

# **2022 7th Asia Conference on Power and Electrical Engineering (ACPEE 2022)**

**Virtual Conference  
16-17 April 2022**

**Pages 1-750**



**IEEE Catalog Number: CFP22E58-POD  
ISBN: 978-1-6654-1820-1**

**Copyright © 2022 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:	CFP22E58-POD
ISBN (Print-On-Demand):	978-1-6654-1820-1
ISBN (Online):	978-1-6654-1819-5

**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

### Chapter 1-New Paradigm Shifts in Power System Planning

Review of Electric Vehicle Ultra-Fast DC Charging Station.....	1
<i>Nini Yuan, Zhuangzhuang Yu, Youfu Zhang, Haojing Chang, and Hewen Kang</i>	
Credible Capacity Evaluation Method of Distributed Generation Based on Islanding Algorithm .....	10
<i>Jiahao Chen, Bing Sun, Yi Zhou, Yuan Li, Min Wen, and Yuan Zeng</i>	
Evaluation Method of Optimal Section Number of Medium Voltage Feeder in Active Distribution Network Based on Reliability Value .....	16
<i>Bing Sun, Ruipeng Jing, Yuan Zeng, Ning Yang, Tianyu An, and Xin Zhang</i>	
A Study on Electricity Substitution Potential Prediction Based on Energy Efficiency Analysis .....	22
<i>Junhong Tian, Haoyu Wang, Junbo Wu, Zixun Zheng, Bo Wu, Xiaoyun Chen, and Ronghu Cao</i>	
Low Carbon Planning of Power System Based on Stepped Carbon Tax Considering Thermal Power Support in the Context of 3060 .....	28
<i>Zesen Wang, Tianqi Zhao, Xue Xia, Jing Luo, Yinglin Liu, and Jing Hao</i>	
A Contribution-Factor Based Under-Frequency Load Shedding Scheme in a Regional Grid .....	35
<i>Pijiang Zeng, Sicheng Liu, Libao Shi, Mingliang Yang, Dan Zhang, and Wenlin Yan</i>	
Optimal Transmission Expansion Planning Considering Demand Response Characteristics of Load Duration Curve.....	40
<i>Zhijia Ding, Zhenda Hu, Ji Wu, Qiao Peng, Hongyang Zhao, and Xin Huang</i>	
A New Method of Short-Circuit Current Limitation for Henan 500 kV Power Grid.....	45
<i>Xueqing Pan, Hua Wang, Fangbing Liu, Ze Gao, Chunsun Tian, and Hao Zhang</i>	
A Wind Power Forecasting Method Considering Shape and Time Loss.....	50
<i>Le Zhang, Jizhong Zhu, Tengyan Luo, and Junwei Fan</i>	
Non-Cooperative Game for Configuration of Equipment with Multi-Agent in County Energy Internet .....	56
<i>Jun Wang, Jianbing Yin, Hui Chen, Wei Du, Junhai Wang, and Chunjie Zhu</i>	
Research on the Influence Factors of Lightning Performance for $\pm 800$ kV UHVDC Double-Circuit Transmission Lines.....	62
<i>Liuchun Zhang, Yu Yin, Weidong Shi, Boyu Zhang, Tiantian Lu, and Ting Lei</i>	
Research on Identity Resolution System for Power Demand Response .....	67
<i>Feixiang Gong, Songsong Chen, Shiming Tian, Jian Qin, Jingju Wang, and Bin Li</i>	
Analysis of Multi-Scenario Power Supply and Demand Balance in Shandong Power Grid Based on the New Generation PSDB Platform .....	72
<i>Peifen Cheng, Si Yang, Nan Wang, Xin Tian, Long Zhao, Yuan Wang, Peng An, and Ying Mu</i>	
Power Flow Calculation and Analysis of Grid-Connected Operation of Large-Scale Wind Farm .....	78
<i>Ge He, Hong Wang, Zhijie Wang, and Xia Sun</i>	

An Improved Modeling Method for Uncertainty of Renewable Energy Power Generation Considering Random Variables Correlation .....	84
<i>Yuhua Tan, Qian Zhang, Chen Li, Qilin Chen, and Nuo Yu</i>	
Research on Improvement Strategies and Transmission Capacity Analysis of Key Sections Considering Multi-DC Access .....	90
<i>Hui Cai, Hui Huang, Xingning Han, Zhenyu Sun, Wentao Sun, and Fusuo Liu</i>	
An Improved Robust Optimization Method for Resilient Distribution Networks with the Strategies of Line Hardening and Distributed Generator Placement .....	95
<i>Jian Wang, Zepeng Li, Tong Qian, and Wenhui Tang</i>	
Probabilistic Economic and Adequacy Evaluation of the Zero-Carbon Power Systems with CCUS .....	102
<i>Tianying Yu, Peixuan Li, Zitong Wang, Qingsheng Xiong, Weifeng Wang, and Haipeng Xie</i>	
Distribution Power Grid Planning Strategies Considering the Future Development of Cities .....	110
<i>Guangyuan Shi, Yunfei Wang, Kaiyu Zhang, Yanru Liu, Yue Guo, and Fan Zhou</i>	
Home Smart Energy Management System for Optimized Electricity Cost Reduction using Photovoltaic-Powered EV Charging Station .....	116
<i>Qin Yan and Xiaofan Tu</i>	
Coordinated Planning of Integrated Multi-Energy Systems Considering Correlation of Heterogeneous Sources and Loads.....	122
<i>Ruopu Yang, Jia Liu, Pingliang Zeng, and Yalou Li</i>	
An Energy Efficient Resource Allocation Method for Intelligent Water Conservancy Edge Network Based on DDQL.....	130
<i>Jia Hu, Yue Hu, and Zhiwei Tong</i>	
Robust Joint Planning of Electric Vehicle Charging Infrastructures and Distribution Networks .....	135
<i>Ping Xue, Yue Xiang, Miadreza Shafie-khah, Run Zhou, Yongtao Guo, Jingrong Guo, and Junyong Liu</i>	
<b>Chapter 2-Energy Storage and Digitisation</b>	
Quantifying the Techno-Economic Benefits from Flexibility of EV Battery Swapping Stations in Distribution Networks .....	140
<i>Zhuangzhuang Yu, Xuanrong Quan, Bo Zeng, Haitao Liu, and Yangfan Luo</i>	
A GRU Based Flexible Resource Identification Approach with Small Dataset .....	146
<i>Renli Cheng, Yechen Han, Tian Mao, and Baorong Zhou</i>	
Mapping the Energy Internet Physical and Cyber System into Complex Networks Model.....	152
<i>Guoqiang Lin, Siyan Liu, and Baohua Zhao</i>	
Optimal Operation Method of Power System with Large-Scale New Energy and Storage Based on Multi-Zoning.....	157
<i>Ping Ding, Xuelong Ma, and Ziqi Zhu</i>	
Source Grid Load and Energy Storage Management Method Based on Cloud Edge Cooperation ....	164
<i>Xingfu Zhang, Zihan Xi, Tao Wang, and Xiaodong Liu</i>	

Independent Operation Control Method of DC Type Double-Fed Wind Power System with Energy Storage on the Rotor Side .....	170
<i>Hao Wu, Youfu Zhang, Zhuangzhuang Yu, Haojing Chang, Hewen Kang, and Jianing Yao</i>	
Online Monitoring System for Storage Battery in Substation .....	177
<i>Wei Wang, Qiuyang Wang, Jing Tian, Ruiliang Zhang, Yi Li, Hengshan Xu, Fei Xue, and Mingyang Zhao</i>	
Measurement of Transmission Line Sag Based on Video Image .....	183
<i>Jun Zhang, Nailong Zhang, Cang Bai, Xiao Tan, Qiwei Wu, and Peilin Gong</i>	
Source-Storage Coordinated Optimal Scheduling Method Based on Improving the Capacity of New Energy Consumption .....	189
<i>Ziyu Shen, Wenying Liu, Qinglun Pang, Chi Liu, Yalou Li, and Li Lin</i>	
Optimal Planning of Energy Storage for Wind Farm GENCO in Power Spot Market .....	197
<i>Zhiyong Pu, Miao Wang, Hao Zheng, and Zirui Liu</i>	
Optimal Scheduling Method of IES Considering Power Network Load .....	203
<i>Meiling Li, Zhongfu Wu, and Lijuan Zhang</i>	
Abnormal Battery Identification via Graph Signal Processing Method .....	208
<i>Yi Wang, Bochao Zhao, Xuhao Li, Wenpeng Luan, and Bo Liu</i>	
Optimization Strategy of Composite Charging Station with Energy Storage for Fast Charging Demand of Electric Vehicles .....	213
<i>Yue Chen, Yifan Wang, Hui Hou, Bo Zhao, Leiqi Zhang, and Changjun Xie</i>	
Research on Energy Storage System Optimization Method Considering Distribution Network Congestion Management .....	218
<i>Hai Huang, Lu Yin, Yongshu Zhang, Wei Wang, Wei Ye, and Tongyu Yan</i>	
Research on Capacity Configuration Method of Energy Storage System for Echelon Utilization to Reduce Wind Curtailment .....	223
<i>Yuxing Li, Jinkai Shi, Jingying Yang, Yu Shi, Xinhong Wang, Liwen Hou, and Yan Bao</i>	
Techno-Economic Analysis of Battery Energy Storage System Considering Degradation and Pricing Mechanism .....	230
<i>Yuting Tian, Wei Wei, Xinwei Sun, Junyong Liu, and Shengwei Mei</i>	
Research on Key Influencing Factors of Endurance Mileage of Battery Electric Vehicle .....	235
<i>Zhang Haiyan, Chen Dawei, and Liu Yu</i>	
Study on Operation Strategy of PV-Battery System Providing Frequency Regulation Based on Chance Constraint .....	240
<i>Xiaoling Yuan, Chen Qian, and Yi Guo</i>	
Single-Phase Hybrid Switching-Capacitor APFC Converter .....	245
<i>Yishan Chen, Qing Fu, Yixing Su, and Hang Yang</i>	
A Photovoltaic Power Forecasting Method Based on EEMD-Kmeans-ALO-LSTM .....	251
<i>Kun Zhu, Qing Fu, Yixing Su, and Hang Yang</i>	

Reliability Assessment of Battery Energy-Storage Module Based on Correlation Analysis .....	257
<i>Jiali Xiong, Qiang Cai, Liyu Dai, Zhicheng Li, Guodong Lin, Chaoping Deng, and Jin Sun</i>	
Optimal Planning of Energy Storage System Capacity in Renewable Energy Power Plants .....	263
<i>Siyang Sun, Wenzhi Lin, Wenchuan Meng, Liang Sui, Lifeng Li, Yunhua Xi, Zhi Rao, and Zaimin Yang</i>	
Research on Operation Mode and Architecture Design of Source-Network-Load-Storage Interactive Regulation Technology in New Power System .....	268
<i>Xin Li, Zhifeng Wei, Hongli Su, Ziwei Hong, Haiyang Liu, and Mengjie Zhao</i>	
Multi-Objective Configuration Method of Energy Storage Capacity of New Energy Microgrid Based on Multi-Functional Application .....	273
<i>Yanbo Hu, Zhi Wen, and Wenguang Ma</i>	
Construction of Biomass-Derived Hybrid Electrodes for High-Performance Hydrogen Evolution Reaction .....	280
<i>Yajun Zou, Fan Yang, Yun Zhao, Wei Wang, Yanbo Wang, Dawei Wang, and Haibin Wan</i>	
Optimal Allocation of Electric/Heat/Cooling Energy Storage in User Side Integrated Energy System Considering Part Load Performances .....	285
<i>Songchen Lin, Jinyan Li, Keming Liu, Jingjie Huang, Chenhao Sun, and Zhichao Qin</i>	
Active Cell Equalization Scheme for Performance Enhancing a Li-Ion Capacitor Energy Management System .....	290
<i>Markos Koseoglou, Evangelos Tsioumas, Nikolaos Jabbour, Dimitrios Papagiannis, Christos Mademlis, Roberto Guarino, Sergio Guarino, and Fabio Tedone</i>	
Analysis on The Effect of Energy Storage on Improving the Transmission Capacity of UHVDC Transmission Line.....	295
<i>Shangxing Wang, Xiangjun Li, and Yuchen Hao</i>	
A Frequency Control Strategy for Offshore Wind Power Based on Electrochemical Energy Storage.....	301
<i>Yuhui Liu, Guangzhu Wang, Zhimin Gao, and Zhilu Han</i>	
Optimal Schedule of Energy Storage and Wind Farms in the Power Spot Market under Risk-Constrained .....	306
<i>Miao Wang, Minghang Lu, Sashuang Sun, Xin Yang, Yufei Yan, Shurui Ren, and Xinying Zhou</i>	
Multi-Station Integrated Economic Scheduling Considering Dynamic Scheduling Capacity of Energy Storage.....	313
<i>Zihao Liu, Ying Wang, Xiaoyu Feng, and Xiufan Ma</i>	
Multiple-Function Control Strategy for Hybrid SLB-NB Energy Storage System.....	318
<i>Shuang Yang, Xing Ma, Weiyu Bao, and Jie Liu</i>	
Optimization of Shared Energy Storage Capacity Based on GRU Neural Network Prediction.....	324
<i>Jun Xiong, Hui Peng, Kangmin Xie, and Jichun Liu</i>	
Analysis of New Energy Accommodation Capacity of Regional Power Grid with Energy Storage Based on Improved Typical Daily Method.....	331
<i>Xinwei Sun, Bo Zhou, Tianwen Zheng, Wei Wei, Yuting Tian, and Lei Pan</i>	

Root-Cause Analysis of Renewable Curtailment Based Integrated Power System Optimal Planning in Power Spot Market.....	337
<i>Xiaorui Hu, Jun Shu, Hao Yue, and Yunli Yue</i>	

### **Chapter 3-Blockchain Technologies and Electricity Market**

Research on key Technologies for the Construction of Power Trading Market Based on Blockchain .....	344
<i>Bin Ji, Zhengwei Jiang, Ziqiang Zhou, Li Chang, and Ying Yao</i>	
Risk Stabilization and Market Bidding Strategy of Virtual Power Plant Alliance Based on Multi-Stage Robust Optimization .....	351
<i>Yan Liang, Qingqing Zhou, Yushu Pan, and Li Liu</i>	
Electricity Purchase Model Considering Day-Ahead Electricity Spot Market Transaction Risk .....	357
<i>Xiaoqi Han, Wenyong Liu, Qinglun Pang, Ziyu Shen, Yaoxiang Zhang, and Yalou Li</i>	
Investment Value Evaluation of Energy Internet Business Based on TOPSIS Method.....	364
<i>Anbang Xie, Peng Li, Yongle Zheng, Hongkai Zhang, and Huixuan Li</i>	
Security Protection Method for the Edge Equipment of Power Internet of Things Based on Blockchain .....	369
<i>Bo Ding, Liyang Du, Zhipeng Xia, and Shaofei Wang</i>	
Design and Application of Load Side Resources Participating in Frequency Modulation Auxiliary Service Market Mechanism in China.....	375
<i>Fan Xu, Yijing Su, Qihang Huang, Li Chang, Min Lu, and Kan Yang</i>	
Research on Power Supply Planning in Power Market .....	381
<i>Haibo Wu, Bo Sui, Mei Wang, Jianing Zhu, Zhiheng Li, and Senmao Li</i>	
Flexible Ramping Product Implementation in Power Market with High Penetration of Renewable Energy .....	386
<i>Xijun Ren, Yutong Ye, Xiaoyu Shao, Bao Wang, Zhumeng Song, Tingxuan Chen, and Ran Xu</i>	
Market-Oriented Transmission Network Expansion Planning with Consideration of Wet and Dry Characteristics of Hydropower .....	392
<i>Yang Liu, Yunche Su, Ting Li, Yunling Wang, Wei Chen, Jiawei Liu, and Youbo Liu</i>	
Agent-Based Modeling for Generation Bidding Strategy using Policy Gradient Algorithm .....	398
<i>Shigang Yan, Wenjie Chen, Guofeng Hu, Kejun Wu, Kai Zhao, Wen Fan, Zhiwei Jin, and Xinying Zhou</i>	
Research and Application of On-Line Performance Inspection Technology of Partial Discharge Intelligent Sensor .....	404
<i>Xiangyi Xu, Peng Xu, Qiyu Lu, Chen Ren, Pei Cao, and Weiyun Mao</i>	
Design of Catalog Pricing Mechanism for Electricity Market with High Proportion of New Energy Power .....	411
<i>Bingbing Li, Menglin Yin, and Yan Long</i>	
A Two-Part Custom Power Pricing Method for High-Tech Customers in an Incremental Distribution Park .....	416
<i>Yuanqian Ma, Danni Lu, Yuhang Liu, and Yuchen Yin</i>	

Research on Settlement Risk Evaluation and Control of Electricity Retailers in the Electricity Spot Market .....	421
<i>Yingying Feng, Jun Zhao, Na Zhou, Xue Cui, Peng Liu, and Yunjie Rao</i>	
Research on the Organizational Model and Value Chain Evaluation of Rural Energy Cooperatives .....	427
<i>Tao Wang, Mengju Wei, Xuefei Liu, Xianlong Zhao, Zhao Liu, and Ning Pang</i>	
Summary of Risk Warning of Electric Power Material Supply Chain .....	435
<i>Zhenyu Zhang, Shuming Feng, and Tianmu Hu</i>	
Blockchain Technology Based Digital Document Management System Design .....	440
<i>Xingyan Zhao, Zhi Zhang, Renchuan Hu, Junyong Liu, Xiaodong Yang, Rui Zhang, and Hongjun Gao</i>	
Optimal Scheduling Model for Virtual Power Plant Participating in Energy and Regulation Markets .....	447
<i>Yuxiang Zhu, Tian Mao, Gui Zhan, Qian Ai, and Shuangrui Yin</i>	
Study on Game Behavior of Power Suppliers Based on Blockchain .....	454
<i>Xiaoling Yuan, Yi Guo, Hua Jiang, and Chen Qian</i>	
Analysis of Quasi-Steady-State Sensitivity Matrix Based on DC Power Flow.....	459
<i>Lun Tang, Chang Xiao, Jian Li, Yi Sun, Wei Wei, Gechao Huang, Xinwei Sun, and Xiuli Wang</i>	
Research on Self-Scheduling Operation of Combined Heat Power Plants Participating in Down-Regulation Ancillary Service Market Considering Uncertainty.....	464
<i>Yunhu Zhou, Yan Zhang, and Yize Wang</i>	
Assessment for Regional Power Market Performance Considering Carbon Emission.....	469
<i>Hongliang Wang, Jiahua Hu, Shuhong Wu, Yizheng Wang, and Jindi Hu</i>	
New Energy Double-Layer Consumption Method Based on Orderly Charging of Electric Vehicles and Electricity Price Interaction.....	476
<i>Hongxia Ma, Li Lai, and Jianyu Sun</i>	
Energy Internet-Oriented Power Trading Platform: Review and Prospect .....	482
<i>Yaping Li, Jian Geng, Kedong Zhu, and Xiaorui Guo</i>	
Power Trading System Design and Key Technology Research Based on Micro-Services .....	488
<i>Yang Ning, Liu Yongwei, Lv Wentao, Gao Chuncheng, Zheng Shiqiang, and Zhang Qian</i>	
Evaluation of Elasticity of Supply Capability of Distribution Network .....	494
<i>Zhihao Li, Xuesong Zhang, Chouwei Ni, Qing Qin, Bei Han, and Guojie Li</i>	
Analysis of Shadow Price of System Power Balance Constraint under Quasi-Steady-State Sensitivity.....	501
<i>Lun Tang, Xiuli Wang, Chang Xiao, Jian Li, Yi Sun, Wei Wei, Chi Zhang, Xi Wang, and Gechao Huang</i>	
Blockchain-Based Smart Contract Enabling Electric Heating Load Participate in Demand Response .....	507
<i>Baoju Li, Dongmei Yang, Yong Sun, Gang Liu, Jiyue Fu, and Chang Liu</i>	



Application of Neural Network Prediction Model Based on Wolf Pack Algorithm in Electricity Sales Side .....	513
<i>Yingying Wu, Hongxia Yan, Yiyao Chen, Tiangang Gong, Yingnan Xue, and Xinhui Du</i>	
Application of Virtual Power Plant in Integrated Smart Energy Substation .....	519
<i>Ruijiang Ran, Chenpeng Zhao, Yang You, and Zaibao Xiong</i>	
Risk-Aware Optimal Bidding Strategy of Wind Farm with Electric Storage Systems in Spot Market .....	524
<i>Fang Qi, Hao Zheng, Xinying Zhou, Tiantian Chen, Shi Cheng, Tizhe Deng, and Yufei Yan</i>	
<b>Chapter 4-Future Electricity Network Infrastructures</b>	
Research and Application of Distribution Network Optimal Segmentation Point Based on Economic Line Loss Rate Range for Mega City Power Grid .....	531
<i>Shuqing Li and Fan Yang</i>	
Optimal Configuration Model of Wind-Light-Water Hybrid System Considering Different Scenarios.....	536
<i>Yan Liang, Li Liu, and Yao Wang</i>	
A Reconfiguration Method of Distribution Network Considering Time Variations for Load and Renewable Distributed Generation .....	544
<i>Juan Wen, Xing Qu, Yinhua Huang, and Siyu Lin</i>	
Research on Application of DC Microgrid Heavy Truck Battery Charging-Replacement Station .....	550
<i>Zaibao Xiong, Lei Li, Di Xu, Guang Su, Huaguang Wang, and Yanning Li</i>	
Optimal Configuration Method for Concentrating Solar Power Capacity of Fully Renewable Energy Sending-End System that Meets DC Transmission Demands .....	556
<i>Ziyu Shen, Wenying Liu, Xiaoqi Han, Qinglun Pang, Weizhou Wang, Qiang Zhou, Yanqi Zhang, and Li Lin</i>	
A Digital Management Model of Power Design Drawings Based on Blockchain .....	565
<i>Jiayuan Fan and Jun Zhao</i>	
Construction Plan for Backup Dispatch of Regional Power Grid .....	570
<i>Jun Guo, Min Li, Deli Lin, Meng Lv, and Lei Guo</i>	
Application of Electric Power Data Analysis and Forecast .....	576
<i>Fubo Cui, Yuou Hu, Liang Han, Qi Wang, and Zhengfeng Cao</i>	
Exploration the Application of Genetic Algorithms and Gene Expression Programming in Future Power System Infrastructure.....	581
<i>Liu Yingjie, Fan Rongquan, Xia Yuhang, Huang Zhengwen, Liu Yijun, Li Guoquan, and Gao Yang</i>	
Impact of 5G Base Station Participating in Grid Interaction.....	586
<i>Yake Wang, Jiming Han, Zihao Liu, Ying Wang, and Xiaoyu Feng</i>	
Research on 5G Base Station Energy Storage Configuration Taking Photovoltaics into Account .....	591
<i>Xiyang Yin, Guoyuan Lv, Zhongyu Wang, Zhixin Lu, Yizhao Liu, and Kunpeng Yu</i>	

A Data Monitoring System using Wireless Network for Inner Suspended Gin Pole Tower Erection Construction.....	596
<i>Fei Wang, Kaixiang Yu, Shun Li, Jiandong Mao, and Wenqi Niu</i>	
Research on Criterion for Harmonic Instability of HVDC Power Transmission System Composed of Double-Circuit Lines Bipolar 12-Pulse Converter Considering Converter Transformer Saturation .....	601
<i>Chizu Mao, Ruijin He, and Ping Dong</i>	
Stability Analysis of Tianchi Pumped Storage Power Station Connected to Central China Power Grid .....	606
<i>Yin Luo, Dejun Shao, Junjie Zhao, Kaiyan Huang, and Xiang Li</i>	
Sustainability Performance Evaluation of Grid Equipment Management Based on Hybrid Fuzzy Entropy-TOPSIS Method towards Future Electricity Network Infrastructures .....	613
<i>Tang Guang-Rui, Zhang Mei-Juan, Li Xue-Ting, and Yan Qing-You</i>	
Review of DC Circuit Breaker Technology Development .....	621
<i>Zehong Yu, Runze Bai, Yuanxin Zhang, and Yongqiang Zhu</i>	
Overview of High-Voltage and Large-Capacity DC / DC Converter Suitable for Offshore Wind Power.....	627
<i>Yuanxin Zhang, Zehong Yu, Runze Bai, and Yongqiang Zhu</i>	
Knowledge Graph Construction Method for Power Grid Infrastructure .....	633
<i>Zhi Zhang, Jianping Yang, Junlin Shu, Junyong Liu, Xingyan Zhao, Yanhan Wang, and Hongjun Gao</i>	
An Electric Vehicle Charger Control Strategy for Reactive Power Compensation .....	638
<i>Yuxin Wang, Zhesheng Hu, Pan Dai, Chao Zhu, Chengjin Ye, and Jindi Hu</i>	
Coefficient Calculation Method of Virtual Resistance Based P-V Droop Control in VSC-MVDC System.....	643
<i>Hongbo Shao, Wanxun Liu, Yuming Cheng, Xin Cao, Hanhao Li, and Minxiao Han</i>	
Space-Earth Integrated High-Precision Positioning System Based on 5G and Beidou Navigation Satellite System .....	649
<i>Geng Li, Xiong Yu, and Wenbing Lu</i>	
Multi Objective Optimal Method for New Energy Power Grid Considering Maximum Demand Response .....	654
<i>Feng Gao and Ziqi Zhu</i>	
Loss Analysis of the Ground Wires of UHV AC Transmission Line under Different Configuration .....	659
<i>Taoning Jiang, Lijing Li, Longzhi Xie, and Peng Sun</i>	
Typical Application and Economic Evaluation under the Background of Deep Integration of 5G+ Smart Grid .....	665
<i>Jiming Han, Yake Wang, Ying Wang, Xiaoyu Feng, and Zihao Liu</i>	
Sharing Overhead Transmission Line System Based on Public Perceptual Information .....	670
<i>Hanxun Tao, Zhuoqun Zhang, Weiguang Tian, Yanjun Cui, and Quan Liu</i>	

A Brief View on Energy Management of Multi-Microgrid Systems: Framework, Communication Technologies, and Dispatching Strategies .....	677
<i>Cheng Gong, Shuang Zeng, Xianglong Li, Ping Chen, Yifeng Ding, Chang Liu, and Liping Jiang</i>	
Simulation Analysis of Lightning Performance of 1000kV UHV-AC Transmission Lines.....	684
<i>Mian Fan, Lei Wan, Ying Lou, and Zhijun Li</i>	
Application of Three-Dimensional Digital Cable Laying in 750kV Substation.....	691
<i>Xiaoming Yu, Bingqiang Zhao, Yunpeng Li, Liwen Qu, Ding Ding, Xiaohong Bu, and Gao Yu</i>	
Research on DC Grid Fault Ride-Through Based on the Coordination of Blocking Converter and Energy Storage System .....	696
<i>Zhankui Zhang, Miao Zhu, Shuli Wen, Yongning Chi, and Yan Li</i>	
Normative Judgment of Power Facilities Based on Machine Learning and Edge Detection .....	701
<i>Yu-Nan Wang, Chengyue Ji, Xiu Cao, Dilin Mao, Ming Chen, Xuni Rao, and Jiayi Shen</i>	
Analysis of Wide-Band Oscillation Characteristics of Rudong Offshore Wind Farm Connected to the Grid through VSC-Based DC Transmission System.....	706
<i>Zhitong Chen, Guojie Li, Xiangping Kong, Chi Zhang, Zijun Bin, and Jin Xu</i>	
Generalized Impedance Modeling Framework with its Application on Modular Multilevel Converter .....	712
<i>Chongbin Zhao, Qirong Jiang, and Hangyin Mao</i>	
Modeling and Parameter Identification of the Photovoltaic Inverter Based on VSG.....	717
<i>Haocong Shen, Zhongyu Chen, Baoping Ren, Anzhe Chen, Minda Shi, and Zhenyu Huang</i>	
Design and Practice of Real-Time Online Management System of Power Grid Stability Control Parameters Based on Blockchain .....	723
<i>Xianbo Ke, Chong Ren, Jili Wang, Haipeng Xie, and Ke Feng</i>	
Study on Stability Analysis and Safety Control Measures of Power Grid in the UHV AC Project of Shandong-Hebei Loop Network .....	731
<i>Gao Yu, Xiong Zaibao, Du Shaofei, Geng Xiaohong, Guo Yinan, and Zhang Ningfang</i>	
Research on Data Synchronization Method for Differential Protection of Distribution Network Based on 5G Communication .....	736
<i>Jiajia Zhang, Tianjun Jing, and Chao Ma</i>	
Study on Calculation of Lightning Intrusive Wave Overvoltage in 750kV AIS Distribution Swtichgear .....	741
<i>Yujing Zhai, Hailong Xu, Qi Lu, and Xiaoman Feng</i>	
Feature Extraction and State Identification of Transformer DC Bias Vibration Based on HHT-SVM .....	746
<i>Jingsong Li, Zhenzong Liang, Yushuai Qi, Linyu Li, Guofeng Li, Nianfeng Zheng, and Zhongqing Wang</i>	
Analysis of Spatial Acoustic Radiation Characteristics of AC Filter Capacitor in HVDC Converter Station.....	751
<i>Liming Ying, Xinyi Xie, Shusheng Tian, and Lu Zhang</i>	

Evaluation of Power Grid Intelligence Level Based on 4G/5G Communication Technology .....	757
<i>Ying Wang, Xiaoyu Feng, Zihao Liu, and Xiufan Ma</i>	
Seismic Fragility Analysis of High Voltage Direct Current Wall Bushing Considering Uncertainty Based on Box-Cox Transform.....	762
<i>Yangjun Luo, Tianyu Xiong, Yuan Fang, Hongzhi Du, and Shaowen Wu</i>	
Study on Aging Properties of Resin Impregnated Paper Composite for Dry-Type Bushing .....	767
<i>Han Zhang, Wei Hu, Xiongjie Xie, Zuoming Xu, Pengbo Yin, and Baoquan Wan</i>	
<b>Chapter 5-Monitoring, Smart Sensing and Data Analytics for Distribution Networks with High Penetration of Renewable Generation and Converter Connected Devices</b>	
Power Generation Scheduling for Long Distance Consumption of Wind-Solar-Thermal Power Based on Game-Theory.....	773
<i>Wenjun Niu, Fan Yang, and Youen Yuan</i>	
Optimal Dispatching Method of Integrated Energy System Considering Volatility of PV Power.....	778
<i>Wenjun Niu, Yanbin Fan, and Shangjun Lu</i>	
Application of Digital Twin and Hologram Technology to Achieve Distribution Network Reliability Forecast .....	783
<i>Wei Chai and Qichao Ma</i>	
Independent and Controllable Security Container Substation Equipment Condition Monitoring Method Based on Cloud Edge Cooperation .....	788
<i>Yingwei Zhu, Dong Liu, Yinqiang Huang, and Lixiang Ruan</i>	
Analysis of Demand Side Energy IoT Communication Channel Requirements of Integrated Stations, Equipment, and Users.....	793
<i>Zhan Shi, Yutu Liang, and Xiuzhu Wang</i>	
Research on Microgrid Information Model Based on Low-Voltage Distribution Station Area .....	798
<i>Zhan Shi, Yutu Liang, Xiuzhu Wang, and Zhenyu Zhong</i>	
Research on Frequency Resource Allocation Model for Power Line Carrier Service of Integrated Station, Equipment and User .....	803
<i>Xingnan Li, Zhan Shi, Xiuzhu Wang, and Lingzhi Lv</i>	
Research on Stratified Channel Characteristics of Power Line Carrier Based on Integrated Station, Equipment and User .....	808
<i>Bo Li, Zhan Shi, Xiuzhu Wang, and Senlin Li</i>	
Simulation Study on Propagation Characteristics of Partial Discharge Optical Signal .....	813
<i>Chen Wentong, Sheng Jun, Qian Xiao, Wu Xuefeng, and Huang Xiaofeng</i>	
Research on Multivariate Image Processing and Pattern Recognition of Power Equipment Failure.....	821
<i>Li Zhijian, Tang Qinghua, Li Songyuan, He Jin, Chen Rong, and Zhou Yiwen</i>	
Parameter Analysis and Experimental Verification of Dynamic Vibration Absorption Design for Transformer Tank Wall .....	830
<i>Bin Wang, Hong Zhang, Meigen Cao, Zhijie Qian, and Dongcheng Zhou</i>	

GAN-Based Residential Load Data Generation Model Considering Users' Privacy .....	838
<i>Panhao Qin, Xiaodong Wang, Zhen Qiao, Xiaojin Li, Qinran Hu, and Wenxuan Shu</i>	
Application of Infrared Spectroscopy in Monitoring the Aging Process of Transformer Oil .....	844
<i>Yihua Qian, Yaohong Zhao, and Qing Wang</i>	
Study on Electric Aging Mechanism of Transformer Insulation Oil Based on Molecular Simulation .....	849
<i>Yihua Qian, Qing Wang, and Yaohong Zhao</i>	
Sound Source Localization Method of Substation Based on Fourth-Order Cumulant.....	854
<i>Li Pengyu, Yan Shuai, Wang Gaojie, Hu Bing, Wang Kunpeng, and Tao Ran</i>	
A Training-Free Non-Intrusive Load Monitoring Approach for High-Frequency Measurements Based on Graph Signal Processing .....	859
<i>Xuhao Li, Bochao Zhao, Wenpeng Luan, and Bo Liu</i>	
State Variables-Based Interval Optimization Method of Combined Electric and Heat Microgrid Considering Loss .....	864
<i>Mingjie Cai, Hongjie Deng, Feixiong Chen, and Zhenguo Shao</i>	
Composite Evaluation Method of Substation Reliability Suitable for Digital Handover Scenarios .....	869
<i>Zhaoyang Zhang, Ran Chen, Xuejun Tang, Zhao Fang, Wanfang Liu, Yixiong Bao, and Lingle Zhang</i>	
Research on Comprehensive Utility Evaluation Model of the Infrastructure ERP System .....	874
<i>Li Zhou, Ran Chen, Xuejun Tang, Fangchao Ke, Wanfang Liu, Liqin Ren, and Lingle Zhang</i>	
Tube Model Predictive Control Based Optimal Scheduling of a Multi-Energy Microgrid .....	880
<i>Weihui Lin, Feixiong Chen, Hongjie Deng, and Zhenguo Shao</i>	
Regional Multi-User Load Dataset Simulation for NILM Based on Appliance Power Consumption Pattern .....	885
<i>Bo Liu, Jinjiang Zhang, Zishuai Liu, Wenpeng Luan, Bochao Zhao, and Longfei Tian</i>	
Study on Implementation Plan for Conformity Assessment of Substation Inspection Robot.....	890
<i>Yongning Chi, Yan Li, Dongqi Li, Jiancheng Ye, Hongxi Yu, Xiaoqing Yu, Fei He, and Qiujiu Yuan</i>	
Identification Model of Key Influencing Factors of O2O Operation of Electricity Enterprises -- Taking Electric Vehicle Charging Service as a Research Object .....	895
<i>Yundan Liang, Yi Huang, Zenghui Xi, and Haini Qu</i>	
Synchronous Oscillation of Direct Drive Offshore Wind Farm Connected to HVDC System.....	900
<i>Fei He, Xiangping Kong, Chi Zhang, Miao Zhu, Yongning Chi, Yan Li, Xiaoqing Yu, and Anni Yu</i>	
Neutral Point Potential Control of Three-Level NPC Inverter Based on Double Balance Factor .....	905
<i>Jianchao Zhang, Bin Zhang, and Lixun Wang</i>	
Exploration of Renewable Energy Standardization for Global Energy Interconnection Development .....	910
<i>Zhou Zhou, Fan Yang, Xi Li, Wei Wang, Yun Zhao, and Haibin Wan</i>	

Constant Frequency Operated Autonomous AC Microgrid with Different MPPT Methods Applied to PV Panels and with Converting Circuit for Powering Unbalanced Loads.....	915
<i>Daming Zhang</i>	
Analysis on the Construction Scheme of the Booster Station of the Offshore Wind Power HVDC Grid-Connected System.....	926
<i>Yongning Chi, Xiangping Kong, Chi Zhang, Yan Li, Dongqi Li, Fei He, Xiaoqing Yu, and Anni Yu</i>	
Power Distribution Network State Assessment Technology Based on Unified Computing Resource Pool .....	931
<i>Zhensheng Wu, Lina Mao, Kemeng Li, and Siwei He</i>	
Analysis of Emergency Control Strategy of System Frequency under Large Power Disturbance .....	938
<i>Xu Guang, Yang Jiahe, Wu Xuelian, Wan Zhonghui, Huang Hui, and Liu Fusuo</i>	
Monitoring the Abnormal Human Behaviors in Substations Based on Probabilistic Behaviours Prediction and YOLO-V5 .....	943
<i>Yaohui Xiao, Yufeng Wang, Weiming Li, Meng Sun, Xiaojie Shen, and Zhengyang Luo</i>	
Day Ahead Residential Load Forecasting with Neural Memory Network.....	949
<i>Jian Zuo, Peishan Ye, Xiangzhen He, Yun Yang, Yashan Zhong, Cong Fu, Bo Bao, and Feng Qian</i>	
An Equivalent Reliable Capacity Calculation Method of Wind Power and Photovoltaic Considering Reserve .....	954
<i>Xiangjun Li, Huimeng Ma, Zijun Yuan, Yujian Wang, Heng Zhang, and Haozhong Cheng</i>	
Characteristic Analysis and Calculation Method of Aggregated Air Conditioning Loads Providing Reliable Reserve for Power System.....	959
<i>Dawei Tian, Qiang Ma, Yujie Geng, Yuanyuan Wang, Lingkai Zhu, and Wei Zheng</i>	
Research on Smart Grid Heterogeneous Communication System Integrating Power Line Communication and 5G Communication.....	965
<i>Hailong Sun, Geng Li, Mingyue Zhai, and Wenbing Lu</i>	
Light Scattering Characteristics of Interface Micro-Defects in Factory Joints of High-Voltage Submarine Cables .....	970
<i>Zhen-Peng Zhang, Hong Zhao, Ming-Zhong Xu, Jian-Kang Zhao, Wen-Jie Li, and Xu Yang</i>	
State Evaluation Method of Distribution Line Based on Improved Combination Weighting Method.....	976
<i>Zongjie Liu, Zhen Dong, Bin Xu, Chi Zhang, and Huifen Zhang</i>	
Partial Discharge Location of Converter Station Based on Time Difference of Arrival .....	982
<i>Xinyan Feng, Han Liu, Da Zhang, Yong Cui, Shuai Xue, and Zhaolin Zhang</i>	
Transformer Anomaly Detection Method Based on MDS and LOF Algorithm .....	987
<i>Chi Zhang, Huifen Zhang, Gang Sun, and Xiaoyu Ma</i>	
Analysis of Heat Transfer and Cooling Structure of Dual-Waterway Parallel Axial Flux Permanent Magnet Synchronous Motor for Electric Vehicles.....	992
<i>Junci Cao, Boyu Zhou, Dong Li, Fa Zhang, Bo Jia, and Guoping An</i>	

Real-Time Dispatching of Distributed Generation Considering Cluster Peak and Voltage Regulation .....	998
<i>Wang Hui Chao, Liu Jiang Dong, Feng Ying</i>	
The Study on Oil-Paper Insulation Classification with Scattering Features of Raman Spectrum .....	1003
<i>Ruyue Zhang, Weigen Chen, Ruimin Song, and Zhixian Yin</i>	
The Oil Chromatographic Data Processing and Analysis Method Based on the Robustness Model .....	1008
<i>Wang Jian, Zhu Mengzhao, Gu Zhaoliang, and Wang Xuelei</i>	
Game Theory Based Inspection Robots Path Planning in Substations .....	1013
<i>Shaojing Wang, Tao He, Hui Sheng, Peng Xu, and Yiping Ji</i>	
Research on Power Consumption Prediction Based on Complex Correlation of Big Data .....	1018
<i>Tao Yu, Wei Wang, Chunyi Chen, Yupeng Huang, Heping Jia, Yaxuan Han, and Dunnan Liu</i>	
Application on 5G Communication for Auto-Transfer-Switch in Regional Distribution Power Grid .....	1023
<i>Zaibao Xiong, Bing Xiao, Ding Ding, Shaofei Du, Xiaohong Bu, and Yu Gao</i>	
Flexible Broadband Overvoltage Sensor for High-Voltage Power Electronic Equipment .....	1029
<i>Zha Kunpeng, Guo Ningming, Li Zhengxing, Feng Zhichang, Luo Jian, and Guo Zhiquan</i>	
Research on Electrical and Thermal Characteristics of 10kV XLPE Cable Terminals with Different Defects in Distribution Network .....	1035
<i>Duan Junpeng, Li Guoyou, and Liu Cong</i>	
Remote Error Estimation Method for Smart Meter in Transformer Area Considering High-Precision Data Reconstruction .....	1041
<i>Fusheng Li, Bin Guo, Mi Zhou, Xingxing Feng, Junyi Chen, Ying Sun, and Fan Zhang</i>	
A Novel Graph-Based Accurate Reactive Power Estimation Method for Transmission Lines Considering the Impacts of Shunt Reactors .....	1047
<i>Chengwen Xia, Jun Tan, Tingting Liu, and Guangyi Liu</i>	
Research on High Permeability Photovoltaic Access Distribution Network Architecture and Protection Configuration .....	1052
<i>Sen Zhang, Ling Yu, and Qiben Li</i>	
Bidding Strategies for Battery Energy Storage in the Energy and Regulation Electricity Market .....	1062
<i>Jiahua Hu, Zhou Lan, Junjie Li, Yang Wu, Weiwei Zhang, and Changsen Feng</i>	
Research of Droop Control Strategy in DC Distribution Network .....	1070
<i>Yibo Li, Dingkang Liang, and Lijiang Li</i>	
Intelligent Identification of Electricity Stealing Based on the Correlation of Line Loss .....	1075
<i>Gaojun Xu, Weijiang Wu, Xusheng Qian, Min Xiang, Lingli Long, and Yongjin Zhu</i>	
Short-Term Load Forecasting for Regional Power Grids Based on Correlation Analysis and Feature Extraction .....	1081
<i>Xiaoyong Deng, Chengke Zhang, Hui Peng, Guoyong Bi, Tong Cheng, and Chengjun Zhang</i>	

Electrical-Thermal-Mechanical Modeling and Analysis of Press-Pack IGBT for Flexible HVDC Converter Valve .....	1086
<i>Li Liu, Enke Yu, and Rongliang Zheng</i>	
Quantitative Analysis of Frequency Dynamics in Real Power System.....	1091
<i>Hao Qin, Yongji Cao, Hengxu Zhang, Zhimin Gao, Dong Yang, and Huan Ma</i>	
Automatic Hexagonal Mesh Generation and Smooth Finite Element Analysis .....	1096
<i>Zhanxi Zhang, Xuanhong Liang, Caiqi Tu, Ruixiao Meng, and Youyuan Wang</i>	
Research and Application of Renewable Energy Panoramic Monitoring Technology .....	1101
<i>Longlong Li, Shangxue Xia, Zuyi Ren, Qingchun Zhao, Liuyang Peng, Ran Duan, Qing Fang, and Lei Zhao</i>	
Onset Characteristics of the Thermoacoustic Engine with Cryogenic Cooling.....	1106
<i>Evgeniy Zinovyev, Gennadiy Vorotnikov, Svetlana Nekrasova, and Dmitry Sarmin</i>	
<b>Chapter 6-Cyber Physical Security and Optimal Operation of New Generation Power Systems to Facilitate Carbon Neutrality</b>	
Exploratory Compilation of Power Generation and Consumption Plans Coordinating Carbon Emissions Peak and Company Development for Power Grid.....	1111
<i>Shuqing Li and Fan Yang</i>	
Coordinated Operation Strategy for PV-Battery-Load in LV Distribution Networks Considering Low-Carbon Economy .....	1118
<i>Cheng Fan, Du Fengqing, Li Jiaqi, Yun Jingyang, and Yan Zheng</i>	
Research on Power Expansion Planning under Low Carbon Economy .....	1125
<i>Jianing Zhu, Mei Wang, Bo Sui, Haibo Wu, Keyuan Fu, and Zhiyuan Hu</i>	
Integrated Energy Carbon Emission Optimization Method with the Goal of Reducing Carbon .....	1131
<i>Qinglun Pang, Wenying Liu, Ziyu Shen, Xiaoqi Han, Ning An, Fang Li, and Li Lin</i>	
Fault Diagnosis Method of Distribution Transformer Based on Improved Deep Learning.....	1137
<i>Yunfeng Liu, MengNan Li, Yihao Peng, and Hongshan Zhao</i>	
Compliance Checking Based Detection of Insider Threat in Industrial Control System of Power Utilities.....	1142
<i>Qingqing Chen, Mi Zhou, Ziwen Cai, and Sheng Su</i>	
Analysis and Research on High Energy Consumption Boom Index under Double Carbon Background.....	1148
<i>Liu Yuer, Su Zhiyu, Xun Chao, Chen Xianzhi, Huang Hui, Chen Siqi, and Liu Shasha</i>	
Hierarchical Modeling of Cyber-Physical Power System for State Evolution Analysis .....	1153
<i>Xiang Zhang, Hongtao Wang, Yuechen Shan, and Shibo Zhai</i>	
Low-Voltage Theoretical Line Loss Calculation Based on Improved K-Means Clustering and Fitting .....	1158
<i>Haihang He, Zehao He, Yang Ji, and Wei Feng</i>	



Energy Storage Active and Reactive Power Coordinated Control Considering DC Commutation Failure Voltage Recovery and Restraining AC Line Active Power Fluctuation.....	1163
<i>Shi Qu, Qie Zhaohui, Li Zhaowei, Shi MingMing, Hao Yuchen, and Lv Zhenhua</i>	
Reactive Power and Voltage Coordinated Optimal Control with Energy Storage and Synchronous Condenser to Suppress DC Subsequent Commutation Failure .....	1169
<i>Shi Qu, Qie Zhaohui, Li Zhaowei, Hao Yuchen, Zhao Jingbo, and Lei Zhen</i>	
Research on Stackelberg Game Optimization Dispatch of Metamodel of Integrated Energy System Considering Carbon Capture and P2G.....	1174
<i>Zhihong Xu, Wendi Zheng, Jihui Li, and Jiurong Li</i>	
Adaptive Detection Method for Physical Access Attack against Temperature Interference .....	1180
<i>Kexin Jiao, Yang Liu, Xiangming Wang, Pengfei Liu, Xiangzhen Yao, and Lin Li</i>	
Enhance Transient Voltage Stability by Retrofitting Thermal Power Unit to Synchronous Condenser .....	1186
<i>Jun An, Jianyun Zhang, Xiaoyong Du, Chenghao Li, and Mingyang Liu</i>	
Numerical Analysis of the Effect of Ignition Position on the Fire Hazard for High-Voltage Switch Cabinet.....	1193
<i>Xianli Zhu, Jiaqing Zhang, Qingtao Chen, Chao Luo, Fengju Shang, Guo Yi, and Yubiao Huang</i>	
Study on Transportation Characteristics of Compressed Air Foam Pipe Network .....	1198
<i>Tiantian Tan, Jiaqing Zhang, Sha Luo, Jia Xie, Yi Guo, Fengju Shang, and Rui Liu</i>	
Research on Performance Evaluation Method of Compressed Air Foam Fire Extinguishing System in UHV Converter Station.....	1204
<i>Yi Guo, Jiaqing Zhang, Yanguo Ke, Weimin Huang, Rui Liu, Yubiao Huang, and Wen Su</i>	
Aggregated Control of Smart Building Units for Frequency Regulation in Multi-Region Power Systems.....	1209
<i>Qinwei Duan, Kaiwen Zeng, Jianing Liu, Bin Du, and Peng Liao</i>	
Research and Application of Communication Security in Security and Stability Control System of Power Grid.....	1215
<i>Xinghua Chen, Lixian Huang, Dan Zheng, Jinchang Chen, and Xinchao Li</i>	
Two-Stage Robust Optimization Dispatching with Ultra-High Proportion of Electricity-Receiving Based on Economic Operation Region Model.....	1222
<i>Wen Hua, Wei Dong, Bolong Shi, Zhe Chen, and Chuangxin Guo</i>	
Fire Safety Verification Test of Installation of Shutoff Valve in UHV Transformer Oil Conservator ....	1229
<i>Xianling Fu, Jiaqing Zhang, Jian Kang, Weimin Huang, Tiantian Tan, Lingxin He, and Yi Guo</i>	
Carbon Flow Estimation in Multi-Microgrids Considering Data Sharing Mechanisms .....	1235
<i>Jiayi Luo, Zhihao Li, Bo Zhao, Zhe Chen, Bei Han, and Guojie Li</i>	
A New Arc Suppression Method for Single-Phase Grounding Fault in Distribution Network.....	1241
<i>Jingming Ding, Guibin Zou, Fanqin Lin, Qian Lin, and Jingjing Yang</i>	
Co-Dispatch of Supply/Grid/Demand Considering Carbon Emission and Air Conditioning Loads .....	1246
<i>Dingyi Cheng, Huan Ma, Dong Yang, Meng Liu, Yan Zhang, Qiao Fang, Linlin Ma, and Xin Li</i>	

Distributed Photovoltaics User's Definition Model Considering Power Control Characteristics.....	1251
<i>Xudong Hao, Peifen Cheng, Ning Zhou, Kang Zhao, Linlin Ma, Changgang Li, and Zhenghua He</i>	
Electricity-Carbon Graph Modeling and Analysis .....	1256
<i>Yachen Tang, Xingping Wu, Chunlei Zhou, Guangxin Zhu, Jinwei Song, and Guangyi Liu</i>	
Assessment on the Overflow Risk of the Large-Scale Oil-Filled Electric Equipment under the Joint Action of Multiple Fire Extinguishing Systems .....	1261
<i>Sha Luo, Jiaqing Zhang, Jia Xie, Xiaozheng Zhang, Jinfei Qin, Yubiao Huang, and Xianli Zhu</i>	
Virtual Inertia Control Strategy for Photovoltaic Power Generation Based on Improved Incremental Conductance Method .....	1265
<i>Zhimin Gao, Yongji Cao, Hengxu Zhang, Hao Qin, Dong Yang, and Huan Ma</i>	
Analysis Model of Auxiliary Service Capability for Thermal Units Peak Regulation .....	1270
<i>Tianheng Chen, Yang Ji, Jian Cui, and Zhihui Li</i>	
The Selection Study on the Main Transformer Fiber Optic Winding Temperature Testing .....	1275
<i>Xiaohong Bu, Ding Ding, Bing Xiao, Xiaoming Yu, Yu Gao, Zaibao Xiong, Yonghong Xie, and Li Xu</i>	
<b>Chapter 7-Power System Control, Operation and Protection</b>	
Thermal Conductivity and Dielectric Properties of High Thermal Conductivity Adhesive for Large Generator Stator Bars.....	1280
<i>Liangliang Nie, Maoyuan Sun, Qiang Fu, Qingguo Chen, Zhiduo Shan, Yang Chen, and Xiangdong Liu</i>	
Reliability Evaluation Model of Park Integrated Energy System .....	1286
<i>Chunzheng Tian, Chengzhou Wei, Peng Li, Shiqian Wang, and Yihan Zhang</i>	
Research on Influencing Factors of Distribution Network Overhaul without Power Interruption Based on Analytic Hierarchy Process .....	1291
<i>Ai Maomin, An Junwei, Sun Congcong, Wang Qingze, Zhang Shouqiang, and Zhang Jiaming</i>	
Safety Helmet Detection Dynamic Model Based on the Critical Area Attention Mechanism .....	1296
<i>Yao Nan, Qin Jian-Hua, Wang Zhen, and Wang Hong-Chang</i>	
Analysis and Modelling of User Behaviors' Impact on Load Characteristics.....	1304
<i>Yue Zhang, Xiaoling Jing, Guanglong Xie, Xinyang Han, Jun Zhang, and Haifeng Bian</i>	
Research on Fault Detection Scheme for Hybrid LCC-MMC System .....	1309
<i>Xinxin Song, Shitao Wang, and Xia Dong</i>	
Research on the Accuracy of Online Sag Monitoring of Overhead Transmission Line .....	1314
<i>Peng Jiang, Jiang Wendong, Jiang Hong, Ge Huangxu, Zhang Huajie, Sun Yuwei</i>	
Study on the Factors Affecting the Compressive Bearing Capacity of Miniature Pile Tower Foundation .....	1320
<i>Rongquan Fan, Tao Li, Feng Zhu, Yuan Wu, Yang Tang, and Liang Wang</i>	

Analysis of Differences in Apparent Resistivity between Soil Model Considering Heterogeneous Region and Traditional Soil Model .....	1325
<i>Ziqiang Ming, Xin Zhang, Ke Liu, Jianxing Ren, Wenxiang Yan, and Tao Yuan</i>	
Improved Three-Point Estimation Method for Probabilistic Power Flow Calculation .....	1330
<i>Guobang Ban, Yutao Xu, Xiandong Yang, Huajun Zheng, Xufeng Yuan, Zhen Zhao, and Xiaohong Ma</i>	
Transient Stability Enhancement for Power Grid with MMC-MTDC under N-k Contingencies .....	1335
<i>Zhongpei Shi, Yuanjian Long, Huaizhi Wang, and Ting Wu</i>	
Research on Fault Analysis of Multi-Source Distribution Network Based on Adaptive Protection.....	1342
<i>Qingtao Cao, Yun Jiang, Chunxiu Liu, Xinzhe Ma, Pengpeng Wang, Zhigang Liu, and Fenfei Lv</i>	
Research on Fault Location of Multi-Source Distribution Network.....	1347
<i>Guodong Feng, Lin Song, Chunxiu Liu, Xuan Liu, LongTan Li, Zaiyan Zhou, and Liqun Han</i>	
Establishment and Application of the CW-MEEM Model for Post-Evaluation of Power Grid Construction Projects.....	1352
<i>Juhua Hong, Lin Liu, Zhihua Ding, Ziqiang Tang, Keyao Lin, Zhenda Hu, Xiaofeng Li, and Qisheng Chen</i>	
Suppression Strategy of Capacitor Voltage Fluctuation of MMC Based on Second Harmonic Injection .....	1358
<i>Zhongfu Wu, Meiling Li, and Xing Li</i>	
A Parallel Decentralized Solution for Multi-Regional Unit Commitment with Convex AC Power Flow Constraints.....	1364
<i>Zitong Wang, Gengfeng Li, Yao Xiao, Shunyu Tang, and Mengjie Teng</i>	
Seismic Response Analysis of $\pm 800$ kV Firewall-Electrical Equipment Interconnected System.....	1374
<i>Ruoyu Zhang and Meigen Cao</i>	
Study on Pollution Flashover Performance of Transformer Bushing .....	1381
<i>Zheheng Huang, Hongwei Mei, Xiangjun Zeng, Fuzeng Zhang, and Liming Wang</i>	
A Harmonic Suppression Method of H6 Topology Single Phase Inverter .....	1386
<i>Cong Liu and Yun Wang</i>	
Analysis and Handling Methods of Line Protection Action Events Caused by the Lightning Strike....	1391
<i>Siqi Zhang, Shaoming Zheng, Tianxiao Huang, Yimin Liu, Rui Chen, Miao Liu, Yu Li, and Xin Guo</i>	
Research on the Detection Scheme of AC/DC System .....	1396
<i>Chunxiang Mao, Bin Chai, and Ruopeng Liu</i>	
The Analysis on the Influence of Cable Laying Mode on Fire Spread Trend .....	1401
<i>Zhang Hao, Ma Guoqing, Li Pengfei, Duan Yubing, Shi Wei, and Wang Xiaolong</i>	
The Safety Margin Analysis of High Voltage Submarine Cable System .....	1407
<i>Ma Guoqing, Ge Jin, Li Pengfei, Duan Yubing, Zhang Hao, and Zhu Zhien</i>	

Analysis and Treatment of Abnormal Growth of Total Hydrocarbon in $\pm 800\text{kV}$ Converter Transformer.....	1412
<i>Xiu Zhou, Qingping Zhang, Xutao Wu, Tian Tian, Bo Niu, Jin Bai, and Xiuguang Li</i>	
Operation Risk Probability Assessment of Power System Considering the Stochasticity of Renewable Energy .....	1420
<i>Siyang Liu, Baoju Li, and Yong Sun</i>	
Fault Line Selection Method for Small-Current Grounding System Based on VMD-DTW Transient Energy Ratio .....	1426
<i>Hao Li, Yunfei Luan, Ruo Chen Zeng, Haiting Shan, Luliang Zhang, and Mengshi Li</i>	
Research on Substation Fault Handling Method Suitable for Digital Handover Scenarios.....	1431
<i>Ran Chen, Li Zhou, Fangchao Ke, Zhao Fang, Zhiwei Li, Wanfang Liu, and Wenbin Liu</i>	
Research on Electromagnetic Interference Protection of X-Ray Detecting Device for Tension Clamp of Transmission Line.....	1436
<i>Qin Weinan, Yu Guangkai, Yu Chi, Zhu Kai, Liang Jiakai, and Liu Ting</i>	
Research on X-Ray Live Inspection Method for Tensile Clamps of Transmission Lines.....	1441
<i>Cui Jianye, Yu Guangkai, Liang Jiakai, Qin Weinan, Zhu Kai, and Liu Ting</i>	
Design of a Robot for Live-Line Repairing of Transmission Line.....	1446
<i>Yu Chi, Chen An, Tang Chunjun, Yu Guangkai, Fang Yuqun, and Liu Ting</i>	
Application of Rubber Insulator Cleaning with Pulsed Fiber Laser .....	1451
<i>Ren Mao-Xin, Kuan Pei-Wen, Xiao Rong, Deng Jin-Yu, Tan Xiao-Mei, Wu Xin-Ye, Xu Peng, and Tian Hao-Yang</i>	
Study on Cancelling Closing Resistor of Circuit Breaker in Long Distance Outlet of 500 kV Power Plant .....	1456
<i>Lou Ying, Zha Zhipeng, Li Zhenqiang, and He Huiwen</i>	
A New Perspective of Power System Operation and Management -- Research on Power/Energy Data Asset Value Evaluation Model for Power Grid Enterprises .....	1462
<i>Junfeng Bai, Xiang Li, Weibin Wang, and Haini Qu</i>	
The Research of Current Harmonic Suppression of Virtual Synchronous Generator on Active Disturbance Rejection Control .....	1467
<i>Zhangyou Shen, Hejin Xiong, Yichen Zhang, and Haojie Wang</i>	
Design of Transformer Iron Core Multi-Point Earthing Automatic Protection Control System .....	1472
<i>Luo Ming-Cai, Ma Jin, and Teng Fu-Li</i>	
Study on Flexible Built-in Miniature Archimedes Spiral Antenna Sensor for High-Voltage Electrical Equipment PD Detection .....	1477
<i>Lin Cheng, Hao Wen, Yi Liu, Yi Jiang, Zhengqin Zhou, Jing Zhang, Guozhi Zhang, and Hangyin Mao</i>	
Research on Electric Field and Temperature Distribution under Insulation Deterioration of UHV Arrester .....	1483
<i>Shi Xiaohang, Yang Jun, Gao Fei, Song Yan, Zhang Lin, and Wang Wei</i>	

Research on Low Frequency Oscillation Control Strategy of PMSG-Wind Farm Grid Connected System .....	1490
<i>Yaqi Shen, Jing Ma, and Yuanpei Gu</i>	
Analysis of Subsynchronous Resonance on PMSG-Based Wind Farm .....	1495
<i>Fengyun Luo, Yun Wang, Guoqing Tao, and YanPing Wu</i>	
A Security-Constrained Economic Dispatch Model Incorporating IPFC Control Characteristics .....	1500
<i>Jinmin Cheng, Hui Cai, Weiyuan Wang, Sheng Chen, Fei Dou, and Wanchun Qi</i>	
Analysis of the Influence of Rotor Structure on Operating Characteristics of Motor Actuator Used in Vacuum Circuit Breaker in Distribution Network .....	1505
<i>Lu Haiwei, Shi Kejian, Hui Shihan, Fan Wei, Yu Yongbin, and Gu Taiyu</i>	
Research on Current DC Offset of Energizing a No-Load Transmission Line with High Voltage Shunt Reactor.....	1511
<i>Li Wenhua, Du Ning, Xiang Zutao, Yang Huiming, Jiang Haiyang, and Zhao Xiaolong</i>	
A Workload Evaluation Method for Electric Power Design Documents .....	1517
<i>Guanhua Chen</i>	
Study on the Effect of Optimizing the Configuration of Metal-Oxide Arresters in UHV Engineering on Suppressing Slow-Front Overvoltage .....	1522
<i>Li Zhenqiang, Lou Ying, Cui Tao, and Zha Zhipeng</i>	
Cooperative Control Strategy for Offshore Wind Farm Black-Start Based on Diesel Generator .....	1528
<i>Wei Zhao, Wenhui Tang, Zekang Lin, and Yanli Xin</i>	
Comparative Analysis of Wind Field Fault Characteristics of Squirrel-Cage Wind Farms and Direct-Drive Wind Farms.....	1533
<i>Naihao Liu, Houlei Gao, Bin Xu, and Yitong Wu</i>	
Study on Small Disturbance Characteristics of AC Side of Grid-Connected VSC.....	1539
<i>Runze Bai, Yuanxin Zhang, Zehong Yu, and Yongqiang Zhu</i>	
Research on Sensorless Control Strategy of PMSM with Improved High Frequency Injection in Low Speed Condition.....	1544
<i>Fu Jia, Yin Dejun, and Wu Zhequan</i>	
Research on Air-Conditioning Load Groups Participating in Grid Primary Frequency Control .....	1549
<i>Shougang Liu, Honghai Li, Xinghui Ren, Chengbin Ren, and Shangbin Wang</i>	
A Review of Fast Frequency Response Techniques for Asynchronous Power Sources.....	1556
<i>Xiaohui Qin, Lining Su, Chengwei Ye, Xiao Xiao, Zhen He, and Pingliang Zeng</i>	
VSG Parallel Control Strategy Based on Secondary Voltage Regulation .....	1562
<i>Ye He, Hongming Hu, Haodong Yang, and Jingwei Du</i>	
Statistical Similarity Based Identification of Power Transformer Inrush Current .....	1568
<i>Yunfei Luan, Hao Li, Ruo Chen Zeng, Chun Mo, Luliang Zhang, and Mengshi Li</i>	
Traveling Wave Location Method for Latent Fault of Medium Voltage Cable Based on Double-Terminal Principle .....	1573
<i>Jian Liu, Bingguang Han, Xue Chang, Cong Wang, and Wenshan Zhang</i>	

Current-Carrying Capacity Calculation Based on Mechanical States Measurement of Overhead Line .....	1580
<i>Yimin Yin, Shihao Wang, Mengxia Wang, and Xiao Liu</i>	
Probability Prediction of Short-Term Allowable Carrying Capacity of Overhead Conductors .....	1586
<i>Haitian Wang, Yimin Yin, Shihao Wang, Mengxia Wang, and Qiang Zhang</i>	
Thermal Rating Prediction with Improved Prediction Input .....	1592
<i>Shihao Wang, Yimin Yin, Mengxia Wang, and Qiang Zhang</i>	
Partial Discharge Positioning Based on Statistical Analysis of UHF RSSI Values .....	1598
<i>Liu Guofeng, Chen Dalin, Zhang Can, Chen Jiankun, Ye Jianqiao, and Sun Yuwei</i>	
Simulation of Positive Surface Discharge in C4F7N Gas Mixture .....	1604
<i>Binhai Fan, Xiaoli Zhou, Yong Qian, and Yiming Zang</i>	
Split PCB Winding Transformer for Dual-Active-Bridge Converter with Full Load Range ZVS .....	1609
<i>Qiuxia Shen, Guo Xu, Xiaoying Chen, Yao Sun, Mei Su, and Hua Han</i>	
Study on Deeply Suppression of Overvoltage of UHV Project in High Altitude Area .....	1614
<i>Bin Han, Xin Qie, Zutao Xiang, Ying Lou, Xiaotong Wang, and Qihao Zhang</i>	
Analysis of Multipoint Grounding Abnormality of Main Transformer .....	1619
<i>Xiu Zhou, Qing ping Zhang, Fei yue Ma, Tian Tian, Yan Luo, Xiu guang Li, and Ning hui He</i>	
Research on the Effect of Initial Surface Temperature of Transformer Oil on Drainage Properties of Three Common Foam Extinguishing Agents .....	1626
<i>Shilei Huang, Fengju Shang, Chun Zhang, Chenchen Zhang, Jiaqing Zhang, Depeng Kong, and Bingqing Li</i>	
Analysis of Influence Law of Rail Transition Resistance on Subway Stray Current .....	1631
<i>Chengbao Song, Zhi Li, Haiyang Wang, Xinghua Liu</i>	
Study on Forward Continuous Operation Characteristics of Bidirectional Double Transistor Flyback Converter.....	1636
<i>Chengbao Song, Mingjiao Guan, Jiyang Bi, and Xinghua Liu</i>	
Fault Analysis of a 110kV Oil Immersed Current Transformer.....	1641
<i>Li Pei, Li Hongbo, Niu Lin, Gao Nannan, Ma Mengchao, Zhang Yanyan, Guo Liangfeng, and Yin Qinghua</i>	
Network Security Protection Method of Smart Substation Based on IEC61850 Message Encryption and Flow Detection .....	1646
<i>Jin Li, Xiaobin Ding, Hongjun Liu, and Peng Xu</i>	
Spectral Analysis of Pyrolytic Reaction Products of Typical High Voltage Cable Materials .....	1652
<i>Guangzhen Ren, Wuhao Huang, Wendong Jiang, Bin Yu, Hongkun Lv, Xiaolong Zhang, Bin Chen, and Anwen Liu</i>	
Power System Line Protection Method Considering Large-Scale New Energy Access .....	1659
<i>Xing Fan, Biao Zhou, ZhenDong Wang, and Guan Bang Qiao</i>	

Failure Mechanism and Improvement Measures of Fireproof Sealing in Valve Hall of UHV Converter Station.....	1665
<i>Fengju Shang, Jiaqing Zhang, Taiyun Zhu, Yi Guo, Yubiao Huang, Tao Sun, and Rui Liu</i>	
Diagnosis and Analysis of Moisture Defects in Oil-Impregnated Paper Bushings Based on Dielectric Response in Frequency Domain .....	1671
<i>Dingqian Yang, Weining Zhang, Jiabao Du, and Zhaoguang Du</i>	
A Muti-Layer Fault Component Identification Method Based on Muti-Source Information Fusion in Distribution Power Grid .....	1679
<i>Lin Jiang, Wenhui Li, Bo Fu, and Lin Bai</i>	
Application of Starting Control Technology on Brushless Doubly Fed Motor with Fan and Pump Loads .....	1684
<i>Tantan Zhao, Kexun Yu, Xianfei Xie, and Jiahao Liang</i>	
A Two-Stage Stochastic Distribution Network Restoration Model with Waste Incineration Power Plants as Black-Start Power Resources.....	1689
<i>Shanshan Shi, Jian Zhou, Yun Su, Xinchu Wei, Sunyang Zhou, and Haoming Liu</i>	
Research on Lightning Arrest Configuration Scheme of 500kV Substation .....	1694
<i>Tiantian Lu, Xiujuan Chen, Boyu Zhang, and Ziming He</i>	
Stability Analysis and Impedance Reshaping Control of Medium-Frequency Oscillation in a PMSG-Based Wind Farm Connected to a VSC-HVDC .....	1699
<i>Kun Sun, Dahu Li, Wei Yao, Yi Zhou, and Jinyu Wen</i>	
Study on Overhead Ground Wire Induced Voltage of 500kV AC/DC Transmission Lines for Ice Melting.....	1704
<i>Zha Zhi-Peng, Li Zhen-Qiang, Lou Ying, and Fan Mian</i>	
Design of Magnetic Barrier Angle of Permanent Magnet Assisted Synchronous Reluctance Motor Based on Minimum Torque Ripple.....	1712
<i>Wu Zhequan, Yin Dejun, Chen Lujun, and Fu Jia</i>	
Stability Analysis of PLL on DFIG-WT with Frequency Support Capability and Robust Damping Controller Design .....	1717
<i>Lei Ba', Lin Jiang, Zheng Li, Haiyan Tang, and Xuhui Shen</i>	
High Sensitivity Protection Method of Low-Resistance Grounding System Based on 5G Technology .....	1722
<i>Wanying Yan, Jiandong Duan, Zequan Hou, and Xiaotong Du</i>	
Optimal Dispatching of Distributed Energy Supply System Based on Model Predictive Control .....	1727
<i>Yanmei Li, Xiaoxue Li, Chaoyu Shi, Yan Li, Man Li, Lifeng Li, Yunpeng Li, and Ya Xin</i>	
Hierarchical Structure Based Energy Consumption Forecasting in Top-Down Approach.....	1732
<i>Barkha Parkash, Tek Tjing Lie, Weihua Li, and Shafiqur Rahman Tito</i>	
Modified Distance Backup Protection Fused with DC Control Information.....	1738
<i>Lingjiao Gongye, Dahai Zhang, Wei Li, Xueqin Wang, and Chuanjian Wu</i>	

Comparison of Harmonics between Panama Power Supply and Traditional AC UPS Power Supply System.....	1744
<i>Miaoxian Zhou, Fang Guo, An Wen, Bingyao Zheng, Shangyun Deng, Guangshan Huang, and Ruiyang Wang</i>	
Cable Model using Defective Melt Joint Applying to Partial Discharge Detection .....	1749
<i>Ran Ding, Xuancheng Huang, Zhicheng Lei, Chao Yuan, Zhengbing Tian, Dong Liang, Baolei Zhang, and Yadong Wu</i>	
Study on Transient Power Angle Stability Emergency Control with Electrochemical Energy Storage.....	1754
<i>Shibin Bai, Chao Wang, Zhihao Tian, Haijun Chang, Gang Liu, Zhenyu Sun, Fusuo Liu, and Wei Li</i>	
Multi-Time Scale Absorptive Capacity Evaluation Method for Large-Scale New Energy Sources .....	1760
<i>Wenjun Niu, Bin Bai, and Fan Yang</i>	
Study on Fault Diagnosis of Metal Oxide Surge Arrester Based on Infrared Detection and Leakage Current Detection .....	1766
<i>Jin Bai, Xiu Zhou, Tian Tian, Luo Yan, Ma Yunlong, and Liu Weifeng</i>	
Fault Diagnosis Method for Hybrid HVDC Transmission System Based on Stacked Sparse Autoencoder .....	1771
<i>Xueqin Wang, Dahai Zhang, Xiaowei Zhang, and Pinghao Ni</i>	
Adaptability Analysis of Traveling Wave Protection for Cascaded Converter Hybrid HVDC Transmission Line.....	1777
<i>Xiaopeng Li, Qi Yang, Yufei Teng, Dalin Mu, and Sheng Lin</i>	
Simpson's Rule Differential Protection for New Energy Power Plant Outgoing Line.....	1783
<i>Bing Luo, Wei Chen, Shilong Li, Fan Xiao, Dan Liu, Yuhan Cao, and Minghao Wen</i>	
Offshore Platform Neutral Grounding Study and Design .....	1790
<i>Xiao Fan, Weidong Xu, and Yu Wang</i>	
Real - Time Load Three - Phase Unbalance Treatment under High Photovoltaic Permeability .....	1795
<i>Pengchen Nie, Kunhua Ji, Cheng Zhang, Yun Wang, Min Wang, and Huilin Wang</i>	
A Method to Calculate the Comprehensive Cost of Electric Power System Peak Regulation Considering Flexible Resource Investment .....	1802
<i>Zhang Jing, Zhang Tao, Hu Yuou, Zhao Guixin, and Zhuang Baisong</i>	
Research on Overvoltage and Insulation Coordination of Cascaded Power Electronic Transformers.....	1810
<i>Shihui Yang, Guoliang Zhao, Zengbo Dong, Haijun Liu, Yongzheng Zhang, and Peng Yang</i>	
Analysis of Spatial Acoustic Radiation Characteristics of Converter Transformer in HVDC Converter Station.....	1815
<i>Liming Ying, Xinyi Xie, Guiqi Zhu, and Lu Zhang</i>	
Study on Small Signal Stability of Power System under MGP Grid-Connected Structure.....	1821
<i>Wenjun Niu, Pengkui Ma, and Zhan Yu</i>	



Event-Triggering Secondary Frequency Control for Islanded Microgrid with Communication Delay .....	1826
<i>Guoqiang Sun and Yongjin Yu</i>	
Estimation and Influencing Factors Analysis for Equivalent Inertia of Wind Turbines with Active Inertia Support .....	1832
<i>Ningyu Zhang, Xinyao Zhu, Dajiang Wang, Xianming Wu, and Jing Bu</i>	
Design and Practice of Distribution Connection Construction Scheme Based on Lightweight Operating System .....	1838
<i>Haoyang Sun, Sijun Qin, Chuanyu Tan, Shuaitao Bai, and Jichuan Zhang</i>	
Experimental Study on Fire Hazard of High-Temperature Transformer Oil Pool Fire and Exploration on Improvement of Fire-Extinguishing System .....	1843
<i>Jiaqing Zhang, Rui Liu, Jia Xie, Hui Wang, Yabin Fan, and Changhai Li</i>	
Review on Charge Generation, Measurement and Dissipation in Large-Length HVDC Cable .....	1848
<i>Jieming Wang, Qiaojue Liu, Zhitong Cui, Zhikun Cai, and Wusheng Hu</i>	
Analysis of AC Failure of New Energy Transmission System via Flexible DC Grid under Island and Grid-Connected Operation Mode .....	1855
<i>Zhongjian Kang, Anqi Zhang, Bing Zhao, Shanshan Wang, Guanglu Wu, and Quan Ma</i>	
Calculation of Reactive Power Requirement for Voltage Improvement at Mardan Station.....	1861
<i>Salman Khan, Arsalan Masood, Sohail Khan, and Arqum Shahid</i>	
Analysis of the Thermal Effects of Conductive Concrete Foundations of Mast Towers under Continuous Lightning Strikes .....	1866
<i>Ziyang Feng, Musang Zhang, and Lixing Zhou</i>	
Design of a Wide-Range Current Transformer Based on Improved 1K107 Material.....	1871
<i>Jun Zhang, Bing Lu, Xiwen Chen, Xu Wang, and Can Ding</i>	
Design and Performance Analysis of Three Axis Solar Tracking System .....	1876
<i>Parija Gupta, Vinay Gupta, Madhu Sharma, Rupendra K. Pachauri, and Jamil Akhtar</i>	
Transient Extraction Transform Based Fault Location Method with Enhanced Accuracy .....	1881
<i>Chun Sing Lai, Ning Tong, Zhenjie Tang, Ahmed F. Zobaa, Zhanlian Li, and Loi Lei Lai</i>	
Multifunctional Power Grid Dispatching System Based on Electric Vehicles Cluster .....	1886
<i>Haitao Li, Jiacheng Liang, Wei Han, and Xin Dai</i>	
<b>Chapter 8-Optimisation</b>	
Optimal Scheduling Model for Integrated Energy Systems in Parks Considering Multi-Energy .....	1891
<i>Peng Li, Chunzheng Tian, Huixuan Li, and Yihan Zhang</i>	
Dynamic Path Planning Based on Improved Particle Filter Optimisation for Patrol Robots .....	1898
<i>Yao Nan, Qin Jian-Hua, Zhu Xue-Qiong, and Wang Hong-Chang</i>	
Data-Driven New Energy Operation Optimization Considering Economy and Photovoltaic Consumption .....	1904
<i>Yingxian Chang, Yang Jiang, Zhiqiang Wang, Ningning Li, Yan Zhao, Xiurong Tu, and Beibei He</i>	

Dynamic Characteristics Analysis of Distributed PV Plants with Panel-Level DC Optimizers under Severe Partial Shading Conditions.....	1909
<i>Qin Wang, Wei Yao, Jiakun Fang, and Mengyao Xu</i>	
Low-Carbon Optimization Operation of Integrated Energy System Considering Ladder-Type Carbon Trading and Carbon Capture.....	1916
<i>Jiming Chen, Ke Ning, Qing Zhang, Qian Xu, Wencong Chen, and Xinwei Yu</i>	
Optimal Planning of District Integrated Energy System Considering Distributed Renewable Energy .....	1922
<i>Chunni Xia, Jiaqi Zhang, Shuqi Luo, Yongqiang Zhu, and Ruihua Xia</i>	
Optimal Power Flow Calculation for Wind Power Grid Connection Based on Adjustable Robust Optimization Theory.....	1927
<i>Jiaqi Zhang, Shuqi Luo, Chunni Xia, Yongqiang Zhu, and Ruihua Xia</i>	
Optimized Configuration of Video Surveillance Layout for Substation Construction Site for Full Coverage Surveillance.....	1932
<i>Jiangpin Yang, Yanhan Wang, Xin He, Junyong Liu, Rui Zhang, Xingyan Zhao, and Hongjun Gao</i>	
An Air Source Heat Pump Load Optimization Operation Method Based on Peak-Valley Electricity Price .....	1940
<i>Meng Liu, Chenhao Li, Song Gao, and Xin Wang</i>	
Optimal Demand Response Considering User's Satisfaction using a Multi-Objective Optimization Algorithm.....	1946
<i>Ruoyao Cui, Jiawei Zhu, Huazhen Li, Ting Li, Yisheng An, and Weidong Lei</i>	
Feasibility of Incorporating FACTS Devices and DG to Optimize the Performance of Pakistan's Transmission Network: A Case Study.....	1952
<i>Hussain Haider, G. I. Rashed, and Yang Jun</i>	
Optimal Scheduling of CCHP Microgrid Considering Real-Time Demand.....	1957
<i>Du Xiaoting and Wang Shiyu</i>	
Demand Response Optimization Strategy of Electric Water Heater Based on BPSO .....	1962
<i>Kun Shi, Ying Zhou, Sheng He, Dezhi Li, and Chao Zhou</i>	
Orderly Charging of Electric Vehicles Considering New Energy Consumption and System Peak-to-Valley Differences.....	1967
<i>Chen Yiyao, Xue Yingnan, Wu Yingying, Liang Yaojun, Wang Qianchun, and Du Xinhui</i>	
Collaborative and Optimal Operation of V2G for Electric Vehicles to Promote Renewable Energy Consumption .....	1972
<i>Jiajie Hao, Hui Hou, Junyi Tang, and Yue Chen</i>	
Overview of Intelligent Optimal Dispatching Strategy for Extensive Electric Vehicles.....	1977
<i>Zhihua Wang, Hui Hou, Yifan Wang, and Yue Chen</i>	
Optimized Scheduling of Virtual Power Plants considering Demand Response with TOU Approach .....	1982
<i>Syed Asad Abbas Rizvi, Ai Xin, and Arsalan Masood</i>	

## Chapter 9-**AI**Machine learning Applications

Multi-Level Security Defense Method of Smart Substation Based on Data Aggregation and Convolution Neural Network .....	1987
<i>Dong Liu, Yingwei Zhu, Haoliang Du, and Lixiang Ruan</i>	
Fault Diagnosis Method of Automation Equipment in Independent and Controllable Substation Based on Deep Reinforcement Learning .....	1992
<i>Haoliang Du, Zhenhua Li, Dong Liu, and Yinqiang Huang</i>	
Research on Deformation of Deep Foundation Pit in an Underground Substation in Water-Rich Pebble Area of Chengdu.....	1997
<i>Junjie Lv, Rongquan Fan, Songmei Lv, and Yang Tang</i>	
Agent-Based Self-Discipline Operation of Integrated Energy System .....	2002
<i>Tianhao Wang, Tianchun Xiang, Bohan Xu, and Yue Xiang</i>	
Reliability Assessment of Hydrogen-Based Carbon-Neutral Power Systems using Improved Quasi-Sequential Monte Carlo Simulation.....	2008
<i>Wenjin Chen, Jun Zhang, Donglai Ma, Xunhang Sun, Jingwei Chen, and Ruoyi Zhang</i>	
EdgeCloudSim Based Computing Resource Configuration Strategy Analysis of Cloud-Edge System in Power Distribution Internet of Things.....	2013
<i>Xin Zhang, Mengyong Duan, Ruifeng Xu, Huan Rao, and Jingzhu Deng</i>	
A New Hierarchical Optimization Dispatching Method of Cross-Provincial Power to Improve New Energy Consumption .....	2019
<i>MingLiang Han, HongXiang Ma, and Wenbo Xu</i>	
Identification of Typical Partial Discharge Defects of Distribution System Equipment Based on Classification Learner .....	2025
<i>Jingde Chen, Yaqing Li, Junfei Chen, Danfeng Liu, and Yitao Yang</i>	
Research on Portrait Models of Performance Evaluation Built for Digital Intelligent Power Supply Departments .....	2030
<i>Daqi Guo, Jihuan Chen, Qiming Zhao, Xiang Huang, and Xin Chen</i>	
ODS-Based Winding Defects Diagnosis of High Voltage Shunt Reactor using Vibration Signal.....	2037
<i>Dajian Li, Liangyuan Chen, Changting Yu, and Jian Zhao</i>	
Harmonic Source Modeling Based on the Linear Cluster-Weighted Model .....	2042
<i>Xiao Lin, Zhenguo Shao, Yan Zhang, and Feixiong Chen</i>	
Hybrid Coordinate Affine Power Flow Algorithm Based on Coordinate Conversion.....	2047
<i>Songtao He, Zhenguo Shao, Feixiong Chen, and Yan Zhang</i>	
Classification of Power Quality Disturbance Signals Based on Weighting Random Forest .....	2052
<i>Chenjing Zhou, Zhenguo Shao, Feixiong Chen, and Yan Zhang</i>	
Research on Temperature Prediction for High Voltage Cable Based on Machine Learning .....	2057
<i>Zou Yu, Guo Zi-Pei, Weng Tian-Yue, and Chen Ya-Fang</i>	
Ultra-Short-Term Wind Speed Prediction Method Based on Fluctuation Pattern Recognition .....	2062
<i>Zhaoxuan Shu, Kai Lv, and Weiqing Wang</i>	

Neural Network-Based Load Forecasting Model for Efficient Charging of Electric Vehicles .....	2068
<i>Hassan Khan, Muhammad Junaid Khan, and Amir Qayyum</i>	
Grid Diagnosis Coupled Comprehensive Evaluation for Distribution Network Investment .....	2073
<i>Yun Chi Qiao, Wei Ting Xu, Jian Ping Yang, and Yue Xiang</i>	
Fault Prediction Method of Distribution Equipment Based on Multi-Source Data Fusion and Hybrid Neural Network .....	2078
<i>Menghui Huang, Zherui Cui, Kui Wang, and Hongshan Zhao</i>	
A New Energy Policy Text Classification and Recognition Model Based on Convolutional Neural Networks .....	2083
<i>Xingang Wang, Zhuan Zhou, Licheng Sun, Guohui Xie, and Qihe Lou</i>	
An Intelligent Cable Fault Location Method Based on the Recognition of Breakdown Discharged Waveform .....	2091
<i>Jinliang Zhang, Guibin Zou, Chao Shan, and Feng Li</i>	
Fast Probabilistic TTC Assessment Based on Copula Theory and Deep Ensemble Learning .....	2096
<i>Shaopeng Zhang, Jiongcheng Yan, Xin Li, Dong Yang, Huan Ma, and Changgang Li</i>	
An RUL Prediction Approach for Lithium-Ion Batteries Based on FIG and SVM with Multi-Kernel ....	2101
<i>Yuxing Li, Lei Song, Rongqing Yi, Junyi Su, Xuefeng Gao, and Jingcai Du</i>	
Interval Multi-Energy Flow Analysis in Integrated Heat and Electricity System Based on Affine Arithmetic.....	2106
<i>Yimin Li, Zhenguo Shao, Yan Zhang, Zhezhuang Xu, and Feixiong Chen</i>	
A Migration Learning-Based Transient Stability and Impact Assessment Method for Hybrid AC-DC Power System Faults .....	2111
<i>Xing Meng, Pingliang Zeng, and Shicong Ma</i>	
A Novel Substation Robot Camera Calibration Method Based on Vanishing Visual Points .....	2118
<i>Tao Jing, Pingliang Zeng, Guo Zhimin, and Qiuxuan Wu</i>	
Outage Probability and Optimal Power Splitting Ratio Analysis for RIS-Aided SWIPT System .....	2123
<i>Jinfeng Xie and Li Li</i>	
Using Artificial Bee Colony Algorithm for STATCOM Sizing and Placement to Prevent Voltage Instability on Pakistan Power System .....	2129
<i>Duku Otuo-Acheampong, Ghamgeen Izat Rashed, Hussain Haider, and Akwasi Amoh Mensah</i>	
Design of Uninterruptible Patrol System for Electric Power Equipment Based on Digital Twin Technology .....	2135
<i>Hailong Xu, Lin Wang, Yujing Zhai, Guang Su, Xiaoming Yu, and Chenpeng Zhao</i>	
Design and Typical Application of Digital Twin Architecture in Smart Grid .....	2140
<i>Bingqiang Gao, Haiyang Liu, Hongli Su, Ziwei Hong, Cong Ji, and Mengjie Zhao</i>	
Power Quality Disturbances Classification using A TCN-CNN Model.....	2145
<i>Zhe Yang, Wenlong Liao, Kuangpu Liu, Xinxin Chen, and Ruijin Zhu</i>	

Dynamic Reconfiguration of Distribution Network with DPV Based on Binary Particle Swarm Optimization .....	2150
<i>Zihao Zhou, Hao Jiang, Hanling Wang, and Xueming Chen</i>	
An Island Partition Method for Distributed Fault Self-Recovery .....	2156
<i>Ning Wang, Jiwen Liu, Pingyang Jiao, Yunchi Zhang, Houlei Gao, and Yaoshuang Yan</i>	
Automatic Inspection of Power System Operations Based on Lightweight Neural Network.....	2161
<i>Bin Li, Shuang Wu, Shengjie Wang, and Liang Zhang</i>	
Decentralized Protection Coordination Based on Multi-Agent System for Active Distribution Networks .....	2166
<i>Kun Yang, Zhen Xiang, Ruixiong Yang, and Lin Jiang</i>	
Task Modelling Based on Power Distribution Cloud-Edge System.....	2172
<i>Junni Su, Zejian Qiu, Xiang Zhang, and Wenhao Liu</i>	
Device-Level Multi-Rate Electromagnetic Transient Simulation of Power Systems Based on Latency Insertion Method.....	2178
<i>Haoyin Ding, Qiguo Wang, Yuancheng Miao, Lu Cao, Zheng Yan, and Keyou Wang</i>	
Partial Discharge Inversion Localization Method for GIS Based on Twin Database .....	2183
<i>Wang Miao, Luo Lingen, Qian Yong, Song Hui, and Sheng Gehao</i>	
Simulation Research on Electric Field Safety of Digital Twin Positioning Device for Live Operators of $\pm 800$ kV UHVDC Transmission .....	2188
<i>Wen Si and Haibo Li</i>	
Non-Intrusive Electric Heating Load Identification Method Based on Bayesian Classification .....	2193
<i>Wei Zhao, Yaoke Shang, Zhishuo Zhang, Jingshu Zhang, and Xinhui Du</i>	
Distributed Photovoltaic Cluster Partition and Reactive Power Optimization Strategy Based on BAS-IGA Algorithm .....	2198
<i>Yang Liu, Lisheng Li, Yong Li, Mingyang Li, Min Huang, Haidong Yu, and Wenbin Liu</i>	
Research on Wind Farm Voltage Ride through Simulation Platform Based on Digital Twin Technology.....	2204
<i>Qi Liu, Xingang Yang, Nengling Tai, Wentao Huang, Yixuan Jin, and Xinxing Xu</i>	
Integration Planning of 5G Network and Smart Distribution Network.....	2209
<i>Xiaoyu Feng, Zihao Liu, Ying Wang, and Xiufan Ma</i>	
Detection Method of Distribution Transformer Capacity Increase Based on Neural Network and Short Circuit Impedance .....	2214
<i>Bin Zhang, Xiaoming Zhou, Heyang Sun, Chen Wang, Lixing Jiang, and Jingjing Li</i>	
A Machine Learning Approach for UHF Partial Discharge Localization .....	2219
<i>Can Zhang, Guofeng Liu, Dalin Chen, Tongqing Xu, and Peilin Gong</i>	
Application on Smart Lighting System in UHV Substation.....	2224
<i>Chenpeng Zhao, Zaibao Xiong, Xiaohong Geng, Xiaohong Bu, Li Xu, and Tianjie Zhang</i>	

An Intelligent Diagnosis Method for Analog of the Secondary Equipment Based on the Remote Dispatching Station.....	2229
<i>Congcong Li, Fangfang Shi, Meng Liu, Yongbo Wang, Wanjie Zhang, and Chenhao Li</i>	
Corrosion Detection Method of Substation Aboveground Steel Structure Based on Deep Learning .....	2234
<i>Feng Pan</i>	
Construction of Knowledge Graph of Hardware Trojan Detection Method.....	2239
<i>Shengguo Ma, Yujia Liu, Yannian Wu, Shaobo Zhang, Yiyang Zhang, and Delong Wang</i>	