

# **2020 IEEE PES Innovative Smart Grid Technologies Europe (ISGT-Europe 2020)**

**The Hague, Netherlands  
26-28 October 2020**

**Pages 1-609**



**IEEE Catalog Number: CFP20SGT-POD  
ISBN: 978-1-7281-7101-2**

**Copyright © 2020 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:	CFP20SGT-POD
ISBN (Print-On-Demand):	978-1-7281-7101-2
ISBN (Online):	978-1-7281-7100-5

**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](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

CURRAN ASSOCIATES INC.  
**proceedings**  
.com

# TABLE OF CONTENTS

<b>TRAINING STRATEGIES FOR AUTOENCODER-BASED DETECTION OF FALSE DATA INJECTION ATTACKS</b> .....	1
<i>Chenguang Wang; Kaikai Pan; Simon Tindemans; Peter Palensky</i>	
<b>SWITCHING SEQUENCE OPTIMIZATION FOR SERVICE RESTORATION IN DISTRIBUTION NETWORKS</b> .....	6
<i>Irena Dukovska; Johan Morren; Han J. G. Slootweg</i>	
<b>POINT AND CONTEXTUAL ANOMALY DETECTION IN BUILDING LOAD PROFILES OF A UNIVERSITY CAMPUS</b> .....	11
<i>Long Wang; Marian Turowski; Meng Zhang; Till Riedel; Michael Beigl; Ralf Mikut; Veit Hagenmeyer</i>	
<b>A NOVEL FAULT LOCATION ALGORITHM FOR ELECTRICAL NETWORKS CONSIDERING DISTRIBUTED LINE MODEL AND DISTRIBUTED GENERATION RESOURCES</b> .....	16
<i>Hamid Mirshekali; Rahman Dashti; Hamid Reza Shaker</i>	
<b>DEPLOYMENT OF A PROBABILISTIC MODEL FOR ANALYSIS OF RESILIENCE IN TRANSMISSION NETWORKS</b> .....	21
<i>Sara Andrita; Diego Pappalardo; Vito Calderaro; Vincenzo Galdi; Alfonso De Cesare; Cristiano Quaciari</i>	
<b>INVESTIGATION OF THE EFFECT OF OPERATING CONDITIONS ON RELIABILITY OF DC-LINK CAPACITORS IN MICROGRIDS</b> .....	26
<i>Sondre J. K. Berg; Fredrik Göthner; Vijay Venu Vadlamudi; Dimosthenis Pefitsis</i>	
<b>EFFECTS OF FALSE DATA INJECTION ATTACKS ON A LOCAL P2P ENERGY TRADING MARKET WITH PROSUMERS</b> .....	31
<i>Sara Mohammadi; Frank Eliassen; Yan Zhang</i>	
<b>BANDWIDTH AND SECURITY REQUIREMENTS FOR SMART GRID</b> .....	36
<i>Kinan Ghanem; Rameez Asif; Stephen Ugwuanyi; James Irvine</i>	
<b>GENERATION OF FALSE DATA INJECTION ATTACKS USING CONDITIONAL GENERATIVE ADVERSARIAL NETWORKS</b> .....	41
<i>Mostafa Mohammadpourfard; Fateme Ghanaatpishe; Marziyeh Mohammadi; Subhash Lakshminarayana; Mykola Pechenizkiy</i>	
<b>NET LOAD REDISTRIBUTION ATTACKS ON NODAL VOLTAGE MAGNITUDE ESTIMATION IN AC DISTRIBUTION NETWORKS</b> .....	46
<i>Hang Zhang; Bo Liu; Hongyu Wu</i>	
<b>HARDWARE/SOFTWARE ARCHITECTURE TO INVESTIGATE RESILIENCE IN ENERGY MANAGEMENT FOR SMART GRIDS</b> .....	51
<i>Steve Lenk; Alexander Arnoldt; Dennis Rösch; Peter Bretschneider</i>	
<b>SECURE DATA EXCHANGE BETWEEN IOT ENDPOINTS FOR ENERGY BALANCING USING DISTRIBUTED LEDGER</b> .....	56
<i>Janez Bartol; Andrej Souvent; Nermin Suljanovic; Matej Zajc</i>	
<b>OPTIMAL HYBRID STORAGE PLANNING UNDER DIFFERENT TARIFFS IN A MICROGRID</b> .....	61
<i>Muhammad Tayyab; Ines Hauer; Christian Klambunde; Martin Wolter</i>	
<b>EVALUATING TEMPERATURE-DEPENDENT CONSUMERS IN A DEMAND RESPONSE PROGRAM USING MACHINE LEARNING</b> .....	66
<i>Miha Grabner; Andrej Souvent; Nermin Suljanovic</i>	
<b>AUTOMATED DEMAND RESPONSE CONTRACTS WHEN PARTIAL CONSUMPTION INFORMATION IS AVAILABLE</b> .....	71
<i>Marilena Minou; George D. Stamoulis</i>	
<b>REDUCTION OF PRICE VOLATILITY USING THERMOSTATICALLY CONTROLLED LOADS IN LOCAL ELECTRICITY MARKETS</b> .....	76
<i>Shantanu Chakraborty; Remco Verzijlbergh; Zofia Lukszo</i>	
<b>TRANSACTIVE CONTROL OF AIR-CONDITIONING SYSTEMS IN BUILDINGS FOR DEMAND RESPONSE</b> .....	81
<i>Rohit Chandra; Gorla Naga Brahmendra Yadav; Sanjib Kumar Panda</i>	
<b>A NOVEL METHOD TO UTILIZE DIRECT ELECTRICAL SPACE HEATING FOR EXPLICIT DEMAND RESPONSE PURPOSES –PROOF OF CONCEPT</b> .....	86
<i>Pekka Manner; Johan Salmelin; Samuli Honkapuro; Ilari Alaperä; Salla Annala</i>	
<b>OPTIMIZATION OF MULTI-ENERGY SYSTEMS USING THE PROFILE STEERING COORDINATION FRAMEWORK</b> .....	91
<i>Gerwin Hoogsteen; Marco E. T. Gerards; Johann L. Hurink</i>	

<b>THE INFLUENCE OF ADVANCED DSM ON PERFORMANCE OF DISTRIBUTION NETWORKS WITH RENEWABLE GENERATION .....</b>	<b>96</b>
<i>Jelena Ponocko; Jovica V. Milanovic</i>	
<b>THE EFFECT OF THE TYPE AND COMPOSITION OF DEMAND ON DSM CONTRIBUTION TO SYSTEM FREQUENCY STABILITY.....</b>	<b>101</b>
<i>Mengxuan Wang; Jovica V. Milanovic</i>	
<b>BATTERY CONTROL IN A SMART ENERGY NETWORK USING DOUBLE DUELING DEEP Q-NETWORKS.....</b>	<b>106</b>
<i>Daniel J. B. Harrold; Jun Cao; Zhong Fan</i>	
<b>A GAME THEORY APPROACH FOR MAXIMUM UTILIZATION OF WIND POWER BY DR IN RESIDENTIAL CONSUMERS.....</b>	<b>111</b>
<i>Mehdi Tavakkoli; Sajjad Fattaheian-Dehkordi; Mahdi Pourakbari-Kasmaei; Matti Liski; Matti Lehtonen</i>	
<b>STOCHASTIC GAME FRAMEWORKS FOR EFFICIENT ENERGY MANAGEMENT IN MICROGRID NETWORKS .....</b>	<b>116</b>
<i>Shravan Nayak; Chanakya Ajit Ekbote; Annanya Pratap Singh Chauhan; Raghuram Bharadwaj Diddigi; Prishita Ray; Abhinava Sikdar; Sai Koti Reddy Danda; Shalabh Bhatnagar</i>	
<b>RELIABILITY ASPECTS OF BATTERY ENERGY STORAGE IN THE POWER GRID .....</b>	<b>121</b>
<i>Syedefatemeh Hajeforosh; Zunaira Nazir; Math Bollen</i>	
<b>DEMONSTRATION OF MAN IN THE MIDDLE ATTACK ON A FEEDER POWER FACTOR CORRECTION UNIT.....</b>	<b>126</b>
<i>Lenos Hadjidemetriou; Georgios Tertytchny; Hazem Karbouj; Charalambos Charalambous; Maria K. Michael; Marios Sazos; Michail Maniatakos</i>	
<b>NON-ISOLATED CASCADED MULTILEVEL CONVERTER BASED ON THREE-PHASE CELLS .....</b>	<b>131</b>
<i>Renner Sartório Camargo; Daniel Santamargarita Mayor; Lucas De Mingo Fernandes; Alvar Mayor Miguel; Emilio José Bueno Peña; Lucas Frizera Encarnação</i>	
<b>TRANSFORMERLESS CASCADED H-BRIDGE BACK-TO-BACK CONVERTER DRIVING AN DYNAMIC LOAD .....</b>	<b>136</b>
<i>Victor M. R De Oliveira; Renner Sartório Camargo; Emilio José Bueno Peña; Lucas Frizera Encarnação</i>	
<b>DECENTRALIZED DATA-DRIVEN TUNING OF DROOP FREQUENCY CONTROLLERS.....</b>	<b>141</b>
<i>Allan Almeida Santos; Edwin Mora; Jan Peters; Florian Steinke</i>	
<b>VOLTAGE UNBALANCE MITIGATION BY NOVEL CONTROL OF BESS SINGLE-PHASE INVERTERS.....</b>	<b>146</b>
<i>Ioannis Mexis; Grazia Todeschini</i>	
<b>FAST ACTIVE POWER-FREQUENCY SUPPORT METHODS BY LARGE SCALE ELECTROLYZERS FOR MULTI-ENERGY SYSTEMS.....</b>	<b>151</b>
<i>Nidarshan Veerakumar; Zameer Ahmad; M. Ebrahim Adabi; José Rueda Torres; Peter Palensky; Mart Van Der Meijden; Francisco Gonzalez-Longatt</i>	
<b>FAST GOERTZEL ALGORITHM AND RLS-ADAPTIVE FILTER BASED REFERENCE CURRENT EXTRACTION FOR GRID-CONNECTED SYSTEM .....</b>	<b>156</b>
<i>Birender Singh; C. C. Reddy</i>	
<b>CONTROL SCHEME FOR PHASE BALANCING AND REACTIVE POWER SUPPORT FROM PHOTOVOLTAIC INVERTERS .....</b>	<b>161</b>
<i>Anastasis Charalambous; Lenos Hadjidemetriou; Marios Polycarpou</i>	
<b>IMPACT OF AN ADVANCED CABLE MODEL AND SYNCHRONOUS GENERATOR ON STABILITY OF HVDC GRID .....</b>	<b>166</b>
<i>Lokesh Dewangan; Himanshu J. Bahirat</i>	
<b>SYNTHETIC INERTIA IMPACT ON INTER-AREA OSCILLATIONS OF THE CONTINENTAL EUROPE POWER SYSTEM .....</b>	<b>171</b>
<i>Mariano G. Ippolito; Rossano Musca; Lazar Bizumic</i>	
<b>P-HIL EVALUATION OF VIRTUAL INERTIA SUPPORT TO THE NORDIC POWER SYSTEM BY AN HVDC TERMINAL.....</b>	<b>176</b>
<i>Salvatore D'Arco; Thuc Dinh Duong; Jon Are Suul</i>	
<b>ENHANCING DISTANCE PROTECTION PERFORMANCE IN TRANSMISSION SYSTEMS WITH RENEWABLE ENERGY UTILIZATION.....</b>	<b>181</b>
<i>Marjan Popov; Jose Chavez; Eduardo Martinez Carrasco; María Teresa Villén Martínez; Samuel Borroy Vicente; David López; Sadegh Azizi; Vladimir Terzija</i>	
<b>THREE-PHASE STATE ESTIMATION BASED ON SYMMETRICAL COMPONENTS .....</b>	<b>186</b>
<i>Murat Gol</i>	
<b>LOCATING GENERATORS CAUSING FORCED OSCILLATIONS BASED ON SYSTEM IDENTIFICATION TECHNIQUES.....</b>	<b>191</b>
<i>Thuc Dinh Duong; Salvatore D'Arco</i>	

<b>AGGREGATION OF ELECTRIC VEHICLES FOR EMERGENCY FREQUENCY CONTROL OF TWO-AREA INTERCONNECTED GRID</b> .....	196
<i>Sareh Agheb; Zhao Yang Dong; Gerard Ledwich</i>	
<b>ESTIMATION OF OSCILLATORY MODE ACTIVITY FROM PMU MEASUREMENTS</b> .....	201
<i>Hallvar Haugdal; Kjetil Uhlen; Daniel Müller; Hjörtur Jóhannsson</i>	
<b>COMPARISON OF DIFFERENT ALGORITHMS FOR EARTH FAULT DISTANCE CALCULATION IN COMPENSATED GRIDS USING SYMMETRICAL COMPONENTS AND DIFFERENCE VALUES</b> .....	206
<i>Michael Steglich; Svenja Joseph; Christian Rehtanz</i>	
<b>INVESTIGATION OF CASCADING EVENTS IN POWER SYSTEMS WITH RENEWABLE GENERATION</b> .....	211
<i>Georgios A. Nakas; Panagiotis N. Papadopoulos</i>	
<b>CORRELATION BASED FAULT MANAGEMENT FOR CENTRALIZED PROTECTION AND CONTROL</b> .....	217
<i>Jani Valtari</i>	
<b>CENTRALIZED FAULT DETECTION AND CLASSIFICATION FOR MOTOR POWER DISTRIBUTION CENTERS UTILIZING MLP-NN AND STOCKWELL TRANSFORM</b> .....	222
<i>Abdulaziz Aljohani</i>	
<b>TOWARDS IMPROVED RELIABILITY INDICES USING WAVEFORM DISTORTIONS IN DISTRIBUTION SYSTEM</b> .....	227
<i>Rishabh Bhandia; Jose J. Chavez; Miloš Cvetkovic; Peter Palensky</i>	
<b>PERFORMANCE COMPARISON OF QUANTITATIVE METHODS FOR PMU DATA EVENT DETECTION WITH NOISY DATA</b> .....	232
<i>L. Souto; S. Herraiz; J. Meléndez</i>	
<b>SERVICE RESTORATION ALGORITHM FOR DISTRIBUTION GRIDS UNDER HIGH IMPACT LOW PROBABILITY EVENTS</b> .....	237
<i>Alberto Dognini; Abhinav Sadu; Andrea Angioni; Ferdinanda Ponci; Antonello Monti</i>	
<b>INNOVATIVE ENERGY SERVICES FOR BEHAVIORAL-REFLECTIVE ATTRIBUTES AND INTELLIGENT RECOMMENDER SYSTEM</b> .....	242
<i>Abiodun E. Onile; Juri Belikov; Yoash Levron</i>	
<b>CYBER ATTACKS ON POWER SYSTEM AUTOMATION AND PROTECTION AND IMPACT ANALYSIS</b> .....	247
<i>Vetrivel Subramaniam Rajkumar; Marko Tealane; Alexandru Stefanov; Alfan Presekaj; Peter Palensky</i>	
<b>TOWARD AUTOMATED UTILITY POLE CONDITION MONITORING: A DEEP LEARNING APPROACH</b> .....	255
<i>Craig J. Ramlal; Arvind Singh; Sean Rocke; Henri Manninen; Jako Kilter; Mart Landsberg</i>	
<b>LOCAL DIFFERENTIAL PRIVACY FOR MULTI-AGENT DISTRIBUTED OPTIMAL POWER FLOW</b> .....	265
<i>Roel Dobbe; Ye Pu; Jingge Zhu; Kannan Ramchandran; Claire Tomlin</i>	
<b>MULTI-OBJECTIVE RESIDENTIAL ELECTRICITY SCHEDULING BASED ON FORECASTING GENERATION AND DEMAND VIA LSTM</b> .....	270
<i>Jan Timo Meyer; Louis-André Agrofoglio; Joris Clement; Qiye Liu; Ogun Yurdakul; Sahin Albayrak</i>	
<b>ENERGY CONSUMPTION MANAGEMENT IN BUILDINGS IN THE CONTEXT OF VOLUNTARY AND MANDATORY DEMAND RESPONSE PROGRAMS IN SMART GRIDS</b> .....	275
<i>Mahsa Khorram; Modar Zheiry; Pedro Faria; Zita Vale</i>	
<b>DEMAND RESPONSE OUTLOOK BASED ON ONLINE SURVEILLANCE: PREDICTING THE UNKNOWN</b> .....	280
<i>Leontina Pinto; Jacques Szczupak; Gustavo Cavalcante</i>	
<b>PROFILE STEERING WITH NON-REGULAR TIME-INTERVALS</b> .....	284
<i>L. M. Bollen; L. R. Heinsius; M. L. Souiljee; M. Boe; G. Hoogsteen; M. E. T. Gerards; J. L. Hurink</i>	
<b>BENCHMARKING REINFORCEMENT LEARNING ALGORITHMS FOR DEMAND RESPONSE APPLICATIONS</b> .....	289
<i>Brida V. Mbuwir; Carlo Manna; Fred Spiessens; Geert Deconinck</i>	
<b>ROBUST DEMAND RESPONSE FOR DEVICE SCHEDULING UNDER FALSE DATA INJECTION ATTACKS IN SMART GRIDS</b> .....	294
<i>Thusitha Dayaratne; Carsten Rudolph; Ariel Liebman; Mahsa Salehi</i>	
<b>SCHEDULING OF BATTERY ENERGY STORAGE AND DEMAND RESPONSE RESOURCE IN BALANCING ANCILLARY SERVICE</b> .....	299
<i>Meysam Khojasteh; Pedro Faria; Zita Vale</i>	
<b>TECHNO-ECONOMIC ASSESSMENT OF THE MISSING OPPORTUNITIES FOR PROSUMAGERS: THE DUTCH CASE</b> .....	304
<i>Ibtihal Abdelmottaleb; Madeleine Gibescu; Roland J. H. De Wit; Bouke Siebenga</i>	

<b>STOCHASTIC MPC FOR ENERGY MANAGEMENT IN SMART GRIDS WITH CONDITIONAL VALUE AT RISK AS PENALTY FUNCTION .....</b>	<b>309</b>
<i>Janani Venkatasubramanian; Vahab Rostampour; Tamás Keviczky</i>	
<b>COST-BENEFIT ANALYSIS OF BATTERY ENERGY STORAGE IN ELECTRIC POWER GRIDS: RESEARCH AND PRACTICES .....</b>	<b>314</b>
<i>Iver Bakken Sperstad; Maren Istad; Hanne Sæle; Magnus Korpås; Irina Oleinikova; Seppo Hänninen; Sergio Motta; Konstantina Panagiotou; Christina Papadimitriou; Venizelos Efthymiou; Chresten Træholt; Mattia Marinelli</i>	
<b>MINI CHP PLANTS LIFE CYCLE ECOLOGICAL ASSESSMENT .....</b>	<b>319</b>
<i>Elena Sosnina; Olga Masleeva; Evgeny Kryukov; Natalya Erdili</i>	
<b>EVALUATION OF ECONOMIC MERITS OF PEER TO PEER ELECTRICITY TRANSACTIONS .....</b>	<b>324</b>
<i>Tomoya Odashiro; Ryoichi Hara; Hiroyuki Kita</i>	
<b>POWER MARKET EQUILIBRIUM ANALYSIS WITH LARGE-SCALE HYDROPOWER SYSTEM UNDER UNCERTAINTY .....</b>	<b>329</b>
<i>Yanjie Liang; Qingbiao Lin; Shizhi He; Qixing Liu; Ziyu Chen; Xue Liu</i>	
<b>DETECTION OF HIGH FREQUENCY CONDUCTED EMISSION USING RADIATED FIELDS .....</b>	<b>334</b>
<i>Gaurav Singh; Eric Auel; James Owens; Thomas Cooke; Mark Stephens; William Howe</i>	
<b>HOW TO OVERCOME THE LIMITATIONS OF P-Q THEORY: GEOMETRIC ALGEBRA POWER THEORY TO THE RESCUE .....</b>	<b>339</b>
<i>Francisco G. Montoya; Alfredo Alcayde; Francisco M. Arrabal-Campos; Raúl Baños</i>	
<b>A NEW METHOD FOR PREDICTION OF STATIC AND DYNAMIC VOLTAGE COLLAPSE USING NODE PARAMETERS IN LARGE POWER NETWORKS .....</b>	<b>344</b>
<i>Tahaguas A. Woldu; Christian Ziegler; Martin Wolter</i>	
<b>REPETITIVE LEARNING FREQUENCY CONTROL FOR ENERGY INTENSIVE CORPORATE MICROGRIDS SUBJECT TO CYCLIC BATCH LOADS .....</b>	<b>349</b>
<i>Craig J. Ramlal; Arvind Singh; Sean Roche</i>	
<b>STUDY OF THE IMPACT OF PROCESSES IN ELECTRIC POWER SYSTEMS WITH RES ON THE OPERATION OF NUMERICAL DIFFERENTIAL TRANSFORMER PROTECTION .....</b>	<b>354</b>
<i>Mikhail Andreev; Aleksey Suvorov; Nikolay Ruban; Ruslan Ufa; Alexander Gusev; Igor Razzhivin; Yuly Bay; Anton Kievets; Alisher Askarov; Vladimir Rudnik</i>	
<b>SUPERPOSITION-BASED MODELLING OF SERIES FACTS IN NONLINEAR MATHEMATICAL OPTIMIZED GRID OPERATION .....</b>	<b>359</b>
<i>Denis Mende; David Sebastian Stock; Lutz Hofmann</i>	
<b>COMPUTING SPARSE AFFINE-LINEAR CONTROL POLICIES FOR LINEAR POWER FLOW IN MICROGRIDS .....</b>	<b>364</b>
<i>Edwin Mora; Florian Steinke</i>	
<b>SOLAR GENERATION ESTIMATION IN DISTRIBUTION NETWORK USING LIMITED MEASUREMENTS .....</b>	<b>374</b>
<i>Amin Mokaribolhassan; Gerard Ledwich; Ghavameddin Nourbakhsh; Ali Arefi; Mehdi Shafiei</i>	
<b>FNET/GRIDEYE: A TOOL FOR SITUATIONAL AWARENESS OF LARGE POWER INTERCONNECTION GRIDS .....</b>	<b>379</b>
<i>Lin Zhu; Shutang You; He Yin; Yinfeng Zhao; Fuhua Li; Wenxuan Yao; Chris O'Reilley; Wenpeng Yu; Chunjie Zeng; Xianda Deng; Yi Zhao; Yi Cui; Yao Zhang; Yilu Liu</i>	
<b>POWER GENERATION NOWCASTING OF THE BEHIND-THE-METER PHOTOVOLTAIC SYSTEMS .....</b>	<b>384</b>
<i>Soheil Pouraltafi-Kheljan; Murat Göl</i>	
<b>SOLAR POWER GENERATION PREDICTION FOR DISTRIBUTION SYSTEMS WITH HIGH PV PENETRATION .....</b>	<b>389</b>
<i>Ufuk Yildiz; Murat Gol</i>	
<b>IMPACT OF REDUCED SYNCHRONOUS MACHINE CAPACITY ON DAMPING AND PHASE OF INTER-AREA OSCILLATIONS .....</b>	<b>394</b>
<i>Daniel Müller; Hjörtur Jóhannsson; Kjetil Uhlen</i>	
<b>REAL TIME FREQUENCY RESPONSE ASSESSMENT USING REGRESSION .....</b>	<b>399</b>
<i>Dimitrios Zografos; Mehrdad Ghandhari; Robert Eriksson</i>	
<b>MODEL-LESS SOURCE LOCATION FOR FORCED OSCILLATION BASED ON SYNCHROPHASOR AND MOVING FAST FOURIER TRANSFORMATION .....</b>	<b>404</b>
<i>Weikang Wang; Chang Chen; Lin Zhu; Wei Qiu; Kaiqi Sun; Xianda Deng; Yilu Liu</i>	
<b>A NOVEL METHOD FOR EARTH FAULT DISTANCE CALCULATION IN COMPENSATED GRIDS USING SYMMETRICAL COMPONENTS .....</b>	<b>409</b>
<i>Michael Steglich; Svenja Joseph; Christian Rehtanz</i>	
<b>ADAPTIVE COORDINATION OF OVERCURRENT RELAYS CONSIDERING SETTING CHANGES MINIMIZATION TO IMPROVE PROTECTION SYSTEM'S RELIABILITY .....</b>	<b>414</b>
<i>Arash Samadi; Reza Mohammadi Chabanloo; Meisam Farrokhipar; David Pozo</i>	

<b>SECURE OPERATION OF FLEXIBLE TECHNOLOGIES IN DISTRIBUTION POWER NETWORKS</b> .....	419
<i>Pavel Hering; Martin Strelec; Petr Janecek</i>	
<b>NON-HEURISTIC IDENTIFICATION OF THE OPTIMAL NUMBER OF OSCILLATION PATTERNS IN UNCERTAIN POWER SYSTEMS</b> .....	424
<i>Juan D. Morales; Jovica V. Milanovic</i>	
<b>BATTERY-ASSISTED ELECTRIC VEHICLE CHARGING: DATA DRIVEN PERFORMANCE ANALYSIS</b> .....	429
<i>Junade Ali; Vladimir Dyo; Sijing Zhang</i>	
<b>THE NEED FOR TIDINESS IN ENERGY DATA ANALYSIS</b> .....	434
<i>Joseph Scott; Neal S. Wade; Johnson Fernandes</i>	
<b>DEEP LEARNING BASED TTC PREDICTOR FOR POWER SYSTEMS WITH WIND ENERGY INTEGRATION</b> .....	439
<i>Gao Qiu; Youbo Liu; Junyong Liu; Lixiong Xu</i>	
<b>ANALYSIS OF THE ELECTRICAL PROPERTIES OF SIMBENCH LOW VOLTAGE BENCHMARK NETWORK MODELS</b> .....	444
<i>Džanan Sarajlic; Christian Rehtanz</i>	
<b>ENERGY FORECASTING USING AN ENSEMBLE OF MACHINE LEARNING METHODS TRAINED ONLY WITH ELECTRICITY DATA</b> .....	449
<i>Gonçalo Luís; João Esteves; Nuno Pinho Da Silva</i>	
<b>IMPACT OF STRATEGIC ELECTRIC VEHICLES DRIVING BEHAVIOR ON THE GRID</b> .....	454
<i>Benoît Sohet; Yezekael Hayel; Olivier Beaude; Alban Jeandin</i>	
<b>MODELLING OF WORKPLACE ELECTRIC VEHICLE CHARGING PROFILES BASED ON TRIP CHAIN GENERATION</b> .....	459
<i>Kathrin Walz; Daniel Contreras; Krzysztof Rudion; Pascal Wiest</i>	
<b>A NOVEL EVALUATION METHOD OF ELECTRIC VEHICLES CHARGING NETWORK BASED ON STOCHASTIC GEOMETRY</b> .....	464
<i>Chenhao Ren; Yunhe Hou</i>	
<b>THE EFFECT OF PRICE-OPTIMIZED CHARGING ON ELECTRIC VEHICLE FLEET EMISSIONS</b> .....	469
<i>Rishabh Ghotge; Marnix Paanakker; Ad Van Wijk; Brecht Baeten; Zofia Lukszo</i>	
<b>MANAGEMENT OF ELECTRIC VEHICLES AS FLEXIBILITY RESOURCE FOR OPTIMIZED INTEGRATION OF RENEWABLE ENERGY WITH LARGE BUILDINGS</b> .....	474
<i>Pedro Moura; Greta K. W. Yu; Javad Mohammadi</i>	
<b>APPLICATION OF DEMAND RESPONSE AND SMART BATTERY ELECTRIC VEHICLES CHARGING FOR CAPACITY UTILIZATION OF THE DISTRIBUTION TRANSFORMER</b> .....	479
<i>Saifal Talpur; Tek Tjing Lie; Ramon Zamora</i>	
<b>AGGREGATOR'S BUSINESS MODELS: CHALLENGES FACED BY DIFFERENT ROLES</b> .....	484
<i>Özge Okur; Petra Heijnen; Zofia Lukszo</i>	
<b>ONLINE NETWORK-CONSTRAINED DISPATCH OF DISTRIBUTED GENERATORS IN RADIAL NETWORKS</b> .....	489
<i>Hazem A. Abdelghany; Carlos Ocampo-Martinez; Nicanor Quijano</i>	
<b>IMPROVING THE AC TRANSMISSION EXPANSION PLANNING BY USING INITIAL SOLUTIONS ALGORITHMS</b> .....	494
<i>Nelson E. Matute; Santiago P. Torres; Edgar G. Morquecho; Fabian Astudillo-Salinas; Julio C. Lopez; Wilfredo C. Flores</i>	
<b>AC DYNAMIC TRANSMISSION EXPANSION PLANNING USING A HYBRID OPTIMIZATION ALGORITHM</b> .....	499
<i>Edgar G. Morquecho; Santiago P. Torres; Nelson E. Matute; Fabian Astudillo-Salinas; Julio C. Lopez; Wilfredo C. Flores</i>	
<b>MIXED INTEGER LINEAR PROGRAMMING TIME-SERIES BASED REDISPATCH OPTIMIZATION</b> .....	504
<i>Christian Klabunde; Martin Wolter</i>	
<b>PREDICTIVE CONTROL OF RURAL MICROGRIDS WITH TEMPERATURE-DEPENDENT BATTERY DEGRADATION COST</b> .....	509
<i>Yifu Ding; Avinash Vijay; Derek Neal; Malcolm McCulloch</i>	
<b>AMPACITY FORECASTING FROM NUMERICAL WEATHER PREDICTIONS: A FUSION OF THE TRADITIONAL AND MACHINE LEARNING METHODS</b> .....	514
<i>Gabriela Molinar; Johannes Bassler; Nicholas Popovic; Wilhelm Stork</i>	
<b>RULE-BASED DISPATCHING OF MICROGRIDS WITH COUPLED ELECTRICITY AND HEAT POWER SYSTEMS</b> .....	519
<i>Martin Seydenschwanz; Corinna Gottschalk; Benjamin D. Lee; Dino Ablakovic</i>	

<b>ON GRID PARTITIONING IN AC OPTIMAL POWER FLOW</b> .....	524
<i>Alexander Murray; Michael Kyesswa; Philipp Schmurr; Hüseyin Çakmak; Veit Hagenmeyer</i>	
<b>AN IMPROVED MULTI-INFEED SHORT CIRCUIT RATIO OF AC/DC POWER SYSTEM CONSIDERING EMERGENCY DC POWER SUPPORT</b> .....	529
<i>Sicheng Wang; Shan Gao; Xin Zhao; Tiancheng E. Song; Yu Liu; Sufan Jiang</i>	
<b>THE OPTIMAL DEPLOYMENT OF RECHARGING STATIONS FOR ELECTRIC VEHICLES BASED ON MOBILITY FLOWS AND ELECTRIC GRID SPECIFICATIONS</b> .....	534
<i>Abood Mourad; Martin Hennebel</i>	
<b>ENHANCING MICROGRID RESILIENCE AND SURVIVABILITY UNDER STATIC AND DYNAMIC ISLANDING CONSTRAINTS</b> .....	539
<i>Agnes M. Nakiganda; Shahab Dehghan; Petros Aristidou</i>	
<b>INSTANTANEOUS FLICKER CONTROL STRATEGY WITH OLTC-FITTED DISTRIBUTION TRANSFORMERS IN LV NETWORKS</b> .....	544
<i>Ammar Arshad; Matti Lehtonen</i>	
<b>ANALYSIS OF TWO HYBRID ENERGY STORAGE SYSTEMS IN AN OFF-GRID PHOTOVOLTAIC MICROGRID: A CASE STUDY</b> .....	554
<i>Yang Jiao; Daniel Månsson</i>	
<b>OPTIMAL CONTROL FOR IMPROVED DAMPING OF VIRTUAL SYNCHRONOUS MACHINES</b> .....	559
<i>Diala Nouti; Martina Josevski; Antonello Monti</i>	
<b>ANALYSIS OF THE IMPACT OF SYNTHETIC INERTIA ON FREQUENCY VARIATIONS AND ON TURBINE GOVERNOR DEAD-BANDS</b> .....	564
<i>D. Del Giudice; A. Brambilla; S. Grillo; F. Bizzarri</i>	
<b>DYNAMIC MODELING OF WIND AND SOLAR POWER GENERATION WITH GRID SUPPORT FOR LARGE-SCALE INTEGRATION IN POWER SYSTEMS</b> .....	569
<i>Michael Kyesswa; Hüseyin Çakmak; Uwe Kühnappel; Veit Hagenmeyer</i>	
<b>ANALYSIS OF DEEP-HEAT ENERGY WELLS FOR HEAT PUMP SYSTEMS</b> .....	574
<i>Andreas Lund; Timo Karvinen; Matti Lehtonen</i>	
<b>OPERATING ENVELOPES FOR PROSUMERS IN LV NETWORKS: A WEIGHTED PROPORTIONAL FAIRNESS APPROACH</b> .....	579
<i>Kyriacos Petrou; Michael Z. Liu; Andreas T. Procopiou; Luis F. Ochoa; John Theunissen; Justin Harding</i>	
<b>THE INFLUENCE OF HYBRID RENEWABLE ENERGY SOURCE PLANT COMPOSITION ON TRANSMISSION SYSTEM STABILITY</b> .....	584
<i>Ana Radovanovic; Joey Naranjo Plaza; Xindong Li; Jovica V. Milanovic</i>	
<b>COMPARATIVE ANALYSIS OF TRANSFORMER-ENERGIZING AND FAULT-CAUSED VOLTAGE DIPS ON THE DYNAMIC BEHAVIOR OF DFIG-BASED WIND TURBINES</b> .....	589
<i>Roger Alves De Oliveira; Cheng Chen; Math H. J. Bollen; Roberto Chouhy Leborgne</i>	
<b>TRANSIENT STABILITY ENHANCEMENT WITH HIGH SHARES OF GRID-FOLLOWING CONVERTERS IN A 100% CONVERTER GRID</b> .....	594
<i>Xianxian Zhao; Damian Flynn</i>	
<b>INVESTIGATING THE IMPACT OF DATA QUALITY ON THE ENERGY YIELD FORECAST USING DATA MINING TECHNIQUES</b> .....	599
<i>Ekanki Sharma; Marco Mussetta; Wilfried Elmenreich</i>	
<b>INVESTIGATION OF LOCAL VOLTAGE CONTROL SOLUTIONS FOR THE INTEGRATION OF RENEWABLE POWER SOURCES INTO THE LOW-VOLTAGE NETWORKS</b> .....	604
<i>Artjoms Obushevs; Fabian Carigiet; Franz Baumgartner; Petr Korba</i>	
<b>ANALYSIS OF VOLTAGE RISE AND OPTIMAL PV CURTAILMENT STRATEGY FOR ITS MITIGATION</b> .....	610
<i>N. K. Singh; A. Elrayyah; M. Z. C. Wanik</i>	
<b>MINIMIZATION OF WIND POWER CURTAILMENT USING DYNAMIC LINE RATING</b> .....	615
<i>Vageesh Chakrapani Manakari; Sandra Thengius; Akshaya Tammanur Ravi; Kateryna Morozovska; Patrik Hilber</i>	
<b>SMALL SIGNAL STABILITY ENHANCEMENT USING WDSR IN RG POWER NETWORKS</b> .....	620
<i>Feba Alias; Manohar Singh</i>	
<b>SUPPLEMENTARY DAMPING CONTROL DESIGN FOR LARGE SCALE PV POWER PLANT AT TRANSMISSION LEVEL INTERCONNECTION</b> .....	625
<i>Younes J. Isbeih; Mohamed Shawky El Moursi; Mohamed Lotfi; Joao P. S. Catalao; Mansour H. Abdel-Rahman</i>	
<b>OPTIMAL RESIDENTIAL BATTERY SCHEDULING WITH ASSET LIFESPAN CONSIDERATION</b> .....	630
<i>Benoit Couraud; Sonam Norbu; Merlinda Andoni; Valentin Robu; Hani Gharavi; David Flynn</i>	
<b>A DEEP LEARNING APPROACH TO EARTH FAULT CLASSIFICATION AND SOURCE LOCALIZATION</b> .....	635
<i>Ebrahim Balouji; Karl Bäckström; Petri Hovila</i>	



<b>APPLICATION OF AGGLOMERATIVE HIERARCHICAL CLUSTERING FOR CLUSTERING OF TIME SERIES DATA .....</b>	<b>640</b>
<i>Ana Radovanovic; Junshi Li; Jovica V. Milanovic; Nina Milosavljevic; Riccardo Storchi</i>	
<b>APPLICATION OF THE K-MEDOIDS PARTITIONING ALGORITHM FOR CLUSTERING OF TIME SERIES DATA .....</b>	<b>645</b>
<i>Ana Radovanovic; Xinlin Ye; Jovica V. Milanovic; Nina Milosavljevic; Riccardo Storchi</i>	
<b>PROBABILISTIC POWER FLOW SOLUTION WITH GRAPH CONVOLUTIONAL NETWORK.....</b>	<b>650</b>
<i>Dawei Wang; Kedi Zheng; Qixin Chen; Gang Luo; Xuan Zhang</i>	
<b>OPEN DATA IN THE DEVELOPMENT OF FUTURE ELECTRICITY DISTRIBUTION SYSTEMS .....</b>	<b>655</b>
<i>Otto Räisänen; Jouni Haapaniemi; Ville Tikka; Juha Haakana; Jukka Lassila; Jarmo Partanen</i>	
<b>CHARACTERIZING FAILURE AND REPAIR TIME OF SERVERS IN A HYPER-SCALE DATA CENTER.....</b>	<b>660</b>
<i>Kazi Main Uddin Ahmed; Manuel Alvarez; Math H. J. Bollen</i>	
<b>IMPACT OF UNBALANCED ELECTRIC VEHICLE CHARGING ON LOW-VOLTAGE GRIDS.....</b>	<b>665</b>
<i>Sebastian Helm; Ines Hauer; Martin Wolter; Christoph Wenge; Stephan Balischewski; Przemyslaw Komarnicki</i>	
<b>A NOVEL ENERGY MANAGEMENT SYSTEM FOR SOLAR ELECTRIC VEHICLES .....</b>	<b>670</b>
<i>Lisette Ten Boske; Tobias Gunneberg; Jonathan Rau; Ogun Yurdakul; Sahin Albayrak</i>	
<b>OPTIMAL SITING AND SIZING OF SOPS IN DISTRIBUTION NETWORKS WITH DG AND EV CHARGING .....</b>	<b>675</b>
<i>Mingyang Li; Yuguang Niu; Hongda Hu; Kun Wang</i>	
<b>A CORRECTIVE INTEGRATED TRANSMISSION AND DISTRIBUTION CO-SIMULATION FOR SCENARIO ANALYSIS OF DIFFERENT TECHNOLOGY PENETRATION .....</b>	<b>680</b>
<i>Ali Hajebrahimi; Seyed Masoud Mohseni-Bonab; Ali Moeini; Innocent Kamwa</i>	
<b>UTILITY-OPTIMIZING REAL-TIME CONGESTION MANAGEMENT IN LOW VOLTAGE DISTRIBUTION GRIDS .....</b>	<b>685</b>
<i>Hanko Ipach; Christian Becker</i>	
<b>A MODEL PREDICTIVE CONTROL ALGORITHM FOR LARGE-SCALE INTEGRATION OF ELECTROMOBILITY .....</b>	<b>690</b>
<i>Sebastian Raczka; Dominik Hilbrich; Annika Brüggemann; Christian Rehtanz</i>	
<b>CHILLER LOAD FORECASTING USING OUTDOOR TEMPERATURE PROFILES FOR A MEDIUM-SIZED OFFICE BUILDING.....</b>	<b>695</b>
<i>Rick Cox; Shalika Walker; Joep Van Der Velden; Wim Zeiler</i>	
<b>AGGREGATED POWER QUALITY INDICATOR FOR CONTROLLING A HYBRID COMPENSATION SYSTEM PROVIDING SYSTEM SERVICES .....</b>	<b>700</b>
<i>Ralf Merkl; Michael Steglich; Martin Paulsburg; Christian Rehtanz; Jörg Franke</i>	
<b>SOLVING THE DIVERGENCE PROBLEM IN AC-QSS CASCADING FAILURE MODEL BY INTRODUCING THE EFFECT OF A REALISTIC UVLS SCHEME.....</b>	<b>710</b>
<i>Sina Gharebaghi; Sai Gopal Vennelaganti; Nilanjan Ray Chaudhuri; Ting He; Thomas La Porta</i>	
<b>PATTERN RECOGNITION-BASED PREDICTIVE UNDER-FREQUENCY LOAD SHEDDING SCHEME.....</b>	<b>715</b>
<i>Tadej Škrjanc; Rafael Mihalic; Urban Rudež</i>	
<b>DECOMPOSITION OF PST FLOWS VIA EXTENDED POWER EQUATION .....</b>	<b>720</b>
<i>Marc Gebhardt; Martin Wolter</i>	
<b>IMPACT OF RENEWABLE INTEGRATION IN DISTRIBUTION NETWORKS ON STATIC LOAD MODEL PARAMETERS .....</b>	<b>725</b>
<i>Mir Toufikur Rahman; Kazi N. Hasan; Peter Sokolowski</i>	
<b>COMPARISON OF STATISTICAL-BASED AND DATA-DRIVEN-BASED SCENARIO GENERATION OF PV POWER FOR STOCHASTIC DAY-AHEAD BATTERY SCHEDULING.....</b>	<b>730</b>
<i>Mahtab Kaffash; Geert Deconinck</i>	
<b>POWER FLOW VISUALIZATION IN DER-RICH LOW VOLTAGE NETWORKS .....</b>	<b>735</b>
<i>Eduardo Vega-Fuentes; Jin Yang; Chengwei Lou</i>	
<b>VOLTAGE/VAR CONTROL USING ELECTRIC SPRINGS IN DISTRIBUTION NETWORKS.....</b>	<b>739</b>
<i>Shuwei Cao; Su Wang; Liang Ni; Danny H. K. Tsang</i>	
<b>OPTIMAL SIZING AND OPERATION OF ISOLATED MICROGRIDS FOR DEVELOPING COUNTRIES: HEDGING UNCERTAINTIES WITH MONTE CARLO TECHNIQUES.....</b>	<b>744</b>
<i>Davide Fioriti; Giovanni Lutzemberger; Davide Poli; Andrea Micangeli</i>	
<b>ANALYSIS OF A RESIDENTIAL HOUSE FOR THE DESIGN AND IMPLEMENTATION OF A DC NANOGRID .....</b>	<b>749</b>
<i>Jonathan P. Ore; Eckhard A. Groll</i>	
<b>EVALUATION OF SUPRAHARMONIC PROPAGATION IN LV NETWORKS BASED ON THE IMPEDANCE CHANGES CREATED BY HOUSEHOLD DEVICES .....</b>	<b>754</b>
<i>Ángela Espin-Delgado; Tatiano Busatto; Vineetha Ravindran; Sarah K. Rönnerberg; Jan Meyer</i>	

<b>COMPENSATION MECHANISM FOR ACTIVE POWER CURTAILMENT IN LV DISTRIBUTION NETWORKS.....</b>	<b>759</b>
<i>Anuradha Tomar; A. N. M. M. Haque; Phuong Nguyen</i>	
<b>ASSESSMENT OF DISTRIBUTED GENERATION HOSTING CAPACITY OF MICROGRIDS WITH THERMAL SMART LOADS.....</b>	<b>764</b>
<i>Darwin A. Quijano; Antonio Padilha-Feltrin</i>	
<b>ON THE ROLE OF PRE-CURTAILED RESIDENTIAL PV FOR PRIMARY FREQUENCY RESPONSE CONSIDERING DISTRIBUTION NETWORK CONSTRAINTS .....</b>	<b>769</b>
<i>William J. Nacmanson; Michael Liu; Luis F. Ochoa</i>	
<b>MODELLING AND ENERGY MANAGEMENT OF A FLYWHEEL STORAGE SYSTEM FOR PEAK SHAVING APPLICATIONS.....</b>	<b>774</b>
<i>Lysandros Tziouvani; Lenos Hadjidemetriou; Charalampos Charalampous; Stelios Timotheou; Elias Kyriakides</i>	
<b>UNIT COMMITMENT FRAMEWORK TO ASSESS FLEXIBILITY RESOURCE CAPABILITY FOR HIGH RE PENETRATION.....</b>	<b>779</b>
<i>Anjali Jain; Sumanth Yamujala; Partha Das; Ankita S. Gaur; Rohit Bhakar; Jyotirmay Mathur; Priyanka Kushwaha</i>	
<b>ENHANCEMENT OF POWER SYSTEM FLEXIBILITY AND OPERATING COST REDUCTION USING A BESS.....</b>	<b>784</b>
<i>Ioannis Papayiannis; Markos Asprou; Lysandros Tziouvani; Elias Kyriakides</i>	
<b>ECONOMIC ASSESSMENT OF BATTERY ENERGY STORAGE SYSTEMS FOR REDUCING PRODUCTION DEVIATIONS OF WIND FARMS .....</b>	<b>789</b>
<i>Candelaria Utrilla; Luis Rouco; Lukas Sigrist</i>	
<b>A HYBRID MODEL OF TYPE-4 WIND TURBINE – CONCEPT AND IMPLEMENTATION FOR POWER SYSTEM SIMULATION .....</b>	<b>799</b>
<i>Mikhail Andreev; Igor Razzhivin; Aleksey Suworov; Nikolay Ruban; Ruslan Ufa; Alexander Gusev; Yuly Bay; Anton Kievets; Alisher Askarov; Vladimir Rudnik</i>	
<b>A REVISIT TOWARDS OPTIMAL CONTROL MODES FOR AI ENABLED WIND POWER PLANTS .....</b>	<b>804</b>
<i>Xue Lyu; Youwei Jia; Tao Liu</i>	
<b>FREQUENCY QUALITY IN THE NORDIC SYSTEM 2040 .....</b>	<b>809</b>
<i>Erik Weihs; Mattias Persson; Peiyuan Chen</i>	
<b>A DECISION-DEPENDENT STOCHASTIC APPROACH FOR WIND FARM MAINTENANCE SCHEDULING CONSIDERING WAKE EFFECT .....</b>	<b>814</b>
<i>Wenqian Yin; Xiaosheng Peng; Yunhe Hou</i>	
<b>SHORT-TERM DISTORTION AND PROTECTION OPERATION IN DFIG-BASED WIND PARKS DURING VOLTAGE DIPS.....</b>	<b>819</b>
<i>Roger Alves De Oliveira; Cheng Chen; Math H. J. Bollen; Roberto Chouhy Leborgne</i>	
<b>EVALUATION OF GRID REDUCTION TECHNIQUES FOR DISTRIBUTION NETWORKS WITH A HIGH PENETRATION OF INVERTER-BASED GENERATION.....</b>	<b>824</b>
<i>Manuel Fernando Valois-Rodriguez; Jakob Ungerland</i>	
<b>USING WIND TURBINES FOR PROVIDING DEFINED LEVELS OF SYNTHETIC INERTIA IN SYSTEM SPLIT SCENARIOS .....</b>	<b>829</b>
<i>Martin Shan; Daniel Duckwitz; Weiwei Shan</i>	
<b>ON THE CONTRIBUTIONS OF OPERATIONAL FLEXIBILITY OFFERED BY SMART SUSTAINABLE RESIDENTIAL BUILDINGS.....</b>	<b>834</b>
<i>Iason I. Avramidis; Florin Capitanescu; Geert Deconinck</i>	
<b>INCENTIVE-BASED RAMP-UP MINIMIZATION IN MULTI-MICROGRID DISTRIBUTION SYSTEMS.....</b>	<b>839</b>
<i>Sajjad Fattaheian-Dehkordi; Mehdi Tavakkoli; Ali Abbaspour; Mahmud Fotuhi-Firuzabad; Matti Lehtonen</i>	
<b>ANCILLARY SERVICE PROVISION METHOD FOR INDUSTRIAL INVOLVEMENT .....</b>	<b>844</b>
<i>Simon Nilsson; Jimmy Ehnberg; Anne Grevener</i>	
<b>SEGMENTED ENERGY TARIFF DESIGN FOR FLATTENING LOAD DEMAND PROFILE .....</b>	<b>849</b>
<i>Na Li; Rudi A. Hakvoort; Zofia Lukszo</i>	
<b>CROSS-MARKET PRICE DIFFERENCE FORECAST USING DEEP LEARNING FOR ELECTRICITY MARKETS .....</b>	<b>854</b>
<i>Ronit Das; Rui Bo; Waqas Ur Rehman; Haotian Chen; Donald Wunsch</i>	
<b>OPTIMAL BIDDING STRATEGY FOR OFFSHORE WIND FARMS EQUIPPED WITH ENERGY STORAGE IN THE ELECTRICITY MARKETS .....</b>	<b>859</b>
<i>Ramin Ahmadi Kordkheili; Mahdi Pourakbari-Kasmaei; Matti Lehtonen; Edris Pouresmaeil</i>	
<b>TRACING HVDC FLOWS USING THE PROPORTIONAL SHARING PRINCIPLE .....</b>	<b>864</b>
<i>Eric Glende; Martin Wolter</i>	

<b>A REVIEW OF P2P ENERGY MARKETS AND A POSSIBLE APPLICATION FOR REMOTE AREAS.....</b>	<b>869</b>
<i>Ekaterina Dudkina; Emanuele Crisostomi; Davide Poli</i>	
<b>DISTRIBUTION LOCALATIONAL MARGINAL PRICING FOR COMBINED THERMAL AND ELECTRIC GRID OPERATION .....</b>	<b>874</b>
<i>Sebastian Troitzsch; Mischa Grussmann; Kai Zhang; Thomas Hamacher</i>	
<b>FREQUENCY SUPPORT OF FAST-MULTI-ENERGY STORAGE SYSTEMS IN LOW ROTATIONAL INERTIA SCENARIOS .....</b>	<b>879</b>
<i>Anne Mai Ersdal; F. Gonzalez-Longatt; Martha N. Acosta; J. L. Rueda; P. Palensky</i>	
<b>CO<sub>2</sub> EMISSION ASSESSMENT OF THE PROVISION OF ANCILLARY SERVICES BY HYDROGEN STORAGE POWER PLANTS .....</b>	<b>884</b>
<i>Elisabeth Bach; Steffen Schlegel; Dirk Westermann</i>	
<b>OPTIMAL TUNING OF ACTIVE POWER GRADIENT CONTROL FOR FREQUENCY SUPPORT IN MULTI-ENERGY SYSTEMS .....</b>	<b>889</b>
<i>Arcadio Perilla; Digvijay Gusain; José Rueda Torres; Peter Palensky; Mart Van Der Meijden; Francisco Gonzalez-Longatt</i>	
<b>PARALLEL TRANSMISSION DISTRIBUTION CO-SIMULATION LEVERAGING A COMMERCIAL DISTRIBUTION SIMULATOR.....</b>	<b>894</b>
<i>Nan Duan; Chih-Che Sun; Ryan Mast; Pedro Sotorrio; Vaibhav Donde; Wei Ren; Inalvis Alvarez-Fernandez</i>	
<b>SOLVING THE STEADY-STATE POWER FLOW PROBLEM ON INTEGRATED TRANSMISSION-DISTRIBUTION NETWORKS: A COMPARISON OF NUMERICAL METHODS.....</b>	<b>899</b>
<i>M. E. Kootte; B. Sereeter; C. Vuik</i>	
<b>DIFFERENTIAL PRIVACY FOR DEEP LEARNING-BASED ONLINE ENERGY DISAGGREGATION SYSTEM.....</b>	<b>904</b>
<i>Xiao-Yu Zhang; Stefanie Kuenzel</i>	
<b>DATA DRIVEN FRAMEWORK FOR LOAD PROFILE GENERATION IN MEDIUM VOLTAGE NETWORKS VIA TRANSFER LEARNING.....</b>	<b>909</b>
<i>Mauricio Salazar; Irena Dukovska; Phuong H. Nguyen; Raoul Bernards; Han J. G. Slootweg</i>	
<b>ENHANCING THE STATE ESTIMATION FOR LOW VOLTAGE DISTRIBUTION GRIDS .....</b>	<b>914</b>
<i>Andreas Kotsonias; Markos Asprou; Lenos Hadjidemetriou; Elias Kyriakides</i>	
<b>CLASSIFICATION OF PD FAULTS USING FEATURES EXTRACTION AND K-MEANS CLUSTERING TECHNIQUES.....</b>	<b>919</b>
<i>Haresh Kumar; Muhammad Shafiq; Ghulam Amjad Hussain; Lauri Kumpulainen; Kimmo Kauhaniemi</i>	
<b>EVENT LOCATION IDENTIFICATION IN DISTRIBUTION NETWORKS USING WAVEFORM MEASUREMENT UNITS .....</b>	<b>924</b>
<i>Milad Izadi; Hamed Mohsenian-Rad</i>	
<b>PRIVACY-COST MANAGEMENT IN SMART METERS USING DEEP REINFORCEMENT LEARNING.....</b>	<b>929</b>
<i>Mohammadhadi Shateri; Francisco Messina; Pablo Piantanida; Fabrice Labeau</i>	
<b>VOLTAGE FLICKER FROM WARM AND COOL WHITE LED BULBS .....</b>	<b>934</b>
<i>K. Jeykishan Kumar; R. Sudhir Kumar</i>	
<b>ANALYSIS OF BALANCE CONTROLLERS FOR CASCADED MODULAR SOLID-STATE TRANSFORMER DURING STEADY-STATE, TRANSIENT AND FAULT CONDITIONS .....</b>	<b>939</b>
<i>Naga Brahmendra Yadav Gorla; Jaydeep Saha; Rohit Chandra; Sanjib Kumar Panda</i>	
<b>A MODULAR APPROACH TO LARGE-SIGNAL MODELING OF AN INTERCONNECTED AC/MTDC SYSTEM .....</b>	<b>945</b>
<i>Yoshihiko Susuki; Naoki Kawamoto; Yusuke Ohashi; Atsushi Ishigame; Tsuyoshi Funaki; Salvatore D'Arco</i>	
<b>FLICKER SOURCE DETECTION USING CORRELATION COEFFICIENTS .....</b>	<b>950</b>
<i>Gaurav Singh; Carl Miller</i>	
<b>NEAR-OPTIMAL USE OF A MRE EXPORT CABLE CONSIDERING THERMAL AND TECHNO-ECONOMIC ASPECTS .....</b>	<b>955</b>
<i>C.-H. Bonnard; A. Blavette; Savy Bourguet; Thomas Soulard; Yves Perignon</i>	
<b>RESEARCH OF THYRISTOR VOLTAGE REGULATOR CHARACTERISTICS IN TRANSVERSE OUTPUT VOLTAGE REGULATION MODE .....</b>	<b>960</b>
<i>Elena Sosnina; Alexey Kralin; Evgeny Kryukov; Rustam Bedretdinov</i>	
<b>THE COMBINATION OF SINGLE- AND THREE-PHASE INVERTERS INTO A HYBRID ENERGY STORAGE SYSTEM.....</b>	<b>965</b>
<i>Simon Resch; Matthias Luther</i>	
<b>CONTROL OF INERTIA IN HYBRID MICROGRIDS FROM A REGULATED DC MICROGRID SYSTEM.....</b>	<b>970</b>
<i>Somesh Bhattacharya; Sukumar Mishra; Brian Azzopardi</i>	

<b>AN INTELLIGENT MEASUREMENT AND CONTROL DEVICE FOR ACTIVE DISTRIBUTION GRIDS .....</b>	<b>975</b>
<i>Rajkumar Palaniappan; Björn Bauernschmitt; Dominik Hilbrich; Christian Rehtanz</i>	
<b>IMPLEMENTATION OF BESS LOAD FREQUENCY CONTROL IN ISLANDED MICROGRID SYSTEM BY CONSIDERING SOC .....</b>	<b>980</b>
<i>Sandro Sitompul; Goro Fujita</i>	
<b>SOFTWARE-IN-THE-LOOP TESTING OF A DISTRIBUTED OPTIMAL SCHEDULING STRATEGY FOR MICROGRIDS' AGGREGATORS .....</b>	<b>985</b>
<i>Fabio Bonassi; Alessio La Bella; Lorenzo Fagiano; Riccardo Scattolini; Donato Zarrilli; Pablo Almaleck</i>	
<b>CLOSE TO REAL TIME CONTROLLER PERFORMING ENERGY EXCHANGES UNDER NETWORK CONSTRAINTS .....</b>	<b>990</b>
<i>Marjorie Cosson; Charles Payement; Gorazd Azman; Zoran Vujasinovic</i>	
<b>RESILIENCE ENHANCING THROUGH MICROGRIDS FORMATION AND DISTRIBUTED GENERATION ALLOCATION .....</b>	<b>995</b>
<i>Juan Manuel Home-Ortiz; José Roberto Sanches Mantovani</i>	
<b>MULTI-STAGE CONGESTION MANAGEMENT CONSIDERING MAXIMUM LEAD TIME AND VOLTAGE-DEPENDENT LOAD MODELS .....</b>	<b>1000</b>
<i>D. Fang; M. Zou; J. Gunda; G. Harrison; S. Z. Djokic; A. Vaccaro</i>	
<b>REINFORCEMENT LEARNING BASED ENERGY MANAGEMENT ALGORITHM FOR ENERGY TRADING AND CONTINGENCY RESERVE APPLICATION IN A MICROGRID .....</b>	<b>1005</b>
<i>Chongaih Hau; Krishnanand Kaippilly Radhakrishnan; Junyen Siu; Sanjib Kumar Panda</i>	
<b>INCREASING DISTRIBUTED GENERATION HOSTING CAPACITY IN DISTRIBUTION NETWORKS: A CO<sub>2</sub> EMISSION ANALYSIS .....</b>	<b>1010</b>
<i>Ozy D. Melgar-Dominguez; José R. S. Mantovani; Mahdi Pourakbari-Kasmaei; Matti Lehtonen</i>	
<b>BATTERY ENERGY STORAGE SYSTEMS ALLOCATION CONSIDERING DISTRIBUTION NETWORK CONGESTION .....</b>	<b>1015</b>
<i>Ahmed A. Raouf Mohamed; D. John Morrow; Robert J. Best; Ian Bailie; Andrew Cupples; Jonathan Pollock</i>	
<b>REINFORCEMENT LEARNING BASED APPROACH FOR VIRTUAL INERTIA CONTROL IN MICROGRIDS WITH RENEWABLE ENERGY SOURCES .....</b>	<b>1020</b>
<i>Vjatseslav Skiparev; Juri Belikov; Eduard Petlenkov</i>	
<b>AN OPEN-SOURCE IMPLEMENTATION OF GRID-FORMING CONVERTERS USING MODELICA .....</b>	<b>1025</b>
<i>Q. Cossart; F. Rosière; A. Guironnet; M. Saugier</i>	
<b>A PROBABILISTIC MODEL FOR CHARACTERISING HEAT PUMP ELECTRICAL DEMAND VERSUS TEMPERATURE .....</b>	<b>1030</b>
<i>Amy Anderson; Bruce Stephen; Rory Telford; Stephen McArthur</i>	
<b>IMPACT OF MODELLING ASSUMPTIONS ON THE VOLTAGE STABILITY ASSESSMENT OF ACTIVE DISTRIBUTION GRIDS .....</b>	<b>1040</b>
<i>Aleksandar Boricic; Jose L. Rueda Torres; Marjan Popov</i>	
<b>PARAMETER OPTIMIZATION OF DIFFERENTIAL EVOLUTION AND PARTICLE SWARM OPTIMIZATION IN THE CONTEXT OF OPTIMAL POWER FLOW .....</b>	<b>1045</b>
<i>Tom Sennewald; Franz Linke; Jakob Reck; Dirk Westermann</i>	
<b>A NOVEL ENERGY MANAGEMENT SYSTEM FOR CRUISE SHIPS INCLUDING FORECASTING VIA LSTM .....</b>	<b>1050</b>
<i>Pengchao Wei; Samira Vogt; Danyang Wang; Raul Elizondo Gonzalez; Ogun Yurdakul; Sahin Albayrak</i>	
<b>ON ASSESSMENT OF THE SCENARIO CLUSTERING IN STOCHASTIC BIDDING: A FULL-CYCLE PERSPECTIVE .....</b>	<b>1055</b>
<i>Guangchun Ruan; Haiwang Zhong; Qing Xia; Chongqing Kang</i>	
<b>ON THE OPTIMALITY OF ELECTRICITY TARIFFS FOR SAUDI ARABIA'S RESIDENTIAL SECTOR CONSIDERING THE EFFECT OF DER .....</b>	<b>1060</b>
<i>Bader Alaskar; Abdullah Alhadlaq; Ahmad Alabdulkareem; Abdullah Alfadda</i>	
<b>LOCAL ENERGY EXCHANGE USING ENERGY COMMUNITY INTERACTION MATRIX .....</b>	<b>1065</b>
<i>Ajla Mehinovic; Džemo Borovina; Matej Zajc; Andrej Souvent; Nermin Suljanovic</i>	
<b>SIMULTANEOUS REDUCTION OF EMISSIONS AND COSTS BY CURTAILING RENEWABLES IN OPTIMAL OPERATION OF POWER SYSTEMS .....</b>	<b>1070</b>
<i>Germán Morales-España; Jos Sijm</i>	
<b>NETWORK OPERATOR OWNED STORAGES AS AN OPTION FOR CONGESTION MANAGEMENT .....</b>	<b>1074</b>
<i>Georg Gutermuth; Marco Giuntoli</i>	
<b>MODELING THE DECENTRALIZED ENERGY INVESTMENT AND OPERATION IN THE PROSUMER ERA: A SYSTEMATIC REVIEW .....</b>	<b>1079</b>
<i>Ni Wang; Remco Verzijlbergh; Petra Heijnen; Paulien Herder</i>	

<b>CONVERGENCE OF NEWTON'S METHOD FOR STEADY-STATE LOAD FLOW PROBLEMS IN MULTI-CARRIER ENERGY SYSTEMS .....</b>	<b>1084</b>
<i>Anne S. Markensteijn; Kees Vuik</i>	
<b>A MODELLING FRAMEWORK FOR CHARACTERISING THE IMPACTS OF UNCERTAINTY ON ENERGY SYSTEMS.....</b>	<b>1089</b>
<i>Yongning Zhao; Meysam Qadrdan; Nick Jenkins</i>	
<b>HIERARCHICAL MODEL PREDICTIVE CONTROL FOR ENERGY MANAGEMENT OF POWER-TO-X SYSTEMS .....</b>	<b>1094</b>
<i>Oguzhan Kaya; Els Van Der Roest; Dirk Vries; Tamas Keviczky</i>	
<b>USING DQ0 SIGNALS BASED ON THE CENTRAL ANGLE REFERENCE FRAME TO MODEL THE DYNAMICS OF LARGE-SCALE POWER SYSTEMS.....</b>	<b>1099</b>
<i>Noa Zargari; Ron Ofir; Yoash Levron; Juri Belikov</i>	
<b>HIGH PERFORMANCE COMPUTING VS. HEURISTIC: A PERFORMANCE BENCHMARK FOR OPTIMIZATION PROBLEMS WITH LINEAR POWER FLOWS .....</b>	<b>1104</b>
<i>Karl-Kiên Cao; Manuel Wetzel</i>	
<b>ASSESSING ENERGY STORAGE REQUIREMENTS BASED ON ACCEPTED RISKS .....</b>	<b>1109</b>
<i>Michael P. Evans; Simon H. Tindemans</i>	
<b>FLEXIBLE PLATFORM FOR THE STUDY AND TESTING OF SMART ENERGY SYSTEMS ENABLING-TECHNOLOGIES .....</b>	<b>1114</b>
<i>Catalin Iosif Ciontea; Kamal Shahid; Florin Iov; Rasmus Løvenstein Olsen</i>	
<b>ACCURATE MEASUREMENT SYSTEM FOR POWER QUALITY MONITORING IN A REAL GRID CONTEXT .....</b>	<b>1120</b>
<i>Paolo Castello; Alberto Murenu; Paolo Attilio Pegoraro; Sara Sulis</i>	
<b>A CIRCUIT-THEORETIC APPROACH TO STATE ESTIMATION .....</b>	<b>1126</b>
<i>Shimiao Li; Amritanshu Pandey; Soumya Kar; Larry Pileggi</i>	
<b>DETECTION OF ERRORS IN THREE-PHASE LINE MODELS USING SYNCHRONIZED PHASOR MEASUREMENTS.....</b>	<b>1131</b>
<i>Ramtin Khalili; Ali Abur</i>	
<b>A PARALLEL FRAMEWORK FOR ROBUST STATE ESTIMATION USING NODE-BREAKER SUBSTATION MODELS .....</b>	<b>1136</b>
<i>Bilgehan Donmez; Ali Abur</i>	
<b>OPTIMAL UFLS SETTINGS: AN ASSESSMENT OF FREQUENCY SYSTEM RESPONSE INDICATORS.....</b>	<b>1141</b>
<i>Choidorj Adiyabazar; F. Gonzalez-Longatt; Martha N. Acosta; J. L. Rueda; P. Palensky</i>	
<b>INSIGHTS ON CAPACITY VALUE OF PHOTOVOLTAIC SYSTEMS COUPLED WITH BATTERIES .....</b>	<b>1146</b>
<i>Wouter L. Schram; Ioannis Lampropoulos; Wilfried Van Sark</i>	
<b>SHARED AUTONOMOUS ELECTRIC VEHICLES AND THE POWER GRID: APPLICATIONS AND RESEARCH CHALLENGES .....</b>	<b>1151</b>
<i>Marco Pruckner; David Eckhoff</i>	
<b>IMPROVING FREQUENCY STABILITY WITH INERTIAL AND PRIMARY FREQUENCY RESPONSE VIA DFIG WIND TURBINES EQUIPPED WITH ENERGY STORAGE SYSTEM.....</b>	<b>1156</b>
<i>Christos Nikolakakos; Umer Mushtaq; Peter Palensky; Miloš Cvetkovic</i>	
<b>DISTRIBUTED CONTROL OF VIRTUAL STORAGE PLANTS IN MICROGRIDS FOR SHORT TERM OPERATING RESERVE IN UK .....</b>	<b>1161</b>
<i>Tianqiao Zhao; Alessandra Parisio; Jovica V. Milanovic</i>	
<b>RELOCATABLE ENERGY STORAGE SYSTEMS FOR CONGESTION MANAGEMENT .....</b>	<b>1166</b>
<i>Suzanne Janssen; Aihui Fu; Miloš Cvetkovic; Peter Palensky</i>	
<b>CVAR-CONSTRAINED STOCHASTIC BIDDING STRATEGY FOR A VIRTUAL POWER PLANT WITH MOBILE ENERGY STORAGES.....</b>	<b>1171</b>
<i>Dongliang Xiao; Hongbo Sun; Daniel Nikovski; Shoichi Kitamura; Kazuyuki Mori; Hiroyuki Hashimoto</i>	
<b>ONE YEAR OPERATION OF AN INNOVATIVE CONDITION MONITORING TECHNIQUE IN FOUR HYDROPOWER PLANTS.....</b>	<b>1176</b>
<i>Antonio Piazzì; Mauro Tucci; Fabrizio Ruffini; Emanuele Crisostomi</i>	
<b>LOW VOLTAGE NETWORK CLUSTERING FOR HIGH RENEWABLE PENETRATION STUDIES—AN ISOLATED NETWORK CASE STUDY .....</b>	<b>1181</b>
<i>Simon Glenister; Ali Arefi; Moayed Moghbel; Md Asaduzzaman Shoeb; Martina Calais; David Edwards; David Stephens; Luke Jones; Pierce Trinkl</i>	
<b>PRACTICAL IMPLEMENTATION OF OPTIMAL VOLTAGE CONTROL IN DISTRIBUTION NETWORK – SYSTEM VERIFICATION, TESTING AND SAFETY PRECAUTIONS.....</b>	<b>1186</b>
<i>Kalle Ruuth; Antti Supponen; Sami Repo; Kenneth Røsland Rosenørn; Philip Douglass; Michael Møller</i>	

<b>FLEXIBILITY MARKET DESIGN FOR CONGESTION MANAGEMENT IN SMART DISTRIBUTION GRIDS: THE DUTCH DEMONSTRATION OF THE INTERFLEX PROJECT</b> .....	1191
<i>Hadis Pourasghar Khomami; Rik Fonteijn; Daphne Geelen</i>	
<b>TOWARDS SMART BUILDINGS: A VERSATILE ACQUISITION SETUP FOR INDOOR CLIMATE DATA</b> .....	1196
<i>Dominique Sauer; Richard Jumar; Richard Lutz; Thorsten Schlachter; Christian Schmitt; Veit Hagenmeyer</i>	
<b>ASSESSMENT OF UNDER-FREQUENCY LOAD SHEDDING IN MONGOLIA CONSIDERING INERTIA SCENARIOS</b> .....	1201
<i>Choidorj Adiyabazar; F. Gonzalez-Longatt; Martha N. Acosta; J. L. Rueda; P. Palensky</i>	
<b>IMPACT OF THE DYNAMIC LINE RATING ANALYSIS IN REGIONS WITH HIGH LEVELS OF WIND AND SOLAR PV GENERATION</b> .....	1206
<i>António Couto; Joaquim Duque; Hugo Algarvio; Ana Estanqueiro; Rui Pestana; João Esteves; Yang Cao</i>	
<b>TECHNICAL CHALLENGES AND LEGAL BARRIERS TO PRE-START A GRID BASED ON WIND POWER IN THE WESTERN PART OF SWEDEN</b> .....	1211
<i>Jimmy Ehnberg</i>	
<b>DISTRIBUTED ONLINE OPTIMIZATION FOR VOLTAGE CONTROL IN LOW VOLTAGE DISTRIBUTION NETWORKS</b> .....	1216
<i>Boyuan Wei; Geert Deconinck</i>	
<b>OPTIMAL DISTRIBUTION GRID OPERATION USING DEMAND RESPONSE</b> .....	1221
<i>Ricardo Faia; Bruno Canizes; Pedro Faria; Zita Vale; José M. Terras; Luís V. Cunha</i>	
<b>DISTRIBUTED CONTROL OF ISLANDED MICROGRIDS BASED ON BATTERY SOC IN DISASTER SITUATIONS</b> .....	1226
<i>Samuel Kihembo Mumbere; Yoshiki Tanioka; Soichiro Matsumoto; Yutaka Sasaki; Yoshifumi Zoka; Naoto Yorino</i>	
<b>OPTIMAL RESTORATION OF DISTRIBUTION NETWORKS THROUGH RECONFIGURATION AND MICROGRID FORMATION</b> .....	1231
<i>Leonardo H. Macedo; Gregorio Muñoz-Delgado; Javier Contreras; Rubén Romero</i>	
<b>Author Index</b>	