2019 IEEE International Conference on Energy Internet (ICEI 2019)

Nanjing, China 27 - 31 May 2019



IEEE Catalog Number: CFP19D74-POD ISBN:

978-1-7281-1494-1

Copyright © 2019 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:
 CFP19D74-POD

 ISBN (Print-On-Demand):
 978-1-7281-1494-1

 ISBN (Online):
 978-1-7281-1493-4

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



2019 IEEE International Conference on Energy Internet (ICEI) ICEI 2019

Table of Contents

Message from General Chairs xx. Conference Organization xxi.
Architecture and Design of Energy Internet
Multi-Session Mapping for Indoor Substation Environment Using a Head-Mounted RGB-D Sensor .1
A Method of Identifying Power System Oscillation and Tracking Oscillation Center Based on Wide Area Measurement System .7
An Improved Hydraulic Turbine Model and Its Impact on Fast Frequency Response .13. Chi Tian (Dalian University of Technology), Rao Liu (Dalian University of Technology), Chenyue Yao (Dalian University of Technology), Quan Lv (Dalian University of Technology), and Haixia Wang (Dalian University of Technology)
Migration Laws of Power System Out-of-Step Center with High-Penetration of Grid-Connected Photovoltaic 19

Plant .25	
Yun Liu (State Grid JIBEI Information & Telecommu Hao Qin (State Grid Beijing Electric Power Company (State Grid JIBEI Information & Telecommunication Shi (Global Energy Interconnection Research Institut Grid Key Laboratory of Information & Network Secu (Global Energy Interconnection Research Institute co Key Laboratory of Information & Network Security), (Global Energy Interconnection Research Institute co Key Laboratory of Information & Network Security)	nication Company), y), Zhongtao Chen Company), Congcong e co. Ltd. State rity), Rui Zhang o. Ltd. State Grid and Wei Chen
Reserch on Cyber Attack of key Measurement and Contractional Jiaxuan Fei (State Grid Key Laboratory of Information Security), Congcong Shi (State Grid Key Laboratory Network Security), Xuechong Yuan (State Grid Beijin Company), Rui Zhang (State Grid Key Laboratory of Network Security), Wei Chen (State Grid Key Laboratory & Network Security), and Yi Yang (State Grid Jiangs).	on & Network of Information & g Electric Power Information & tory of Information
Cyber Contingencies Impacts Analysis in Cyber Physical Keren Chen (Zhejiang University), Fushuan Wen (Ta Technology), and Ivo Palu (Tallinn University of Tech	llinn University of
Study on Grounding Modes of AC/DC Hybrid Distribution Wei Zhang (China Co., Ltd.), Tao Wei (China Co., Ltd.), China Co., Ltd.), Yanyan Ltd.), Wei Liu (China Co., Ltd.), and Jinggang Yang (Jiangsu Electric Power Co., Ltd. Research Institute)	d.), Qing Chen 1 Cui (China Co.,
Study on the Relationship Between Partial Discharge Car Energy 47	Ltd.), Dan Zhao vang Zhao (State (State Grid Grid Liaoning
Rotating Machinery Fault Prediction Method Based on B Ling Zheng (North China Electric Power University), China Electric Power University), Fei Chen (North C University), Biying Chen (North China Electric Power Wenhao Xue (North China Electric Power University (North China Electric Power University), and Jianbin Electric Power University)	Jiaqi Chen (North hina Electric Power r University),), Pengtian Guo
A Method for Distribution Line Impedance Calculation E Integration .59	Beijing Jiaotong ower Co. , Ltd),

Key Techniques of Multi-Energy Systems Modeling and Simulation .64
Modeling of CHP-EHP Coupled Energy Station Considering Load Side Flexibility 7.1. Lu Zhang (North China Electric Power University) and Yongqiang Zhu (North China Electric Power University)
A Co-Simulation Platform for Cyber-Physical Power Systems Utilizing State Caching Based Synchronization Method .75
Optimal Design of Energy Hub Based on Matrix Analysis Theory .8.1
Research on Global Uncertainty and Sensitivity Analysis(SA) Algorithms Based on the Development of Energy Internet .86
Survey for Information Security Strategies and Techniques Based on the Development of Energy Internet 92

Energy Switching and Routing for Energy Internet

Unit Commitment Problems in Power Systems With Wind Farms Based on Probability Offset Binary Particle Swarm Optimization Algorithm .104. Peng Xi (State Grid Hebei Economic Research Institute), Jia-Kun An (State Grid Hebei Economic Research Institute), Xiao-Guang Qi (State Grid Hebei Economic Research Institute), Rui Liu (State Grid Hebei Economic Research Institute), Liang-Dong Qin (State Grid Hebei Electric Power CO., LTD), Hua Shao (State Grid Hebei Economic Research Institute), Zhang Zhang (State Grid Hebei Economic Research Institute), Li-Jie Zhang (State Grid Hebei Economic Research Institute), Kun Wang (State Grid Shijiazhuang Gaocheng Electric Power Supply Company), and Fei-Fei Zhang (State Grid Hebei Electric Power CO., LTD)
Analysis on Comprehensive Analysis and Management of Renewable Energy Data 1.1.0
A Second Order Indice for Estimating Voltage Stability Margin Based on Analytic Thévenin Equivalent .1.16. Tiankui Sun (Jiangsu Electric Power Research Institute), Haitao Liu (Nanjing Institute of Technology), and Zhimin Li (Harbin Institute of Technology)
A Low-Cost Multi-Port Type HVDC Breaker for HVDC Grids .121. Feng Xu (State Grid Zhejiang), Yi Lu (State Grid Zhejiang), Xiaojun Ni (State Grid Zhejiang), and Chaoliang Wang (State Grid Zhejiang)
Incremental Distribution Network Planning with Energy Storage .127. Guilian Wu (Fujian Economic Technology Research Institute), Linyao Zhang (Fujian Economic Technology Research Institute), Xue Chen (Fujian Economic Technology Research Institute), Dayang Huang (Fujian Yongfu Power Design Co., Ltd.), and Jie Wang (Fuzhou University)
AGC Control Performance Evaluation Standard for Battery Energy Storage Considering Battery Life .132 Song Zhao (Dalian University of Technology), XingJi Hu (Dalian University of Technology), XiBai Li (Dalian University of Technology), Yu Ba (Dalian University of Technology), and WeiDong Li (Dalian University of Technology)
Research on Coordinated Recovery Control of Emergency DC Power Supply and Voltage Dependent Current Order Limiter .138

A Method for State Assessment of Intelligent Substation Secondary Equipment Based on Fuzzy Set Theory .144.
Theory 144. Zhiwei Dong (State Grid Liaoning Electric Power Company Limited), Meng Wu (State Grid Liaoning Electric Power Company Limited), Wei Huang (State Grid Liaoning Electric Power Company Limited), Min Wang (State Grid Liaoning Electric Power Company Limited), Mingrui Wang (Shenyang No.2 High School), and Baoquan Song (State Grid Liaoning Electric Power Company Limited)
Reliability Evaluation of Weak Transmission Terminal Power Grid with EHV/UHV Direct Current .1.49 Tianshu Zhang (North China Electric Power University), Mingxuan Lu (North China Electric Power University), Ming Zhou (North China Electric Power University), and Mengxi Hou (Transmission Network Planning Center State Grid Economic and Technological Research Institute CO.LTD)
A Planning Method of New Energy Integration System with Multi-Circuit DC in Continuous Cost .155
Short-Term Energy Cache Regulation for Energy Router: A Robust H-Infinity Approach .1.61
Node Importance Evaluation in Power System Restoration Considering the Impact of DC Converter Station .167
Static Voltage Stability Domain and Power Margin for Multi-Infeed DC System During Recovery Process .1.7.3 Shandong Yang (Shandong University), Hongtao Wang (Shandong University), Dong Yang (Shandong Electric Power Research Institute State Grid), Huan Ma (Shandong Electric Power Research Institute State Grid), and Kang Zhao (Shandong Electric Power Research Institute State Grid)
Information and Communication for Energy Internet
Micro-Kernel OS Architecture and its Ecosystem Construction for Ubiquitous Electric Power IoT .1.79
Framework Design of Edge IoT Agent Used in State Grid Electrical Internet of Things .185

Authentication Algorithm and Techniques Under Edge Computing in Smart Grids .191	
Controller Deployment in SDN-Enabled Redundant Structure with Considering Network Reliability .196 Zhang Zenghua (Global Energy Interconnection Research Institute Co. Ltd), Chuan Liu (Global Energy Interconnection Research Institute Co. Ltd), Zheng Lou (Science Information and Communication Technology Department, State Grid JiangSu Electric Power Co. Ltd), Xin Xu (State Grid Chongqing Electric Power co. State Grid Chongqing Electric Power Co. Ltd), Weichun Ge (State Grid Liaoning Electric Power Company Shenyang), and Huanhuan luo (State Grid Liaoning Electric Power Company Shenyang)	
nfluence Analysis of Voltage Stochastic Error on Similarity Calculation 201. Zeyang Tang (Electric Power Research Institute State Grid Hubei Electric Power Co., Ltd), Kunpeng Zhou (Electric Power Research Institute State Grid Hubei Electric Power Co., Ltd), and Kan Cao (Electric Power Research Institute State Grid Hubei Electric Power Co., Ltd)	
Research on Partial Discharge Detection Based on Spectrum Analysis in the Complicated and Strong Relectromagnetic Environment of Substation .206	
Time-Sensitive Network Technology and Its Application in Energy Internet .2.11. Li Huang (Global Energy Internet Research Institute Co., Ltd.), Yun Liang (Global Energy Internet Research Institute Co., Ltd.), Yajian Zhang (Tianjin University), Yonggang Wang (XJ Group Corporation), and Qiang Wang (XJ Group Corporation)	
Electric Device Abnormal Detection Based on IoT and Knowledge Graph .2.17	
An Optimal Real-Time Pricing Algorithm With Compensation Mechanism Designed For Critical Power Hortage .221	

Paging-Efficient NB-IoT Resource Allocation for Massive-Connectivity-Enabled Communications in Smart Grid .227..... Yao Wang (Global Energy Interconnection Research Institute, State Grid Corporation of China), Yun Liang (Global Energy Interconnection Research Institute, State Grid Corporation of China), Wenfeng Tian (Global Energy Interconnection Research Institute, State Grid Corporation of China), Pengfei Zeng (Global Energy Interconnection Research Institute, State Grid Corporation of China), Oiang Zhao (Beijing University of Posts and Telecommunications), Jin Tan (Beijing University of Posts and Telecommunications), Jinlong Chai (Beijing University of Posts and Telecommunications), and Lei Feng (Beijing University of Posts and Telecommunications) Noise Reduction for Time-Domain Sensing Signal of Brillouin Scattering Based on Time Series Analysis and Kalman Filter Algorithm 232 Hongzhen Yang (Information & Telecommunication Branch, State Grid Zhejiang Electric Power Co., Ltd.), Jianpeng Zhao (Information & Telecommunication Branch, State Grid Zhejiang Electric Power Co., Ltd.), Hui Wu (Information & Telecommunication Branch, State Grid Zhejiang Electric Power Co., Ltd.), Chao Fan (Information & Telecommunication Branch, State Grid Zhejiang Electric Power Co., Ltd.), and Yuxiang Lv (Anhui Jiyuan Software Co. Ltd. State Grid Info. & Telecom. Group Co. Ltd.) **Smart Devices in Energy Internet** Performance Modeling and Assessment of Unified Video Surveillance System Based on Ubiquitous SG-eIoT.238 Shidong liu (Global Energy Interconnection Research Institute) and Xiande Bu (Global Energy Interconnection Research Institute) Research on Optimization of Wind Power System Based on Reliability Evaluation and Modeling 244...... Yang Qi (Economy Technical Research Institute of Liaoning Elctric CO., Ltd.), Yutong Liu (Economy Technical Research Institute of Liaoning Elctric CO., Ltd.), Jing Gao (Economy Technical Research Institute of Liaoning Elctric C0., Ltd.), Yihe Wang (Economy Technical Research Institute of Liaoning Elctric CO., Ltd.), Fengxi Gao (Economy Technical Research Institute of Liaoning Eletric Co., Ltd.), and Shanshan Wang (Electric Powerl Research Institute of Liaoning Eletric C0., Ltd.) State Monitoring System Based on Wireless Charging .250. Chunlong Li (Global Energy Internet Research Institute Co., Ltd.), Hui Huang (Global Energy Internet Research Institute Co., Ltd.), and Luming Li (State Grid Jiangxi Electric Power Company) Hierarchical Optimal Control of Electric Vehicle Considering Wind Power Consumption .255..... Tao Yu (College of Electrical and Information Engineering, Hunan University, Changsha), Minfang Peng (College of Electrical and Information Engineering, Hunan University, Changsha), and Xiaodan Xu (College of Electrical and Information Engineering, Hunan University, Changsha)

A Novel Method for Evaluating the Operating Status of Complex Intelligent Equipment .261	
Research on Locating and Sizing of Concentrating Solar Power Plant with Electric Heater .267	
Optimal Dispatch for Power System Considering Pumped Storage and Demand Response .273 Deyi Li (Xi'an Jiaotong University), Huizhe Chen (Training Center of State Grid Zhe'Jiang Electric Power Co.Ltd), and Hanjie Yuan (Xi'an Jiaotong University)	
Reliability Evaluation Model of Zhangbei Multi-Terminal HVDC Transmission System .279	
Heating Calculation Under the Topology of Cascaded Full-Bridge HVDC Circuit Breaker .285	

Energy Management Systems for Energy Internet

Engineering Measurement Method of New Energy Consumption Based on Multi-Constraint Analysis .298. Xiaoguang Qi (State Grid Hebei Electric Power Co., Ltd. Institute of Economics and Technology), Jiakun An (State Grid Hebei Electric Power Co., Ltd. Institute of Economics and Technology), Peng Xi (State Grid Hebei Electric Power Co., Ltd. Institute of Economics and Technology), Hua Shao (State Grid Hebei Electric Power Co., Ltd. Institute of Economics and Technology), Ying Wang (State Grid Hebei Electric Power Co., Ltd. Institute of Economics and Technology), and Rui Liu (State Grid Hebei Electric Power Co., Ltd. Institute of Economics and Technology)	
Combined Optimization Model for Electricity and Byproduct Gas in Energy-Intensive Enterprises with Self-Provided Power Plants .303	
Dispatching and Control Center) Multi-Objective Optimal Calculation for Integrated Local Area Energy System Based on NSGA-II Algorithm 310	
Tianhao Liu (University of Hong Kong) and Dongdong Zhang (Xi'an Jiaotong University)	
Optimal Allocation of Distributed Energy Resources in Energy Microgrids 316	
Optimal Allocation of Time-Space Cooperation for Fast Frequency Response Reserve 322	••••
An Iteration Method for Optimal Energy Flow of Combined Heating and Electricity System .328	

Multi-Objective Optimal Day-Ahead Dispatching for Offshore Integrated Electricity and Natural Gas Energy System Considering Load Forecasting .333
Evaluation of Black-Start Schemes Based on Prospect Theory and Improved TOPSIS Method .339
Consumption Ability Estimation of Distribution System Interconnected with Microgrids 345. Min Zhao (Economic Research Institute State Grid Jibei Electric Power Company Limited), Shunxin Li (Economic Research Institute State Grid Jibei Electric Power Company Limited), Dong Xiao (Key Laboratory of Underwater Acoustic Environment, Institute of Acoustics, Chinese Academy of Sciences), Guoliang Zhao (Economic Research Institute State Grid Jibei Electric Power Company Limited), Bo Li (Economic Research Institute State Grid Jibei Electric Power Company Limited), Li Liu (Economic Research Institute State Grid Jibei Electric Power Company Limited), Xiangyu Chen (Economic Research Institute State Grid Jibei Electric Power Company Limited), and Min Yang (Economic Research Institute State Grid Jibei Electric Power Company Limited)
A Differential Game Model of Energy Demand Side Management for Micro Grid .351. Yanzhu Liu (Great Wall Computer Software and Systems Inc.), Zhi Li (State Grid Information & Telecommunication Group Co., Ltd.), Di Liu (State Grid Information & Telecommunication Group Co., Ltd.), Xueying Ding (State Grid Information & Telecommunication Group Co., Ltd.), Mimi Zhang (State Grid Information & Telecommunication Group Co., Ltd.), and Yuanyuan Liu (State Grid Information & Telecommunication Group Co., Ltd.)
Measuring Interestingness of Theorems in Automated Theorem Finding by Forward Reasoning Based on Strong Relevant Logic .356. Hongbiao Gao (North China Electric Power University), Jianbin Li (North China Electric Power University), and Jingde Cheng (Saitama University)
Energy-Efficient Spectrum Allocation for Wireless Sensor Networks in Micro-Grids 362. Jiming Yao (State Grid Corporation of China Beijing), Lei Wei (State Grid Jiangsu Electric Power Company), Yintao Li (Tangshan Power Supply Company, State Grid Jibei Electric Power Company), and Peng Lin (Beijing Vectinfo Technologies Company)
Optimal Operation Model of the Multi-Energy Network in the Distribution System .368

Automated Testing of Energy Hotspots and Defects for Android Applications 37.4. Ao Liu (Nankai University), Jing Xu (Nankai University,), Weijing Wang (Nankai University), Jiawei Yu (Nankai University), and Hongcan Gao (Nankai University)
Infrastructure and Control Strategy of Microgrid Energy Switches for Regional Energy Internet .380
Shapelets-Based Research on Fault Classification of Rotating Machinery .386. Ling Zheng (North China Electric Power University), Biying Chen (North China Electric Power University), Fei Chen (North China Electric Power University), Wenhao Xue (North China Electric Power University), Pengtian Guo (North China Electric Power University), Jiaqi Chen (North China Electric Power University), and Jianbin Li (North China Electric Power University)
Predictive CO2-Efficient Scheduling of Hybrid Electric and Thermal Loads .392. Laura Fiorini (University of Groningen) and Marco Aiello (University of Stuttgart)
A Load Classification Framework Based on VMD and Singular Value Energy Difference Spectrum .398
Load Pattern Recognition and Prediction Based on DTW K-Mediods Clustering and Markov Model .403 Shen kaili Shen (National University of Defense Technology), Wei Liu (National University of Defense Technology), and Tao Zhang (National University of Defense Technology)
IDEMS: An Intelligent Dynamic Environment Monitoring System for Data Center of Energy Internet .409 Fangqi Xiang (Tsinghua University), ZhaoGuo Wang (Tsinghua University), Zi Wang (State Grid Tianjin Electric Power Company), and Yibo Xue (Tsinghua University)
Method for Evaluation on Power Grid Operation Status for Intra-Day Tie-Line Scheduling .4.15

Energy Market and Trading for Energy Internet

Application and Prospect of Integrated Energy Interoperability Management System Based on Blockchain.42. Songsong Chen (China Electric Power Research Institute), Bingqing Guo (China Electric Power Research Institute), Huaguang Yan (China Electric Power Research Institute), Qiuyue Qin (North China Electric Power University Beijing), Bin Li (North China Electric Power University Beijing), and Bing Qi (North China Electric Power University Beijing)	L.
Alliance Game Pricing Model of Charging Service Fee Under Market Competition Mode .426. Shu Su (State Grid Electric Vehicle Service Company), Wen Wang (State Grid Electric Vehicle Service Company), Hui Yan (State Grid Electric Vehicle Service Company), and Ning Ding (State Grid Electric Vehicle Service Company)	•
Key Line Identification of Power Network Considering Active and Reactive Power Coupling Relationship between Branches .432	. •
Research and Design of Simulation System for Electricity Sales Market Operations .437	•
Multi-Energy Services for Buildings in China: Cost-Effectiveness Analysis and Market Potential Forecast 444. Fang Tang (State Grid Energy Research Institute), Hongcai Dai (State Grid Energy Research Institute), and Yongfang Jian (State Grid Energy Research Institute)	••
Research on Locational Marginal Value of Wind Power .449	
Minimizing Electricity Cost in Multi-Electricity-Market Environment .455	••

Research on the Power Quality Control of Distributed Photovoltaic Power .461. Jichuan Zhang (China Electric Power Research Institute), Qun Ma (State Grid Jilin Electric Power Company Limited), Shengfeng Xia (State Grid Fujian Electric Power Company Limited), and Guo Huan (Chong Qing university)	
An Insurance-Based Pricing Method of Power Supply Reliability in Electricity Retail Market .466 Lizhi Dong (Hohai University), Haoming Liu (Hohai University), Wenqian Yin (The University of Hong Kong), and Yunhe Hou (The University of Hong Kong)	
Fuel Hedging and Optimal Energy Management .472	
A Smart Contract-based Energy Trading Strategy in Energy Internet 478. Haixia You (Tsinghua University), Haochen Hua (Tsinghua University), and Junwei Cao (Tsinghua University)	
Machine Learning and Artificial Intelligence	
Digital Innovation to Drive Intelligent Utility Enterprise <u>484</u> Bernd Keller (SAP SE)	
Using Deep Learning to Detect Malicious URLs 487 Yuchen Liang (Shady Side Academy) and Xiaodan Yan (Beijing University of Posts and Telecommunications)	•••••
Detecting SQL Injection Attacks Using Grammar Pattern Recognition and Access Behavior Mining .493 Hongcan Gao (Nankai University), Jingwen Zhu (Nankai University), Lei Liu (Nankai University), Jing Xu (Nankai University), Yanfeng Wu (Nankai University), and Ao Liu (Nankai University)	
An Accurate False Data Detection in Smart Grid Based on Residual Recurrent Neural Network and Adaptive threshold .499	
Electric Field Simulation Study of Squeezed Insulated Tube Bus .505	

Priority-Based uRLLC Uplink Resource Scheduling for Smart Grid Neighborhood Area Network .5.10 Liang Zhu (State Key Laboratory of Networking and Switching Technology, Beijing; University of Posts and Telecommunications, Beijing), Lei Feng (State Key Laboratory of Networking and Switching Technology, Beijing; University of Posts and Telecommunications, Beijing), Zhixiang Yang (State Key Laboratory of Networking and Switching Technology, Beijing; University of Posts and Telecommunications, Beijing), Wenjing Li (State Key Laboratory of Networking and Switching Technology, Beijing; University of Posts and Telecommunications, Beijing), and Qinghai Ou (State Grid Information & Telecommunication Group Ltd., Beijing)
Multi-Objective Planning of DG Based on Credible Capacity 5.16. Wenxia Liu (North China Electric Power University), Yue Yang (North China Electric Power University), Mengyao Yang (North China Electric Power University), Xuxia Li (ShanXi Electric Power Company of SGCC), and Yao Wang (ShanXi Electric Power Company of SGCC)
Generator Model Validation and Parameter Calibration Based on PMU Measurement Data .522
Hybrid Computing Hierarchy Based on-Line Analysis Service for Power Dispatching and Control System .527. Jian Guo (Tsinghua University), Shaojie Zhang (Tsinghua University), Junwei Cao (Tsinghua University), Jie Yang (Tsinghua University), Yadi Luo (Research Institute of Power System Automation), and Jing Li (Research Institute of Power System Automation)
Research on Integrated SVDD Rotating Machinery Vibration Fault Detection Method Based on Deep Autoencoder .531.
Ling Zheng (North China Electric Power University), Pengtian Guo (North China Electric Power University), Fei Chen (North China Electric Power University), Jiaqi Chen (North China Electric Power University), Wenhao Xue (North China Electric Power University), Biying Chen (North China Electric Power University), and Hongbiao Gao (North China Electric Power University)
A Fault Prediction Of Equipment Based On CNN-LSTM Network 537. Ling Zheng (North China Electric Power University), Wenhao Xue (North China Electric Power University), Fei Chen (North China Electric Power University), Pengtian Guo (North China Electric Power University), Jiaqi Chen (North China Electric Power University), Biying Chen (North China Electric Power University), and Hongbiao Gao (North China Electric Power University)
Short-Term Forecasting of Electricity and Gas Demand in Multi-Energy System Based on RBF-NN Model .5.42 Yu Tang (Hohai University), Haoming Liu (Hohai University), Yunfei Xie (Hohai University), Jingjing Zhai (School of Automation Nanjing University of Science and Technology), and Xiaobei Wu (School of Automation Nanjing University of Science and Technolog)

A Novel Cooperative Full Duplex Device to Device Communication Underlaying Cellular Networks .548 Yajing Zhang (Beijing University of Posts and Telecommunications) and Fang Liu (Beijing University of Posts and Telecommunications)
Wind Power Generation Forecasting and Data Quality Improvement Based on Big Data with Multiple Temporal-Spatual Scale .554
Denoising Convolutional Neural Networks Based Dust Accumulation Status Evaluation of Photovoltaic Panel .560
Continuous Power Flow of Islanded Microgrids with Droop-Controlled Distributed Generations .567
Towards Intelligent Energy Control and Optimization in Energy Internet: A Review 5.7.3. Haochen Hua (Tsinghua University) and Junwei Cao (Tsinghua University)
Analysis of CVT Harmonic Transfer Characteristics and Coefficient Correction Strategy Considering the Circuit Distribution Parameters .5.79
5G Network and Communication Technology
Research on Mobile Application Local Denial of Service Vulnerability Detection Technology Based on Rule Matching 585
Evolution Trend of LTE 230MHz Electric Wireless Private Network Technology .591. Weiping Shao (State Grid Zhejiang Electric Power Co., Ltd.), Zhi Ling (State Grid Zhejiang Electric Power Co., Ltd.), Jianqi Li (Global Energy Interconnection Research Institute Co. Ltd.), Yang Lu (Global Energy Interconnection Research Institute Co. Ltd.), Wei Bai (Global Energy Interconnection Research Institute Co. Ltd.), and Donglei Zhang (Global Energy Interconnection Research Institute Co. Ltd.)
Author Index 597