2022 9th International Forum on Electrical Engineering and Automation (IFEEA 2022)

Zhuhai, China
4-6 November 2022

Pages 1-622

IEEE Catalog Number: CFP22Y96-POD
ISBN: 978-1-6654-6422-2

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:	CFP22Y96-POD
ISBN (Print-On-Demand):	978-1-6654-6422-2
ISBN (Online):	978-1-6654-6421-5

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
Web: www.proceedings.com

Table of Contents

A Review of Short Circuit Detection Sensor for SiC MOSFET 1
Zekun Li, Bing Ji, Kun Tan, Wenping Cao

Leveraging the strength of mixed reality for maintenance training -- A case study in large pumped storage power station 6
Chao Wen, Huaijie Ji, Menglong Hou, Xiaobo Qiu, Yifeng Zhao, Jiaheng Zou, Huazhe Shen, Zhile Yang

Cost-benefit Analysis of Virtual Power Plant for Demand Response Scenario 11
Shijun Tian, Gao Zhang, Yuan Hu, Li Ma

Design and research on comprehensive evaluation index of China regional electricity market 15
Yuanrui Hong, Fubin Liu, Zhongyang Chen, Mengge Zhang

Safety Analysis and Reinforcement Measures of Transmission Tower 20
Jingshan Han, Danyu Li, Yayang Lin, Xiaoxiang Zhang, Jianhua Yu, Bin Liu

Design of Flexible Market Mechanism Adapting to New Power System 25
Bo Ning, Jing Zhang, Qiang Li, Lin Shao, Chenning Wu, Qianru Guo

A high-performance nano-refractive index sensor structure based on Fano resonance 30
Guoquan Zhou, Shubin Yan, Lifang Shen, Yi Zhang, Yifeng Ren

Petal-type refractive index sensor based on Fano resonance 34
Qiang Wang, Shubin Yan, Chuanhui Zhu, Lifang Shen, Yifeng Ren

Design of a Single-Terminal Forward Switching Power Supply 38
Gaili Yue, Cong Sun

Research on sensing characteristics of PVDF piezoelectric film and its application in aerospace static test 45
Yan Bai, Chuncheng Xiao, Qiunan Liu, Zijian Wei, Haoxiang Zhong

Application for Lumped Circuits With US-FDTD Method 50
Wenbing Wang, Mo Zhao, Xutong Wang, Yifei Liu

Research on Electromagnetic Vibration Energy Harvester for Casing of Transformers 55
Liangyuan Chen, Dajian Li, Ke Zhou, Jian Zhao

Square-Wave Modulation for High-frequency Modular Multilevel DC-DC Converter with High Voltage-Conversion Ratio 62
Lifeng Guo, Yunlong Liu, Liang Xu, Fuli Wang, Liqun Bao, Hongliang Li

Influence of parameters of bidirectional pulse power supply on copper plating on printed circuit board 76
Shoutao Wang, Wenguang Chen, Zhijian Liu, Caiyi Wei, Yuanyuan Peng

A High-Precision Hall High-Current Sensor Detection Source 81
Caiyi Wei, Wenguang Chen, Chongjie Wang, Qianwen Wang

An Optimal Allocation Model of Coupled System Considering the Matching of Flexible Supply and Demand 85
Longjie Yang, Niancheng Zhou, Yiming Chang, Yuan Chi, Qianggang Wang, Deren Zhao, Xiaobo Huang

Thermal Recovery and Utilization of Coal Gangue Mountain Based on Semiconductor Thermoelectric Technology 91
Hong Peng, Yiwen Song

Simulation of Crosstalk between DC Cable and Signal Cable of Accelerator 98
Yongbo Zhang, Anhui Feng, Runzu Zhang, Ye Liu, Pengfei Liu, Zhongzu Zhou, Jiancheng Yang

Recognition method of hydrophobicity grade of composite insulator based on RS-RepVGG-B0 102
Liye Song, Xuyang Liu

Integrated Impact of high percentage Distributed Photovoltaic on Power Grid 109
Xu Zhang, Huaidong Yan, Jingjing Bai, Sha Jun
An Optimization Method for Reducing the Sub-module Capacitor Voltage Ripple Amplitude of Hybrid MMC 115
Zhen Yang, Wenchen Jiang, Xin Li, Han Bu
A Hybrid Half-bridge LCC Resonant Converter and Phase-Shift Full-bridge Converter for High Step-up Applications 123
Zhigang Chen, Peipei Liu, Shengwen Fan
Research on Online Identification of Lithium-ion Battery Equivalent Circuit Model Parameters 130
Yahui Wu, Haishan Chen, Liangqiang Cao, Jinjin Duan, Xu Chen, Jiyao Zhai
Study on The Thermal Operation Characteristics of LNAB Swirl Burner 137
Mingliang Zhao, Weiwei Jiang, Jiting Han, Zhiyu Song, Shuai Guo, Xiu Liu, Dan Zhang, Shaobo Lu
The Simulation Study of Simulink-based Four-way Slide Valve Modeling 141
Xu Zhou, Jian Zhao, Wen Xie, Leilei Li, Lilei Miao, Yingli Xu, Yuanyuan Li, Yafei Ren
Characteristic Analysis And Overall Performance Optimization of the Three-phase Induction Motor with Cast Copper Rotor 145
Jicheng Li, Aiyuan Wang, Chengmin Wang, Shixiong Yin
Fast Low Power 4 Transistor 4 Memristor Sense Amplifier 151
Bolin Zhang, Lei Li, Nan Pan, Shuo Li, Sen Gao
Construction of digital twin model of other-excited DC motor and application of simulation experiments 155
Qinghui Wu, Shiqing Di, Baoming Hou, Yaqing Bao
Research on design and collision properties of bionic anti-collision girder 160
Xv Li, Hongjun Li, Chi Zhang, Chengjun Zhang
Dynamic Characteristic Analysis of Pneumatic Soft Actuator with High Expansion Ratio 166
Qing Zhu, Wujie Chen, Deyu Tu, Qingyun Liu
Research and Design of Photoelectric Detection System Based on FPGA Data Compensation 171
Yuhang Jiang, Guoxiongg Wang
A Method for Measuring the Broken State of Electric Meters 175
Zhiyu Zhao, Shen Liu, Xuan Li, Yue Yu, Xiaoguang Wang, Shipo Zhao
A Study of the Characteristics of the Induced Geoelectric Field of Geomagnetic Storms in March 1989 179
Yilin Yang, Zezhong Wang, Lianguang Liu
Design and research on microfluidic impact printing for picoliter-sized droplet 187
Zongqi Liu, Qiwei Wang, Chenxuan Zhang, Wenxuan Zhao, Ce Wang, Xiaochu Wang
Design of a Low-power System Based on Lora Wireless Communication for the Detection of Knife Gate Status with Convective Photoelectric Sensing 193
Gaoru Chen, Wengeng Wu, Zheqiang Ji, Jiansen Lin, Xianyun Lin, Xiang Li
Miniaturized Reconstructed Antenna Based on Coupled Feed 198
Zhibing Wang, Zhaoliang Meng, Yong Gao
Design of Intelligent Wearable Device Based on Embedded System 202
Xun Zhou, Xin Yi, Yukun Liu, Shacheng Xu, Zhihui Liu, Zhiyong Yan
Study on Electromagnetic Shielding Indexes of Large Aperture Radio Telescope 206
Fenghui Yang, Min Wang, Liang Dong, Shuobiao Shi
Simulation Analysis of Transient Stability of Regional Power Grid with High Penetration of Photovoltaic Power Generation Integration 212
Zhengxi Li, Mingfei Sun, Libin Yang, Xiang Han, Zhiqiang Chen, Xuan Qiu
Study on Identification Method of Electrical Topology in Low-voltage Transformer Area 217
Sijian Zhang, Peng Wang, Guan Chen, Wenshi Li

Research on the Market Transaction Mechanism of Orderly Charging of Electric Vehicles Based on Blockchain to Participate in Demand Response 221
Desheng Bai, Xiaokun Yu, Lei Zhou, Wenhao Xue, Guomin Li
HIRF Protection Design And Optimization For Nacelle Area Of The Aircraft 226
Wei Xiong, Leyi Wang, Kai Han
A High-Performance SOI Single-pole Sixteen-throw RF Switch 230
Caozheng Zhang, Libo Zheng, Zhengxuan Sheng, Jinghao Yu, Pengfei Ye, Yi Liu
Numerical Simulation and Electromagnetic Scattering Calculation of Freak Waves Based on Different Wave Spectra 234
Bin Liu, Gengkun Wu, Lichen Han
Design of a new electricity spot market based on time-of-use capacity tariff 239
Hao Chen, Chaoyang Liu, Binbin Wang, Yan Liang, Yongli Wang, Miaomiao Xu, Yi Li
Study on Shapley method-based benefit allocation models for electric vehicle participation in demand response 244
Jie Ma, Jinfeng Wang, Haifeng Zheng, Min Cao, Yuelong Jia, Yuzhuo Zhang, Zhengmou Ren, Xiaochen Sun
Correlation between pump-turbine S characteristics and transients in pumped-storage stations 248
Congying Wu, Liu Han, Peili Yan
Research on the capacity ratio relationship under the combined operation of hydropower, wind power and photovoltaic power generation in the basin 256
Boyu Sheng, Weibin Huang, Guangwen Ma, Shijun Chen, Chengqian Ju
An Operational Mechanism for Prosumers to Participate in Real-Time Demand Response 261
Zhukui Tan, Bin Liu, Yufeng Wu, Junwei Zhang, Saiqiu Tang, Yutao Xu
Impact analysis of towed linear array shape distortion to conventional focused beamforming 267
Qi Zhang
Evaluation Method of Multidimensional Scientific Research Value of Power Grid Enterprises Based on Fuzzy Analytic Hierarchy Process 270
Fan Cheng, Yong Li, Jiaang Li
Risk Assessment of Smart Grid Dispatching Considering Flexible Load 275
Chenguang Qiu, Bolun Wang, Zhaoyang Yan, Zhenhua Zhang, Xiaojing Guo
Selection of the Disruptive Nodes to Destroy Power Grid 279
Yong Yu, Shaoheng Zhong, Jinrong Chen, Yubing Yang
Research on the development mode and technical route of smart grid 283
Chen Zhang, Meng Zhang
Analysis on energy-saving of natural cooling chilled water system 289
Zhen Fang, Chuntao Hu, Qian Liu, Ping He
Research on capacity cost compensation mechanism on power generation companies 295
Yuan Hu, Shijun Tian, Menghua Fan
User-side integrated energy system evaluation index system and its application 298
Xiaoguang Tang, Liang Song, Xiaolong Xu, Tao Wang, Guojing Wu, Yang Wang, Yongli Wang, Xin Chen
Research on Optimization Decision Technology of Power Grid Investment Project Based on Multi-attribute fuzzy Evaluation 302
Xueli Chu, Yang Cao, Jiong Ye
Analysis of DC Line Bipolar Short Circuit Fault in Full Bridge MMC Flexible DC System 306
Zhong Liu, Junyan Zhang, Chaowu Liu, Kaixin Zhang, Shenxing Shi, Xinzhou Dong
Fault Risk Early Warning Method of Distribution Network Based on Multi-source Information Fusion 311
Fan Yang, Jun Liu, Junjie Wan

Noise reduction method of plastic pipe leakage signal based on WOA-VMD algorithm 315
Mingyu Chen, Xiaoxiao Zhang
Research on Carbon Traceability of Power System Based on Blockchain and Power Flow Calculation under Carbon Peaking and Carbon Neutrality Goals 320
Heyang Sun, Tong Li, Chao Yang, Jinliang Song, Zhenjiang Lei, Yang Liu, Yingli Zhang, Yihan Hou
Flexibility model of integrated energy system for peak load regulation demand of power grid 325
Shiyan Li, Hao Tang, Daohong Fang
Compound Elimination Method of Potential Transformer Ferroresonance in Distribution Network 332
Guixi Peng, Shuangchen Yuan, Xinhan Gao, Hao Sun
Quantitative analysis of SOP optimal operation concerning a real distribution network 337
Xuejin Huang, Songtao Yu, Xuheng Luo, Guanke Liu, Xiliang Dai
Programmed Operation Technology and Realization of Distribution Network Based on Multi-system Information Integration 344
Bin Li, Yanhe Yin
A Length Adaptive Memory Management Framework in High Speed Acquisition System 349
Xin Chen, Haolun Ding, Xinyu Li, Haiou Li, Yajun Liu, Hong Mei, Zhiwen Kang, Guolin Song
Early anomaly detection of distribution network based on large-dimensional matrix spectrum analysis 353
Yudong Gao, Xianguo Yan, Xiaokun Liu
Underwater fish detection in sonar image based on an improved Faster RCNN 358
Di Zhao, Yinke Dou, Bo Yang, Xiaojia Guo
Test Method for Overload Protection Based on 9000 Power Auto Test System 364
Qiangmin Xia
A Lightweight Named Entity Recognition Method for Chinese Power Equipment Defect Text 368
Yifan Jiang, Jing Chen, Hao Jiang, Xiren Miao
A Novel Temporal Convolutional Network for NLOS Identification of UWB Signal 373
Peiqin Li, Yifan Tan, Yuhao Yan, Haowen Wang
Research on Methods and Procedures of Chip - testing for ST16C2552 on test-system of J750EX 377
Ying Xiao, Chongjun Sun
An Automated On-orbit Test System and Rapid Evaluation Method 381
Qiang Li, Ligang Fei, Jun Zheng, Zhaoqing Yun, Wenwen Liu, Liyun Hao
Control strategies for DC microgrid energy storage systems under SOC balancing objectives 386
Jiefu Mei
Research on Identity Management Technology in Multi-agent Power Load Cooperative Dispatching System Based on Zero Trust 393
Liang Li, Jiaxing Xuan, Hejian Wang, Qinglei Guo, Mingyang Zhu, Jin Du
Region of Attraction Estimation of New Energy Power System via Sum of Square Method 399
Huibiao Yang, Guangming Lu, Hongqiang Li, Yawei Wei, Bei Tian, Jing Ma
A Bay Graph Automatic Generation Technology of new generation Smart Grid Dispatching and Control Systems 404
Lulu Li, Xia Yin, Zhen Yan, Zhimeng Lv, Hua Xu, Kun Zhao, Kun Huang
Study on Vertical Vibration System of Person-Seat-Suspension of Electric Wheelchair 409
Hui Liu
Design and implementation of integrated monitoring system for product oil depot 414
Song Li, Xinming Liu, Shaolou Song, Zhihao Cai

Research on Forced Oscillation Source Location Method of New Power System Using Complete EEMD with Adaptive Noise 421
Xintong Yang, Bohan Liu, Jing Wang, Changjiang Wang
Assessment Method of Vulnerable Lines in Power System Based on Comprehensive Betweenness 426
Kaizhe Yang
Lightweight multi-modal emotion recognition model based on modal generation 430
Peisong Liu, Manqiang Che, Jiangchuan Luo
Cable Joint Monitoring System Based on Finite Element Simulation Analysis of Thermal-electric Bidirectional Coupling Field 436
Zhihao Cai, Xinming Liu, Shaolou Song, Song Li
Design of monitoring system for water accumulation in steel pipe based on ultrasonic 441
Qi Xu, Chuan Zhang, Nan Jiang, Haichao Peng, Yang Zhang
A Boruta-LightGBM Model-based Method For Detecting Electricity Theft 445
Xinxing Nie, Song Li
Modeling and Comprehensive Assessment of Flexible Resource for Power Dispatch 449
Liubao Zhu, Hao Tang, Daohong Fang
Research on Collaborative Planning of Multi-energy Complementary System Considering Carbon Emission Cost 455
Zhipeng Sun, Xiaodi Zhang, Zhenhua Zheng, Chao Zhu, Siwei Hou
Mid-long term Load Forecasting Model Based on Error Compensation 460
Xin Li, Le Liu, Guoliang Zhao, Fanbo Meng, Yang Liu, Bo Zhao
Research on the development path and strategy of Yunnan New power system Construction 464
Run Huang, Peng Sun, Guangzeng You, Chaoming Zheng, Xinyu Meng, Pengcheng Zha, Yuguo Chen
Day-ahead Strategic Low-carbon Operation of Regional Integrated Energy System in the Electricity Market 471
Jianzhong Shen, Chunyan Zhang, Jingjing Jiang, Haitao Yang, Zhenlan Dou, Zhan Xiong
Analysis of the Network Architecture and Typical Protection Techniques of Wind Power Monitoring System 477
Peng Hu, Kaifeng Meng, Qile Wang, Dong Wang, Yinsheng Wang, Haiquan Wang, Jinxuan Hu
Research on the construction of new power system value evaluation index system 481
Chunming Wang, Xuanjie Zhou, Wen Hu, Shiling Zhang, Zhenlong Wu
Power Grid Operation Value Optimization Considering Energy Storage System Access Under Supply and Demand Uncertainty 486
Huijuan Huo, Yijiang Liu, Yanchao Lu, Dan Xu, Yingdan Fan, Shuo Wang
Modeling customer purchasing behaviour considering time-of-use tariffs and demand response 491
Miao Liu, Xiaohe Liang, Jian Li, Jipeng Kuai, Shiyi Zhao, Xuan Hui
Multi-temporal Remote Sensing Analysis of Landslide Evolution around the Yingxiu Hydropower Station after the 2008 Wenchuan Earthquake, in Sichuan Province, Southwest China 495
Zhongyu Zhao, Tao Xu, Jie Min, Qingsong Zhang, Weile Li, Chaoyang He
A Container Task Scheduling System for Edge Computing in the Power Industry based on Server Zone 499
Jian Chang, Jun Lu, Muchuan Yang, Lin Huang, Yan Gong, Jiayu Liu, Kunling Liu, Lei Liang
Regional energy Internet simulation system based on active distribution network technology 504
Jing Wang, Jing Liu, Yue Guo, Guanghong Li, Tianyou Yin, Li Mou

Study on the Development and Evolution of Distribution Network Form Driven by Scenario Demand 508
Xubin Wang, Jialei Zhang, Guanglong Xie, Yuwei Xiong, Yucheng Ding
Influence of grid-connected distributed power sources with different penetration rates on residual current of human body electric shock 514
Zihu Wang, Wentian Wang, Rui Li, Zhengsheng Liu, Xu Zhou, Honghua Xu, Gang Li
Data Quality Evaluation Method of Jiangsu Power Grid Based on Data Mining 520
Meng Zhu, Qianhui Zhai, Xusheng Qian, Yang Yu, Ke Chen
Market power monitoring method of electricity sales company based on entropy weight method 524
Hongpeng Qi, Rong Zheng, Zhe Lin, Yunwang Hu, Shengsheng Liang, Jianrong Qin
Research on the trading mechanism of regional electricity-gas-heat multi-energy market 528
Han Zhang, Song Xue, Zeyu Ding, Li Ma
Low carbon optimal dispatching of power system considering carbon emission flow theory 532
Jifeng Li, Nan Zou, Jun Wu, Qun Yang
Design and Implementation of Web Real-time Alarm System Based on Push Technology 537
Xueyong Zhang, Yueyan Chen, Qing Zou, Meifang Hou
Research on Source-load Coordinated Optimal Scheduling of Integrated Energy System 542
Dongxu Zhou, Zhengyi Zhu
Research on the Integrated Intelligent Monitoring Method of Turbomachinery Regulation System 549
Yongchao Dong, Chengcheng Wang, Jiu Zhang
Study on Control Strategy of Cooling System for Oil Immersed Air-cooled Transformer 558
Chuang Yao, Liqing Liu, Junji Feng, Jufang Wei, Guangzhen Liu, Xin Zhang, Minghui Duan, He Zhang
Research on current limiting protector testing technology based on thyristor phase control technology 562
Xiaobai Li, Yu Shao, Hongjun Ding
Indoor Acoustic Localization with IMU for UGV 568
Bowen Xu, Naizheng Jia, Zhi Wang
Design of Vacuum Monitoring System Based on EPICS for HIRFL 573
Piaopiao Zeng, Jianchuan Zhang, Lili Li, Yongliang Yang, Jia Yin, Yanyu Wang
Accurate and fast clustering of residential customer load curves based on bid-vote integration algorithm 579
Xiangxiang Liu, Zongyao Wang, Guili Ding, Zhihao Xu, Wei Han, Bing Kang
Automatic installation system of soft rubber caps based on multi-rivet aircraft structural parts 585
Qingshi Zhang, Jianwei Mu, Bowen Xu, Chuanjun Yu, Xin Tong, Wei Wang
Power load combination prediction based on EEMD decomposition with K-means clustering and frequency separation 590
Yamei Li, Tengfei Gao, Shaohua Sun, Wenhao Fan
Intrusion Detection Approach of Power Information Network Based on DNSAE and IQPSO-SVM 596
Ajun Cui, Yifei Li, Yudong Gao, Rui Guo
Research on Cable Modeling and Calculation Method Based on Revit Secondary Development 602
Wenxin Yang, Zhiming Ye, Dejiang Wang
Construction of knowledge graph for security threat tracing in Power Distribution Internet of Things 610
Qigui Yao, Jiaxuan Fei, Qi Wang

A Real-time Online Monitoring System for Soil and Water Conservation Based on Transmission Cloud 614
Lei Lei, Zihan Dong, Shixiong Jiang, Chongqing Wang, Hai Huang, Ningning Guo, Jinxuan Jiang
Research on the Limitations of UAV Path Planning Based on Artificial Potential Field Method 619
Xiaoye Yuan
Investigation on High Power Five-level Converter for driving High-speed Induction Motor 623
Zhiming Lan, Chengsheng Wang, Wei Duan, Qiongtao Yang
UAV Swarm Collaborative Path Planning Based on RB-ABC 627
Chang Lu, Yutao Lv, Yongzhen Su, Luming Liu
Effective Visualization and Analysis of Recommender Systems 633
Hao Wang
Technology and Application of Electric Energy Meter with Embedded JVM 641
Hangchen Liu, Guoying Lin, Zheng Zeng, Xiangfeng Li, Jiaming Wu, Min Ling
Decision Optimization Method via Fuzzy Evaluation for AUV Covert Search Condition 648
Xiangpeng Zhang, Shuang Huang, Xu Cao, Yuanbao Chen, Yunfei Lyu
Industrial Grade Modular Smart Helmet for Power Grid and AI/XR Intelligent Platform Construction 653
Qing Song, Dekai Chen, Xingyu Lei, Guojian Liu, Yingzhuo Li
Distributed Energy Storage Planning Considering Active Distribution Network Vulnerability 657
Zhen Qiu, Ruijin Dai, Yong Peng, Wenlan Cai, Wenyue Zhu, Peixue Zhu, Qian Guo
Study on Dynamic Electrical Contact Failure of Pantograph-Catenary Under Fluctuating Load 662
He Wang, Guang Shi, Jiakun Zhao, Zhonghua Chen
Design of Distribution Network Monitoring System Based on EPICS for Accelerators 668
Jiang Zhao, Zhongzu Zhou, Peng Sun, Xinwei Jiang, Yongqi Cheng, Shuai Zhang
Application Research of Daytime and Night Road Conditions Maps Conversion Based on CycleGAN Style Conversion Technology 675
Hanhui Guo, Zhongjun Xiao, Peng Ji
Research on Error Calibration Method for Power Big Data Based on K-Means Clustering 679
Wei Xing, Botao Wu, Mingyuan Liang, Yue Li, Lin Cheng
The DC Power Flow Model Based Analysis on Failure of Power Grid Communication Network 683
Jiaqi Huang, Qixin Wang, Zixia Sang, Jie Yang, He Lei, Junyao Liu, Jiong Yan, Yinxiang Wang
A multi-objective power flow optimization model of electric and thermal distribution network using the power flow method 687
Zhiyu Zhao, Zesen Wang, Junhong Hao, Shunjiang Wang, Xingce Wang, Huan Xie, Xuan Li
Energy Efficiency Evaluation of Industrial Users Based on AHP - Entropy Weight Method 691
Hongtu Shi, Shengwang Mei, Yazhong Sun, Yujiao Liu, Chuang Wang, Tong Liu, Yongli Wang, Xin Chen
Intelligent Substation Switch Traffic Scheduling Model Based on Time-Sensitive Network 696
Huihui Liang, Linghao Zhang, Chao Tang, Linlin Yuan, Yong Tang
Distribution Network Load Forecasting Based on Data Analysis Model 701
Mingze Zhang, Shenghui Hua, Fei Fei, Jun Wang, Wanjian Zhao
Real-time Data Analysis Model of Power Grid Equipment Based on Big Data Monitoring 705
Yingbin Shi, Jie Wang, Bing Hou, Zhongqiang Zhan
The mechanism connotation of step tariff and punitive tariff in high energy-consuming industries 709
Weiwei Zhang, Jiahua Hu, Sheyu Zhou, Qinyu Chen

AUV Path Planning in Strong Current Fields with Less Computing Time and Improving Incompleteness Problem 713
Feng Wang, Chenlong Li, Wenliang Chen
Research of Station Black out Accident Operating Procedure 718
Zhiyun Liu, Min Li, Rushi Fu
Analysis of Distribution Network Planning Strategy in Urban Center based on Grid Concept 724
Xin Zhao, Wei Feng, Le Yang, Jie Tang, Qian Wu
Discharge Characteristics of Epoxy Resin Partial Discharge under Different Harmonic Voltages 728
Yufeng Du, Yufeng Li
Rockfall Investigation around the Yingxiu Hydropower Station using Airborne and Ground Remote Sensing Technologies, in Sichuan Province, Southwest China 732
Jun Fu, Shan Tang, Zhuo Gao, Jianjun Dai, Weile Li, Chaoyang He
Research and application of optimization strategy for new energy on-grid consumption capacity 736
Zhiyu Liu, Tao Wang, Zhiqiang Wang, Jingxiang Liu, Jiuye Zhang
Initial Quota Allocation Scheme Based on Energy Consumption and Carbon Emission Rights 740
Junjie Li, Kun Wang, Shiqiang Guo
Sensitivity analysis of rotating motion parameters of ammunition loading manipulator considering nonlinear factors 746
Jiehao Wang, Yadong Xu, Quan Zou
Key Technologies for Numerical Weather Prediction to Support Load Forecasting 753
Kuidong He, Fengming Xiao, Xiaofeng Jiang, Haisong Zhou, Hao Qian, Yifan Zhou
An example of the influence of depth peak-regulating on heating surface of 1000MW ultra-supercritical unit 758
Daojun Wei, Xinying Liu, Weiji Gong, Xiaoyang Su, Lei Zhang
Power material supply equipment downtime fault detection based on intelligent supply chain 762
Heng Yue, Jingna Jiang, Minghui Lin, Yang Li
Single Phase Short Circuit Fault Location Method Based on Innovation Graph 766
Huaiyu Guo, Dan Li, Zihao Yang, Zhi Song, Ji Wang, Mingrui Zhang, Ying Gao, Songtao Ning
Control of ammonia escape from SNCR flue gas denitrification of circulating fluidized bed boilers in coal-fired power plants 770
Yuan Han, Yujie Zhu
Research on the construction and application of LCC based auxiliary decision model in the early stage of project 774
Hongwei Wang, Wen Zhang, Shenglin Zhang, Fei Wei, Yajing Ji, Fengying Hu
Establishment of a comprehensive evaluation index system for siting new energy power plants 779
Zheyong Piao, Dongwei Guo, Tao Peng, Yangsiqi Zhang, Xue Li, Hao Liu
Research on the Management Strategy of Charging Station Based on the Differential Integrated Moving Average Autoregressive Model 784
Yidan Zhang, Yan Jiang, Lu Li, Zhiqiang Sheng, Xueying Song, Peipei Tian, Ran Li
Construction of Diagnosis and Evaluation Model of "Total Factor" Resource Input 789
Chenhong Zheng, Mengzhe Liu, Cong Zeng, Fangshun Xiao, Ying Wang
Medium-term load prediction based on GA-LightGBM-LSTM 793
Genghao Cui, Saisai Yu, Dongming Song, Yongqiang You
Study on Insulation Tension and Damage of Control Cable 798
Xiaoxiao Luo, Qian Wang, Mingming Du, Yingkai Long, Siquan Li, Xiangxin Jian

A Novel Switch Open-Circuit Fault Diagnostic Method for Three-Phase Inverter Based on PSO-DBN 802
Zhiqiang Hu, Kun Xia, Zhifu Fan, Kaixuan Chang, Dongwen Wu
Power Generation Strategy of FESS Based on Sliding Mode and Linear Active Disturbance Rejection Control 807
Peng Zhang, Shanming Wan, Caiyong Ye, Yang Zhao, Jintao Lu, Zhijie Xu
Diffusion-reaction model and electrolysis dynamic characteristics of electrode surface and channel in solid oxide electrolytic cell 813
Hanbing Zhang, Jichao Ye, Xinwei Hu, Hongyang Huang, Hong Wang, Jian Han
Effect of thermal on cable insulation breakdown 821
Runzu Zhang, Anhui Feng, Yongbo Zhang, Ye Liu, Pengfei Liu, Zhongzu Zhou, Weiqing Yang, Jiancheng Yang, Yagang Shi
Anomaly Detection Method for Metering Data of Electric Energy Meter Based on Association Rule 825
Shubei Hua, Yang Gao, Bin Ma, Xi Li
An Electrical Wire Fault Detection Method with Spread Spectrum Time Domain Reflectometry 829
Junjian Zhu, Jiwen Yu, Kaixuan Chang, Desen Ji, Fan Liu
Flux-weakening Control of Permanent Magnet Synchronous Motor Based on Sliding Mode Active Disturbance Rejection Control 833
Jun Hu, Huacai Lu, Xiangyu Tang
Research on current control of MRC coupling electric vehicle wireless charging 838
Kai Deng
Research on SINS/ Couple Odometer Integrated Navigation Technology Based on Two-wheel Differential Steering Robot 842
Junxuan Kang
Investigation of the modelling of transformer windings' axial vibration and factors to influence its modal characteristics 846
Minghui Duan, Liqing Liu, Jufang Wei, Hao Ma, Xiaoguang Ma, Chuang Yao, Junji Feng, He Zhang
High Frequency Soft Switching Control Method for SiC Buck-Boost Converter in Dual Source Application 853
Qing Lv, Lifu Zhang, Keling Song, Renjun Jiang
Automatic Voltage Control Scheme of Zonal-Provincial Coordination with Renewable Energy Access 858
Gang Qu, Hao Yuan
Research on Flexible Packaging Printing Enterprise Scheduling Plan Based on Control Platform Collaboration 863
Rui Zhu, Yuanheng Qi, Yongbin Zhang, Yunfei Du
Trend Analysis and Fault Diagnosis of Equipment State Based on Transformer Operation Mechanism Modeling 868
Xuefei Yang, Gongliao Zhang, Song Yang, Yi Zhou
Large Disturbance Stability Analysis of Voltage Source Doubly-fed Wind Generator Based on Improved Hybrid Potential Function 874
Bin Qiu, Yi Hu, Kai Wang, Chi Ma
Lightweight Disconnector State Detection Model Based on Improved yolov5s 883
Jishen Peng, Dongjie Xin, Haiming He, Liye Song
Research on PMSM Control Algorithm Based on Temperature Effect 890
Hailong Zhang, Licun Fang, Zhaokun Yang, Tun Wang
Research on Water Tank Heater Heating and Anti-freezing Performance Simulation of Civil Aircraft 895
Chong Zhu

Peak Regulation Strategy for Flexibility Resources Considering Carbon Trading Mechanism 900
Yi Guo, Zhenlan Dou, Chunyan Zhang, Songcen Wang, Hongyin Chen, Guixiong He, Yongfeng Huo, Pei Sun
Research on anti-disturbance control strategy of rolling steel synchronous motor 904
Xingwu Fu, Tao Wang
Torque Performance Optimization of Permanent Magnet Motor with Open Circuit Fault Based on BQGA and Current Harmonic Injection 912
Xiaqing Pei, Peijuan Cui, Chunyi Wang, Zaiping Zheng
Research on Optimal Operation and Safety Control of Thermal Power Unit Auxiliary Machines Under Deep Peaking Conditions 916
Shuai Di
Optimal Control Strategy of CLLC Bidirectional Resonant Converter under Light Load 921
Han Bu, Jiangshan Guan, Caochao Zhang, Zenghui Li
Automatic landing trajectory control of aircraft based on Iterative-LQR algorithm 925
Zhen Liu, Zhongjian Li, Tao Yang, Zhipeng Li
A 110 kV Transformer Fault Simulation and Comprehensive Analysis 930
Jufang Wei, Chun He, Junji Feng, Liqing Liu, Chunhui Zhang, Qinghua Tang, Xin Zhang, He Zhang
Low Impedance Fault Location of Submarine Cable in Seafloor Observation Network Based on Transient Current Travelling Wave 936
Guangju Li, Shaoze Luan, Weiming Gan, Jiahua Hu
Implementation of SOMS and Predictive Maintenance Study of Power Grid Facilities 942
Qiuyan Zhang, Yulei Daiji, Bin Liu, Pingchuan Zhou, Honbo Zhou
The cause analysis and preventive measures of transformer short circuit fault 950
Jufang Wei, Chi Zhang, Chuang Yao, Songyuan Li, Minghui Duan, Longji Li, Xiaoguang Ma, Hao Ma
Research on Continuous Lightning Strokes Analysis and Protection of 220kV Substation 955
Xiaofeng Zhao, Zhiming Liao, Qian Li, Lei Yang, Zhaoting Li, Yongxia Han, Xian Yang
Voltage feed-forward control strategy for virtual synchronous motor 964
Guangling Lu, Zhiyuan Sun, Xuanren Meng
Direct Simulation Analysis of Electromechanical Coupling and Joule Heating Effect of a MEMS SiC Piezoresistive Accelerometer 969
Yanxin Zhai, Tiantong Xu, Guoqiang Xu, Xiaoda Cao, Chunhui Yang, Haiwang Li
MOA Fault Early Warning Method Based on Inverse Cumulative Function 975
Guobin Wang, Wei Huang, Kang Wang, Jinglan Zeng, Xiaoyao Zhang, Yangyang Chen
Typical Method of Failure Analyze and Troubleshooting of Secondary Circuit of 220kV Line Protection 980
Yunyun Yang, Guangmin Jin, Cheng Cheng, Mengmei Zhu, Xia Meng, Qian Peng
Secured RoLa-based Power Grid Monitoring and Application of Connector Temperature Analysis 984
Zhukui Tan, Qiuyan Zhang, Yulei Daiji, Yuedan Deng, Zhiyou Yang, Honbo Zhou
Normalized Control Strategy for Bidirectional Power Converter under Unbalanced Operation 989
Fulu Yan, Mian Hua, Feng Zhao, Xuan Liang
Ultrasonic Inspection And Defect Identification of Thin - Walled Stainless Steel Welded Pipe Weld 995
Menglong Liu
A branch energy control strategy for Hexverter based on branch power hierarchical modeling 999
Fan Yang, Xiaohong Wang, Haishan Guo, Hemin Yang, Zhixin Huo, Youzong Jian, Jing Hu

Study on The Operation Scheme of One Key Sequential Control in Double Bus Line 1008
Ge Qun, Zaiqiang Li, Jiaqi Xing, Siyuan Liu
Improved Deadbeat Current Prediction Control for Permanent Magnet Synchronous Motor 1014
Xijie Wu, Ying Wang
A Finite Control Set Model Predictive Control Algorithm for PV Maximum Power Point Tracking 1018
Yue Liu, Chunsheng Wang, Yuan Cao
Research on Clean Energy Consumption Mechanism of New Park Considering Multi Energy Complementarity 1023
Guiyuan Xue, Chen Wu, Wenjuan Niu, Xun Dou, Shizhen Wang
Cause Analysis on Wall Thickness Reduction of Fire Side of Water Wall Tube of Power Plant Boiler 1027
Linyuan Guo, Dongming Chen, Shouliang Chen, Dong Jin, Qiang Dai, Qingchuan Pan
Super-Twisting Sliding Mode Control for Segmented Long Primary Double-Sided Induction Motor 1032
Mingyuan Zhang, Liming Shi, Keyu Guo, Manyi Fan
Simplified Model and Control of Dual Active Bridge Series Resonant Converter 1037
Enze Fan, Qiongxuan Ge, Lu Zhao, Yaohua Li
Multi-Objective Optimization of a Coaxial Magnetic Gear under High Speed Operation Mode 1042
Keyu Guo, Liming Shi, Mingyuan Zhang, Yaohua Li
Pedestrian Positioning Method with Phone Attitude Estimation 1046
Yutong Han, Yanhui Lu, Hang Li, Guangxu Zhu
Research on big data anomaly mining method for power grid operation and maintenance based on reinforcement learning algorithm 1055
Xing Wen
Power Consumption Portrait of Users Based on Improved ISODATA Clustering Algorithm 1060
Huixuan Yang, Ming Su, Xin Li, Jinhui Liu, Ruizhao Zhang
Research on the cost prediction method of overhead line technical transformation project based on particle group algorithm 1065
Yabo Shen, Gaosheng Rong, Qidan Xu, Na Li
Research on Transformer Purchase Price Fusion Factor Screening Method Based on Deep Learning 1069
Xi Li, Haichao Duan, Jie Liu
Research on Compression Optimization Algorithm for Super-resolution Reconstruction Network 1075
Xiaodong Zhao, Yanfang Fu, Feng Tian, Xunying Zhang
Research on Three - Phase Unbalance Phase switch Strategy in Courts Based on Improved Genetic Algorithm 1080
Wei Zheng, Chen Liang, Dilong Fan, Xiping Ma, Yaxin Li, Xiaoyang Dong, Junting Yang, Rui Xu
An Adaptive Communication Routing Algorithm in Dual-mode Heterogeneous Field Network of Power Distribution Grid Based on RPL Protocol 1084
Fangbin Ye, Jianqiao Sun, Ling Zhao, Chi Jiang, Chaoliang Wang
Optimization Design of Silicon Carbide Power Module Based on Neural Network 1091
Jianing Wang, Fuchen Wu, Yaodong Huang, Renhai Yang
Deep Learning-Based Text Entity Recognition Method for Distribution Network Operation and Maintenance 1096
Yongmin Gao, Bing Kang, Tiancheng Zhao, Hui Xiao, Jiashuai Li, Zhihao Xu, Guili Ding, Zongyao Wang

Islanding Method for Power Restoration of Distribution Network Based on Flexible Adaptive Genetic Algorithm 1101
Jiawei Zhang, Xiaoning Kang, Shiduo Jia, Yunzhang Yang, Chengpeng Xue
Temperature prediction method based on improved GA_BP neural network 1108
Wenbin Zhang, Zhihua Liu, Jiangang Tong, Man Li, Shaoying Li, Xiaodong He
Research on vehicle fuel consumption prediction model based on Cauchy mutation multiverse algorithm 1115
Chenxi Chen, Quan Liu, Qiyuan Chen, Junwei Yan
A Cloud-edge Collaborative Framework for Computing Tasks Based on Load Forecasting and Resource Adaptive Allocation 1120
Yu Meng, Xingchuan Liu, Jiaxi Chen, Yongjie Nie
Improved Harris Eagle Optimization Algorithm Based on Adaptive Water Wave 1125
Wenhao Fan, Yafeng Shan, Hua Fu, Tengfei Gao
Research on Phase identification in Distribution Area Based on Smart meter 1131
Bin Liu, Zhukui Tan, Qiuyan Zhang, Yutao Xu, Jiyulei Dai
Study and Implementation of Trusted WLAN Communication for Distributed Generation 1136
Chao Yuan, Xiuzhen Jiang, Ti Guan, Hengjie Liu, Ziqi Zhao, Zhiyong Lv, Lianzhen Zheng
Security Risk Identification in Power Grid Infrastructure Construction Site Based on Micro Intelligence Device 1140
Ming Li, Denghui Zhai, Kaiyu Peng, Zhaoyang Li, Xiaodong Lou, Yanlong Zhang
Obstacle avoidance path planning algorithm for mobile robot based on improved RRT* 1144
Tao Yang, Zhongjian Li, Zhen Liu, Zhipeng Li
Research on the scheme of auto-adaptive distance protection with the influences of wind power integration 1148
Qun Ge, Siyuan Liu, Jiaqi Xing, Zaiqiang Li
Fault Diagnosis of Oil-immersed Transformer Based on Improved Seagull Optimization Algorithm to Optimize Wavelet Neural Network 1156
Jingou Wang, Yafeng Shan, Hua Fu
Optimization of SVM transformer fault diagnosis by multi-strategy improved Grey Wolf optimization algorithm 1163
Xianjing Meng, Xiaoliang Ma, Zhifeng Guan
Wind turbine cogging torque optimization based on particle swarm optimization 1170
Zhengjun Huang, Quan Liu, Shuoming Wang
Transient Voltage Prediction Method Based on Spatial-Temporal Graph Convolutional Network 1174
Xintong Yang, Yu Dong, Jing Wang, Changjiang Wang
Look-Ahead Power Grid Dispatch Method Based on A2C Algorithm 1179
Peiyao Yu, Tianwei Liu, Hao Tang, Daohong Fang
Short-term Wind Speed Prediction Based On Quadratic Decomposition Improved Particle Swarm Optimization Extreme Learning Machine 1186
Chenchen Zhai, Hanlin Li
Improved Chimp optimization algorithm with multi-strategy integration 1192
Yamei Li, Tiancheng Jin, Shanglin Liu, Su Liu
Research on short-term electricity price prediction in power market based on BP neural network 1198
Haidong Chen, Jisheng Zhang, Chao Zhang, Ning Qiao, Jing Zhang, Qiang Li
Reconfiguration Strategy of Distribution Network Based on Hatchable Particle Swarm Optimization 1202
Yi Jiang, Min Wu, Ling Luo, Chaojin Yang

Research on the measurement method of primary equipment technical transformation investment demand based on the statistical analysis of equipment scrap time probability 1207
Yabo Shen, Qidan Xu, Shuang Li, Yaode Huang
Short term output power prediction of photovoltaic power station based on ISSA-BP neural network 1211
Jinxian Han, Hongwei Ma, Chaoxian Han, Wentao Chen
Construction of An Early Warning Model for Market Power Identification in the Electricity Spot Market Based on Improved BP Neural Networks 1215
Hongpeng Qi, Zhe Lin, Rong Zheng, Yunlong Shang, Yunwang Hu, Liuqiang Huang, Fei Huang
Research on blockchain consensus algorithm for large-scale high-concurrency power transactions 1221
Xuesen Zhang, Qinglei Guo, Xiaoxiao Ma, Zhe Du, Shuang Sun, Desheng Bai
Intelligent Identification Technology of Power Grid Dispatching Work Order Based on Multidimensional Data 1226
Jiaming Zhao, Han Yan, Xin Zhou, Xuan Zhao, Yusheng Wu
Research on robustness technology of power equipment image recognition algorithm model in confrontation scenario 1231
Xiangzhou Chen, Xiaoyan Li
Intention Recognition Method of Power Grid Dispatching professional language Based on Hybrid Neural Network 1236
Xiangming Dong, Yue Zhang, Mengya Zhang, Kefan Zhu, Di Cheng, Lianfei Shan
Transaction Risk Assessment of New Electricity Market Based on Multi-fractal Theory 1241
Guang Tian, Yang Yang, Beifang Xu
Author Index