>M. F. Zambroni De Souza, Kankar Bhattacharya, Claudio A. Cañizares</i>	
INVESTIGATING INCREASED RENEWABLE ENERGY PENETRATION ON SAN CRISTOBAL ISLAND IN THE GALAPAGOS ARCHIPELAGO	1665
<i>Nicole Frons Dahl, Pritpal Singh</i>	
DYNAMIC ACTIVE POWER CONTROL IN TYPE-3 WIND TURBINES FOR TRANSIENT STABILITY ENHANCEMENT	1670
<i>Stavros Konstantinopoulos, Joe H. Chow</i>	
SHORT-TERM OPERATIONAL PLANNING PROBLEM OF THE MULTIPLE-ENERGY CARRIER HYBRID AC/DC MICROGRIDS	1675
<i>Reza Bayani, Mohammed Bushlaibi, Saeed D. Manshadi</i>	
FREQUENCY RESPONSE AND CONGESTION MANAGEMENT USING MULTI-TERMINAL HVDC OVERLAY	1680
<i>Ahmad Tbaileh, Marcelo Elizondo, Yuan Liu, Yuri V. Makarov, Harold Kirkham, Nihal Mohan, Suman Debnath, Madhu Chinthavali</i>	
A DATA-DRIVEN NONLINEAR RECHARGE CONTROLLER FOR ENERGY STORAGE IN FREQUENCY REGULATION	1685
<i>Wenting Ma, Bolun Xu</i>	
ANALYSIS OF WEATHER AND CLIMATE EXTREMES IMPACT ON POWER SYSTEM OUTAGE	1690
<i>Huiying Ren, Z. Jason Hou, Xinda Ke, Qiuhua Huang, Yuri Makatov</i>	
FROM STATIC TO DYNAMIC OBSERVABILITY FOR A MULTIPLE-MODEL FILTER BASED FAULT DIAGNOSIS APPROACH	1695
<i>Morteza Sarailoo, N. Eva Wu</i>	
A PROCEDURE FOR THE ESTIMATION OF FREQUENCY RESPONSE USING A DATA-DRIVEN METHOD	1700
<i>Bruno Pinheiro, Lucas Lugnani, Daniel Dotta</i>	

INDOOR CLIMATE MODELLING AND OPTIMAL PLANNING WITH RESPECT TO ELECTRICITY PRICES	1705
<i>Shaojun Huang, Konstantin Filonenko, Yuming Zhao, Tao Yang, Tianlong Xiong, Christian Veje</i>	
AUTOMATICALLY GENERATED THREE-PHASE STATE ESTIMATION FOR UNBALANCED DISTRIBUTION POWER GRIDS	1710
<i>Goran Švenda, Sonja Kanjuh</i>	
IMPACT OF INCREASED INVERTER-BASED RESOURCES ON POWER SYSTEM SMALL- SIGNAL STABILITY	1715
<i>Yashen Lin, Gab-su Seo, Sanjana Vijayshankar, Brian Johnson, Sairaj Dhople</i>	
REAL-TIME POWER SYSTEM DYNAMIC SIMULATION USING WINDOWING BASED WAVEFORM RELAXATION METHOD	1720
<i>M Al Mamun, Sumit Paudyal, Sukumar Kamalasan</i>	
COMPREHENSIVE ANALYSIS OF CONTINUOUSLY VARIABLE SERIES REACTOR USING G-C FRAMEWORK	1725
<i>Mohammadali Hayerikhiyavi, Aleksandar Dimitrovski</i>	
PRICING ENERGY STORAGE IN REAL-TIME MARKET	1730
<i>Cong Chen, Lang Tong, Ye Guo</i>	
MINIMAL COORDINATION OF DYNAMIC RESERVES FOR FLEXIBLE OPERATIONS AT VALUE: THE CASE OF AZORES ISLANDS	1735
<i>Marija Ilic, Pedro M. S. Carvalho, Donald Lessard</i>	
NETWORK RECONFIGURATION IMPACT ON RENEWABLE ENERGY SYSTEM AND ENERGY STORAGE SYSTEM IN DAY-AHEAD SCHEDULING	1740
<i>Arun Venkatesh Ramesh, Xingpeng Li</i>	
TRANSACTIVE HVAC AGENT - DESIGN AND PERFORMANCE EVALUATION	1745
<i>Ahmad Tbaileh, Bishnu Bhattarai, Robert Pratt</i>	
DISTRIBUTED CO-ORDINATED CONSENSUS CONTROL FOR MULTI-ENERGY STORAGE OF DC MICROGRID	1750
<i>Don Gamage, Xibeng Zhang, Abhisek Ukil, Chathura Wanigasekara, Akshya Swain</i>	
OPTIMAL POWER SYSTEM BLACK START USING INVERTER-BASED GENERATION	1755
<i>Ahmad Tbaileh, Mallikarjuna R. Vallem, Quan Nguyen, Xinda Ke, Nader A. Samaan, George Stefopoulos, Xia Jiang</i>	
ANALYSIS OF LOCAL AND CENTRALIZED CONTROL OF PV INVERTERS FOR VOLTAGE SUPPORT IN DISTRIBUTION FEEDERS	1760
<i>Oguzhan Ceylan, Sumit Paudyal, Ioana Pisicay</i>	
SAFEBUILD: RISK-BASED ANALYSIS OF OVERHEAD ELECTRIC DISTRIBUTION FACILITIES	1765
<i>Jennifer Lew</i>	
EFFICIENT DISTRIBUTION GRID OPTIMAL POWER FLOW WITH DISCRETE CONTROL OF LEGACY GRID DEVICES	1770
<i>Alper Savasci, Adedoyin Inaolaji, Sumit Paudyal, Sukumar Kamalasan</i>	

ESTIMATION OF ESS AND DR REQUIREMENTS BASED ON STOCHASTIC RELIABILITY ANALYSIS	1775
<i>Yi-syuan Wu, Jian-tang Liao, Hong-tzer Yang</i>	
EMS AND DMS INTEGRATION OF THE COORDINATIVE REAL-TIME SUB-TRANSMISSION VOLT-VAR CONTROL TOOL UNDER HIGH DER PENETRATION	1780
<i>Quan Nguyen, Jim Ogle, Xiaoyuan Fan, Xinda Ke, Mallikarjuna R. Vallem, Nader Samaan, Ning Lu</i>	
RESILIENT UNIT COMMITMENT FOR DAY-AHEAD MARKET CONSIDERING PROBABILISTIC IMPACTS OF HURRICANES.....	1785
<i>Tianyang Zhao, Huajun Zhang, Xiaochuan Liu, Shuhan Yao, Peng Wang</i>	
CONTROL AND SIMULATION OF A GRID-FORMING INVERTER FOR HYBRID PV-BATTERY PLANTS IN POWER SYSTEM BLACK START	1786
<i>Quan Nguyen, Mallikarjuna R. Vallem, Bharat Vyakaranam, Ahmad Tbaileh, Xinda Ke, Nader Samaan</i>	
STRATEGIC BIDDING FOR ENERGY HUBS BASED ON HYBRID STOCHASTIC/DISTRIBUTIONALLY ROBUST OPTIMIZATION.....	1791
<i>Shengwei Liu, Tianyang Zhao, Peng Wang</i>	
SMALL-SIGNAL VOLTAGE STABILITY ANALYSIS FOR DROOP CONTROLLED INVERTER-BASED MICROGRIDS: AN ALGEBRAIC GRAPH THEORY PERSPECTIVE	1796
<i>Abdullah Al Maruf, Anamika Dubey, Sandip Roy</i>	
ONLINE DICTIONARY LEARNING BASED FAULT AND CYBER ATTACK DETECTION FOR POWER SYSTEMS	1801
<i>Gabriel Intriago, Yu Zhang</i>	
TOWARD FUTURE INFORMATION MARKET: AN INFORMATION VALUATION PARADIGM.....	1806
<i>Lin Chen, Zhaoyuan Wu, Jianxiao Wang, Mingkai Yu, Yang Yu, Gengyin Li, Ming Zhou</i>	
A SCALABLE METER PLACEMENT METHOD FOR DISTRIBUTION SYSTEM STATE ESTIMATION.....	1811
<i>Jianqiao Huang, Vahraz Zamani, Yiyun Yao, Xian Guo, Xinyang Zhou</i>	
FALSE DATA INJECTION ATTACK AGAINST POWER SYSTEM SMALL-SIGNAL STABILITY	1816
<i>Mohamadsaleh Jafari, Mohammad A. Rahman, Sumit Paudyal</i>	
R-CHAIN: A UNIVERSALLY COMPOSABLE RELAY RESILIENCE FRAMEWORK FOR SMART GRIDS	1821
<i>Abubakar Sadiq Sani, Dong Yuan, Ke Meng, Zhao Yang Dong</i>	
BALANCING ECONOMY AND RELIABILITY OF INTEGRATED COMMUNITY ENERGY SYSTEM PLANNING BASED ON RELIABILITY MARGINAL COST	1826
<i>Zeyu Liu, Kai Hou, Hongjie Jia, Yushu Zhu, Qian Jiang, Lewei Zhu</i>	
CONTROL OF TRANSIENT OVERVOLTAGE FOR INVERTER ONLY BASED MICROGRIDS IN POWER DISTRIBUTION SYSTEM	1831
<i>Bilkis Banu, Michael Smith, Sukumar Kamalasan</i>	

A NOVEL THREE-PHASE TRANSMISSION AND UNBALANCE DISTRIBUTION CO-SIMULATION POWER FLOW MODEL FOR LONG TERM VOLTAGE STABILITY MARGIN ASSESSMENT	1836
<i>Arun Suresh, Sukumar Kamalasadana, Sumit Paudyal</i>	
DEEP Q-LEARNING FOR AGGREGATOR PRICE DESIGN.....	1841
<i>Aisling Pigott, Kyri Baker, Cory Mosiman</i>	
SIZING ENERGY STORAGE SYSTEM FOR ENERGY ARBITRAGE IN EXTREME FAST CHARGING STATION	1846
<i>Waqas Ur Rehman, Rui Bo, Hossein Mehdipourpicha, Jonathan Kimball</i>	
INVESTIGATION AND DESIGN OF A MEASUREMENT BASED ELECTRO-MECHANICAL OSCILLATION MODE IDENTIFICATION AND DETECTION IN POWER GRID.....	1851
<i>Fahim Al Hasnain, Sheikh Jakir Hossain, Sukumar Kamalasadana</i>	
FIELD DEMONSTRATION OF INVERTER-BASED VOLTAGE MANAGEMENT USING EXTREMUM SEEKING CONTROL	1856
<i>Jason S. Macdonald, Maxime Baudette, Kevin Dunn, Hamed Mohsenian-rad</i>	
PRIMARY VOLTAGE FORECASTING IN DISTRIBUTION SYSTEMS USING PRINCIPAL COMPONENT ANALYSIS	1861
<i>Motakatla Venkateswara Reddy, Anamika Dubey</i>	
DETECTION OF GAUSSIAN ATTACKS IN POWER SYSTEMS UNDER A SCALABLE KALMAN CONSENSUS FILTER FRAMEWORK	1866
<i>Arnold Fernandes, Rui Bo, Jonathan Kimball, Bruce Mcmillin</i>	
AGENT-BASED MODELING OF FEEDER-LEVEL ELECTRIC VEHICLE DIFFUSION FOR DISTRIBUTION PLANNING.....	1871
<i>Lisha Sun, David Lubkeman</i>	
STATISTICAL ANALYSIS OF POWER SYSTEM FREQUENCY MEASUREMENTS BASED ON MOTIF THEORY.....	1872
<i>Xiangyu Ma, Zhiyi Li, Huanhai Xin</i>	

Author Index