

2017 2nd International Conference on Power and Renewable Energy (ICPRE 2017)

**Chengdu, China
20 – 23 September 2017**



**IEEE Catalog Number: CFP17H25-POD
ISBN: 978-1-5386-2157-8**

**Copyright © 2017 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:	CFP17H25-POD
ISBN (Print-On-Demand):	978-1-5386-2157-8
ISBN (Online):	978-1-5386-2156-1

Additional Copies of This Publication Are Available From:

Curran Associates, Inc
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: (845) 758-0400
Fax: (845) 758-2633
E-mail: curran@proceedings.com
Web: www.proceedings.com

CURRAN ASSOCIATES INC.
proceedings
.com

2017 2nd International Conference on Power and Renewable Energy

ICPRE 2017

Table of Contents

Preface.....	xx
--------------	----

Modern Electronic Technology and Application

Prediction of Lithium-ion Battery Remaining Useful Life Based on Hybrid Data-driven Method with Optimized Parameter	1
<i>Yishan Cai, Lin Yang, Zhongwei Deng, Xiaowei Zhao, Hao Deng</i>	
Research on the Strategy of Voltage Sag Comprehensive Management Based on Supply and Demand Coordination.....	7
<i>Chen Lipin, Wang Xi, Zhang Yuhong, Tang Quan, Kan Lifeng, Li Huaqiang</i>	
Design and Analysis of magnetic coupling resonant wireless power transfer system with class-E inverter	11
<i>Yan Liu, Yu Xian Zhang</i>	
Internal Model Startup Control for VSC-LCC Based Hybrid Pseudo Bipolar HVDC System	15
<i>Yu Yu, Yuhua Lu, Qijiang Chen</i>	
Equivalent Three-phase Short Circuit Calculation Method Based on Static Equivalence Considering Grounding Branches.....	20
<i>Yunling Wang, Xi Ye, Yang Liu, Yuxuan Tao, Quanyan Shi, Juan Yu</i>	
Research on Eddy Current Loss of 'Wet' Magnetic Coupling	25
<i>Wang Jiaqiong, Wang Kai, Zhao Ruijie, Tong Kai, Dai Tao</i>	
Optimal Operation of Energy Hub with Different Structures for Minimal Energy Usage Cost	31
<i>Thanh-tung Ha, Yong-jun Zhang, Jin-bao Hao, Hong Anh Pham. T</i>	
Electric Insulator Detection of UAV Images Based on Depth Learning	37
<i>Guo Tao, Chen Fengxiang, Wang Wei, Shen Ping, Shi Lei, Chen Tianzhu</i>	

Propagation Feature of Partial Discharge UHF Signal Diffusing from GIS Pouring Aperture	42
<i>Liang Wang, Rui Li, Chongzhi Yin, Junjie Feng, Hongyi Li</i>	
Harmonic Assessments with Multi-values Considering the Regulation Effect	46
<i>Jinhao Wang, Yan Pang, Da Lei, Yonghai Xu, Mengmeng Zhang</i>	
The Rapid Development of A Three-phase Grid-forming Micro-source Inverter.....	51
<i>Jing Bian, Chuazhi Zang, Xianhong Li, Bo Hu, Wanjiang Gu</i>	
Characteristic Research of Commutation Failure for Hybrid AC/DC system	56
<i>Ge Beichang, Wu Xiao, Huang Lincun, Li Shengwei</i>	
Capacity Optimization of Hybrid Energy Storage for Smoothing Power Fluctuations Based On Spectrum Analysis.....	61
<i>Li Lin, Liyun Zhu, Ruirui Yang, Yi Gao, Qi Wu</i>	
Comparison of Response Surface Method and Kriging Method for Approximation Modeling.....	66
<i>Zhang Xiaobo</i>	
Establishment of Hybrid AC/DC System Model and Its Characteristic Research.....	71
<i>Wu Xiao, Ge Beichang, Liu Yingying, Zhang Zhang, Yang Fan, Xu Jing</i>	
Detection and Analysis of Typical Fault Partial Discharge Characteristics in Switchgear	76
<i>Yin-zhu Kang, Yong-xiang Li, Gang Yang, Tian-zheng Wang, Li-qiang Guo, Zhi-peng Wang</i>	
Novel Supercapacitor Model Parameter Identification Methods	81
<i>Xiao Chang, Da Lei, Shifeng Zhang, Shengwen Li, Yunlei Yang</i>	

Power Electronics and Mechatronics

Dynamic Performance Research on Bi-stable Permanent Magnetic Actuator Applied in 40.5kV Vacuum Circuit Breaker	87
<i>Guo Liqiang, Li Yongxiang, Wang Tianzheng, Hao Wang, Hongwei Wang</i>	
Impact of Strong Dynamic Couplings between VSC-Based Generation Units and Power Systems on Power System Electro-Mechanical Oscillation Modes	93
<i>Xiao Chen, Wenjuan Du, Chen Chen, H. F. Wang</i>	
Research on Flow Noise in Water-Cooled Motor Room of Pump.....	98
<i>Cao Ruijia, Zhou Yisong, Sun Jingru, Wang Kai, Tong Kai, Dai Tao</i>	
Degradation State Recognition of Ultrasonic Motor Based Upon Locality Preserving Projection and Support Vector Machine Optimized by Fruit Fly Optimization Algorithm	103
<i>Baiyan Chen, Hongru Li, Guoqing An</i>	
Nonlinear Varying-Network Magnetic Circuit Analysis for Segmental-Rotor Flux-Switching Motor.....	108
<i>Peng Chen, Yubo Yang, Guopeng Liu, Xiaotong Yang</i>	

Analysis of Subsynchronous Oscillation Characteristics and its Dominant Factors in the DFIG-based Wind Farm with Fixed Series Compensation	114
<i>Guoliang Zhao, Hongyang Yu, Kun Zhang, Zongye Liu, Xiaohan Zhang, Lin Yang</i>	

Electrical Automation Equipment and Control Technology

Fundamental Frequency Switching Strategy of 120-Unit Cascaded Half-bridge Multilevel Converter for Battery Management System	120
<i>Libo Liu, Boyang Li, Jian Xie</i>	
Study on the Influence of Amorphous Debris on the Magnetic Field Distribution of Amorphous Alloy Transformer.....	126
<i>Jiannan Zheng, Yuhua Zhao, Xiaodan Qin, Zhiyuan Zhang, Dongni Shi</i>	
Prediction of Top Oil Temperature for Oil-Immersed Transformer Based on Kalman Filter Algorithm .	132
<i>Wenqing Lai, Hanwu Luo, Wenpeng Li, Yongdong Cao, Ligang Ye, Yongqiang Wang</i>	
Study on Feasibility and Method of Live Replacement of 110kV Isolators	137
<i>Long Chen-hai, Xia Zeng-ming, Zou De-hua, Guo Hao, Zhang Jian-jun, Yang Miao</i>	
New Experimental Method for H-bridge Modules used in the Distributed New Energy Field based on Voltage-Current Dual Control	143
<i>Zhang Yang, Yang Xiaopin</i>	
Flux Weakening Control for Torque and Efficiency Optimization of a Vector Controlled Four Switch Three Phase Inverter Fed Induction Motor drive.....	147
<i>Ufot Ufot Ekong, Mamiko Inamori, Masayuki Morimoto</i>	
Dynamic Characteristics of a Novel Bistable Electromagnetic Vibration Energy Harvester Excited by Gauss White Noise	152
<i>Ziying Wu, Rui Liu, Qiang Liu, Minghong Zhang</i>	
The Amelioration of Control Strategy of VSC-MTDC Based on Voltage Droop Control.....	157
<i>Ning Lianhui, Xie Chunxiao, Bai Huiyuan, Wu Di</i>	
A Control Strategy of Single Phase Voltage Source PWM Rectifier under Rotating Coordinate	162
<i>Xing Wan, Jie Ren, Tian Wan, Shi Jing, Sinian Xiong, Jiayu Guo</i>	
Low DC Voltage Control Strategy of Bipolar LCC-MMC Hybrid HVDC Transmission System.....	166
<i>Yijun Cai, Minghao Wen, Yu Chen, Yaguang Shi, Yu Qin</i>	
A New Type of Full Scale Photovoltaic DC Power Generation System and Its Control Strategy of Modular Multilevel Converter.....	172
<i>Wei Zhang, Yin Zhu Kang, Xiao Ma, Weidong Xiao, Lang Huang</i>	

Web-Based Design and Implementation of Smart Home Appliances Control System	N/A
<i>Samuel Bimenyimana, Aimable Ishimwe, Godwin Norensa Osarumwense Asemota, Mesa Cicilia Kemunto, Lingling Li</i>	
Impact of Var Compensation on Total Harmonic Distortion Measured Using Smart Meter	182
<i>Hafiz Mudassir Munir, Chuan Xie, JianXiao Zou, Xiaodong Wang, Syed Abdul Rahman Kashif, Talha Younas</i>	
Controller Design and Performance Evaluation of the Three-Phase MMC for Statcom and Active Rectifier Applications	187
<i>Zhenyu Wu, Chang Lu, Zhifeng Zhou, Yang Han</i>	
Optimal Configuration of the Segmented Switch in Complex Multi-Interconnected Feeder Considering Branch Layer and Different Reliability Requirements	192
<i>Li Jingping, Xian Haoxin, Cai Zhiping, Zeng Fanhua, Zhang Shijian, Gao Chongjie</i>	
Detection and Analysis of Internal Abnormal Heating for High Voltage Switchgear Based on Infrared Thermometric Technology	199
<i>Yin-zhu Kang, Yong-xiang Li, Tian-zheng Wang, Li-qiang Guo, Gang Yang, Na Zhang</i>	

Power System Protection and Fault Detection

Anti-Vibration Hammer Detection In UAV Image.....	204
<i>Yang Heng, Guo Tao, Shen Ping, Chen Fengxiang, Wang Wei, Liu Xiaowei</i>	
Analysis on Transient Equivalent Circuit of Doubly Fed Induction Generator with Crowbar Protection	208
<i>Cheng Tang, Yuping Lu, Tao Huang</i>	
Loss Analysis of Contactless Power Transmission in Seawater	214
<i>Toshiya Shinohara, Mamiko Inamori, Masayuki Morimoto</i>	
Transient Simulation of Lightning Strokes on HVDC Transmission Lines and Fault Pole Selection	219
<i>Luhua Xing, Haixia Weng, Liang Wang, Linlin Ma, Cheng Wu, Xiaobo Wang</i>	
Fault Analysis and Fast Protection of DC Bus in MMC-based HVDC Grids.....	225
<i>Qiuxia Xie, Haifeng Li, Kun Zhang, Jiyang Wu</i>	
Automatic Fault Line Selection Technology for Small Current Grounding System	229
<i>Ge Beichang, Wu Xiao, Huang Lincun, Chen Xiaojin, Yang Shengnan, Jiao Lichen</i>	
Impact of UPFC on Distance Protection in AC Transmission System	234
<i>Cao Hong, Cui Yu, Liu Jing, Cao Haiou, Li Zhongqing, Li Pei</i>	
Reliability Assessment of Relay Protection System Considering Different Protection Configuration Schemes	239
<i>Xinyu Liu, Xibin Zhou, Jun Gu, Jiang Chen, Biao Liu, Xing Chen</i>	

Online Monitoring of Partial Discharge Initiated under Metallic Protrusion Defect in High Humidity by Measuring Air Decomposition by-Products	244
<i>Hassan Javed, Kang Li, Guoqiang Zhang, Adrian Traian Plesca</i>	
ZIP and Equivalent Thermostatic Loads Impacts on Energy Savings of Conservation Voltage Reduction	250
<i>Jun Wang, Qi Hunag, Ashhar Raza, Tianqi Hong, Zhenyuan Zhang, Hongyan Li</i>	
A Coordinated Protection Scheme for DC Faults in Multi-terminal MMC-HVDC Transmission System	255
<i>Yanjun Ma, Haifeng Li, Gang Wang, Qiuxia Xie</i>	
Simulation and Fault Analysis of DC Breaker in HVDC Converter Station	261
<i>Bo Zhang, Jinjiao Kong, Jun Chen, Zhi Zhang, Eddie Chen, Yingtong Xiang</i>	
The Simulation Study on Line Protection of HVDC Transmission System	266
<i>Huidong Guo, Mengqiong Wang, Shuyong Song, Rui Li</i>	
Computation of Transient Induced Voltages along a Wind Turbine Struck by Lightning	270
<i>A. S. Zalhaf, Mahmoud Ahmed, S. Ookawara, Mazen Abdel-Salam</i>	

Transmission and Distribution System and Engineering

A Three-Dimensional Real-Time Model for Calculating Minimum Air Clearance on Wind Deviation of Overhead Transmission Line	276
<i>Yongling Lu, Hao Liu, Chengbo Hu, Chenjiang Luo, Zhicheng Zhou, Fengbo Tao</i>	
Study on a New Topology of Power Electronic Transformer	281
<i>Xiaohui Lv, Yonghai Xu, Xueyin Zhang, Tingdong Zhou</i>	
Optimal Power Flow Algorithm Based on Self-Adaptive Filter-Trust Region Method	286
<i>Penghui Zhao, Xiaoming Dong, Jun Liang, Zhe Li</i>	
Prediction of Dissolved Gases in Power Transformer Oil Based on RBF-LSSVM Regression and Imperialist Competition Algorithm	291
<i>Ma Hongzhe, Zhang Wei, Wu Rongrong</i>	
An Improved Islanding Detection Method Based on Adaptive Chopper Factor for Inverter-Interfaced Distributed Generation.....	296
<i>Liming Zhang, Meiyi Hou, Fangfang Dong, Zhen Jin, Binhua Huang, Yuanfeng Zhang</i>	
Centralized Residential Load Scheduling with Consideration of Voltage Control in Future Distribution System	301
<i>Qiagnqinag Xie, Ryoichi Hara, Hiroyuki Kita, Eiichi Tanaka</i>	
On-Line Monitoring Device for Operating State of GIS Isolating Switch Operating Mechanism	306
<i>Zhao Huicheng, Chen Xu, Zhang Jinbo, Ling Jiaye, Qi Manshun</i>	

Study on Vibration Monitoring and Multi-feature Analysis of Oil-immersed Power Transformer in Arctic Area.....	310
<i>Wenqing Lai, Yuandong Wang, Wenpeng Li, Guang Sun, Guomin Qu, Yongqiang Wang</i>	
Research and Design of Voltage Source with Arbitrary Waveform and Multiple Output	315
<i>Hongli Cheng, Lihua Zhang</i>	
Experimental Study on the Tolerance Ability of Adjustable Speed Drives to Voltage Sags.....	320
<i>Chenyi Li, Shuming Liu, Yingying Liu, Qionglin Li, Yonghai Xu</i>	
Research on the Random Wind Power Integration Based on Modular Multilevel Flexible DC Transmission.....	326
<i>Wu Lei, Xu Wu, Jin Chunjie, Su Ying, He Jin</i>	
The Simulation Analyses of Jinnan $\pm 800\text{kV}$ UHVDC Transmission Control System Based on PSCAD/EMTDC.....	331
<i>Huidong Guo, Mengqiong Wang, Yuxin Shi, Zhenguo Ma</i>	
Analysis and Detection on Noise Characteristics of AC Power Transmission and Transformation Project in Different Voltage Levels	336
<i>Liqiang Guo, Yongxiang Li, Tianzheng Wang, Hongwei Wang, Hao Wang</i>	

Principles and Techniques of Wind Power Generation

Influence and Strategy Research of Cross-Regional Renewable Energy Incremental Spot Trading	N/A
<i>Mao Hua, Li Yuanyuan, Wang Kui, Yan Dawei, Lei Zheng, Zhou Jin</i>	
Study on Characteristics of Wind Power Generation in Plateau Mountainous Area.....	346
<i>Xiankui Wen, Qiang Fan, Chenghui Lin</i>	
Study on Short Circuit Characteristics of DFIG and its Impact on Current Protection of Collector Lines in Wind Farms	350
<i>Dongmin Shi, Yuping Lu, Xingyu Zhang</i>	
Seasonal Weather Effects on Wind Power Production in Ice Prone Regions - A Case Study.....	N/A
<i>Jia Yi Jin, Muhammad S. Virk</i>	
Review of Icing Effects On Wind Turbine in Cold Regions	N/A
<i>Faizan Afzal, Muhammad S. Virk</i>	
The Transient Distance Protection on Wind Farm Transmission Line with Crowbar Protection.....	366
<i>Xingyu Zhang, Yuping Lu, Dongmin Shi</i>	
Research on Meteorological Impact Factors of Wind Farm Output Power in Plateau Mountainous Areas	372
<i>Qiang Fan, Xiankui Wen, Chenghui Lin, Yan Zhang</i>	

Research on Effects of Large-Scale Wind Farms Integration on Bus Protection.....	377
<i>Zheng Junchao, Wen Minghao, Qin Yu, Yin Xianggen</i>	
Accommodated Capacity for Wind and Solar Power under the Background of Supply Side Reform: Model and Empirical Study	382
<i>Yin Shuo, Bai Hongkun, Wang Jiangbo, Yang Meng, Ma Renyuan, Yan Jing</i>	
Wind Speed Patterns Mining Based on Multiple Views.....	N/A
<i>Zongxia Xie, Jimin Jin</i>	
A Compound Control Method for Optimal Configuration of Wind/PV/Storage System	392
<i>Shu Li, Zhenyuan Zhang, Luan Chen, Dongpo Zhang, Qi Huang</i>	
Imputation of Missing Wind Speed Data Based on Low-Rank Matrix Approximation	397
<i>Zong-Xia XIE, Xiao-Fei SUN</i>	
Power System Angular Stability as Affected by the Reduced Inertia Due to Wind Displacing Synchronous Generators.....	402
<i>Xiao Chen, Wenjuan Du, H. F. Wang</i>	
Data Assimilation Method Based on Wind Farm Data and DBSCAN-OI Algorithm.....	407
<i>Chenyu Xu, Ping Yang, Yuqi Huang</i>	

Modeling and Simulation of Wind Power Generation System

Sub-Synchronous Resonance Analysis and Simulation on Wind Farm	412
<i>Liqin Shi, Guodong Xu</i>	
On the Empirical K -Factor in Ice Accretion on Wind Turbines: A Numerical Study	417
<i>Pavlo Sokolov, Jia Yi Jin, Muhammad S. Virk</i>	
An Aggregation Method of Wind Farms Model for Studying Power System Low Frequency Power Oscillation	422
<i>Jingtian Bi, Wenjuan Du, H. F. Wang</i>	
Online Detection for Blade Imbalance of Doubly Fed Induction Generator Wind Turbines Based on Stator Current	428
<i>Liqin Shi, Jixing Qiu, Guodong Xu, Jing Yang, Jiahua Wang</i>	
A Simple Wall Function for Complex Atmospheric Boundary Layer and Its Application in Wind Energy	434
<i>Jieshun Yue, Songping Wu, Bo Wang, Zongpeng Song, Shuanglong Jin, Shuanglei Feng</i>	
Dynamic Equivalence for Wind Farm Based on IBSA- K-means Algorithm	443
<i>Yuancun Sun, Sanming Liu</i>	

Research on Modeling Spatiotemporal Correlation of Wind Power Forecast Error on Multiple Wind Farms Based on Copula Theory.....	447
<i>Teng Qijun, Wang Chengfu, Liang Jun, Liang Zhengtang</i>	
Long-Term Wind Power Forecasting Model by Multi Meteorological Variables Based on Data Compensation.....	451
<i>Shuai Xiao, Jiping Lu, Dian Li, Hua Yu, Mengjiao Li, Jialin Liu</i>	
The Value of Accurate Modeling of Coal-Fired Units in Promoting the Use of Wind Power.....	456
<i>Gang Wang, Dahai You, Li Dai, Suhua Lou, Jianqin Liu, Siwei Liu</i>	
Wind Field Reconstruction Using Non-negative Matrix Factorization and Principal Component Analysis with CFD Basis	461
<i>Li Qin, Muhammad Ali Shahzad, Xin Yuan Pan, Shi Liu</i>	
Wind Speed Prediction Research Based on Time Series Model with Residual Correction	466
<i>Zhang Chenhong, Wang Penghui, Zhao Yuan, Zhang Yagang</i>	

Distribution Network Control and System Evaluation

Alternating Iterative Method for Congestion Management of Microgrid Integrated Distribution Network	471
<i>Chuheng Tang, Wei Zhang, Ruiye Liu</i>	
Topology Identification in Distribution Network Based on Power Injection Measurements	477
<i>Mei Rui, Yu Kun, Chen Xingying</i>	
Fault Section Location Method Based on Fuzzy Self-Correction Bat Algorithm in Non-solidly Earthed Distribution Network.....	485
<i>Kai Jiang, Xiaoyang Tong</i>	
Least Mean Absolute Third Adaptive Control Algorithm for Distribution Static Compensator	490
<i>Liyuan Li, Haiquan Zhao, Zeliang Shu</i>	
Comprehensive Evaluation of Equipment Utilization on DG-connected Distribution Network Based on Pignistic Probability Distance Optimum Evidence Synthesis.....	495
<i>Linhao Ye, Xu Chen, Lai Zhou, Yongjun Zhang, Jinbao Hao</i>	
Research on Distribution Network Data Fusion Considering Renewable Energy	500
<i>Wang Zhe, Zhang Zhang, Zhang Xuefei, Xu Jing, Chi Fujian</i>	
Research on Receptivity Evaluation of Distribution Network Based on Optimal Access of Clean Energy	505
<i>Zhang Zhang, Wu Xiao, Liu Yingying, Chi Fujian, Yang Fan, Wang Shiju</i>	
Research on Optimal Load Shedding for Active Distribution Network Based on Genetic Algorithm.....	510
<i>Yang Fan, Xin Zi, Liu Jun, Lu Bingbing</i>	

Loss Calculation of Smart Distribution Grid Based on the Similarity of Feeder Loss	515
<i>Chen Zhe, Zhu Weiping, An Haiyun, Zhou Qian, Mei Rui, Yu Kun</i>	
Research on Micro-Grid Distribution Network and Its Operation Efficiency in the Energy Internet.....	520
<i>Li Juan, Wang Shiju, Xu Jing, Zhang Xuefei, Li Peng</i>	
An Integrated Power Restoration Method Based on Improved Genetic Algorithm for Active Distribution Network	524
<i>Yang Fan, Xin Zi, Liu Jun, Lu Bingbing</i>	
Analysis of the Correlation between Characteristic of Equivalent Load and Power Loss in Smart Distribution Grid	529
<i>Weiping Zhu, Qian Zhou, Haiyun An, Zhe Chen, Shuai Liu, Kun Yu</i>	

Power System and Automation

Research on Reliability Evaluation of Power System Including Improved Monte Carlo and Parallel Calculation	534
<i>Na Li, Zhenhua Zhu, Ming Li, Ying Lin, Xiaoliang Wang , Qinglong Liu</i>	
Automatic Design for Power Frequency Voltage Withstand System	539
<i>Xun Fu, Xiaoming Ren, Chunlei Gu</i>	
Research on Calling Sequence of Peaking Regulation Means in Power System with Pumped Hydro Power (PHP) Station.....	543
<i>Jinfang Zhang, Bo Yuan, Xiaochen Wang, Nan Li</i>	
Research on Influence Factors Analysis and Countermeasures of Improving Prediction Accuracy of Run-of-River Small Hydropower.....	548
<i>Qiang Fan, Xiankui Wen, Chenghui Lin, Wen Peng, Yan Zhang</i>	
A Comprehensive Flexibility Optimization Strategy on Power System with High-Percentage Renewable Energy.....	553
<i>Tian Xing, Qi Caijuan, Zhao Liang, Ge Pengjiang, Gong Jianfeng, Jin Panlong</i>	
Research on Communication Protocol Supporting Large Scale Load Group Control.....	559
<i>Dongsheng Jing, Jinsong Xue, Fang Wang, Lin Liu, Bing Qi, Bin Li</i>	
A Novel Convex Combination of LMMN and RLS Algorithms for Power System Parameter Estimation	564
<i>Gebeyehu Likassa, Haiquan Zhao</i>	
Passive Congregation Based Particle Swam Optimization (PSO) with Self-Organizing Hierarchical Approach for Non-Convex Economic Dispatch	571
<i>K.T. Chaturvedi , N. P. Patidar, M.L. Kolhe, T. Khobaragade</i>	
Research on Automatic Demand Response Simulation Service Architecture	577
<i>Xiao Chen, Kun Shi, Gaoying Cui, Hui Xiao, Bin Li, Bing Qi</i>	

Research on Commerical Mode for Load Optimizing via Power Grid and Information Network Integration	581
<i>Mingfeng Xue, Kun Shi, Bin Yang, Xuejing Wang, Yi Sun, Bin Li</i>	
The Model Combination Method of Power System Load Forecasting Based on Freshness Availability Index	585
<i>Xuan Wenbo, Song Jia, Xiao Weidong, Yan Dawei, Lei Zheng, Zhou Jin</i>	
Short-Term Load Forecasting Model Based on Deep Neural Network	589
<i>Xue Hui, Wang Qun, Li Yao, Zhang Yingbin, Shi Lei, Zhang Zhisheng</i>	
Research on Zero-Sequence Current Calculation Method for VSC and Circulation Current of Parallel VSC	592
<i>Di Wu, Jinda Zhu, Zhuofei Yu, Jian Luo, Yonghua Chen, Luyao Chen</i>	
Study on Renewable Energy Integration with Electric Thermal Storage in Demand-side——Part II: Sequential Production Simulation Based Sensitivity Analysis	597
<i>Yan Zhang, Xianzhong Dai, Xinyang Han, Wei Wang, Ning Jiang, Gang Zhao</i>	
Multi-source Optimal Schedule of Power System Considering Smoothing Effect of Wind and Photovoltaic Sources	602
<i>Dandan Sun, Shihong Miao, Lixing Li, Chang Ye, Kaiyun Chao</i>	

Power Engineering and Management

Research and Development of Automated Demand Response Standard System	608
<i>Mingyu Dong, Shiming Tian, Weiyi Zhu, Bincheng Jia, Bin Li, Bing Qi</i>	
Research on Collaborative Regulation Strategy of Intelligent Power Equipment Group	612
<i>Songsong Chen, Huaguang Yan, Wenjun Ruan, Di Liu, Yi Sun, Bin Li</i>	
Comprehensive Evaluation System of Power Quality Compensation Based on Grey Relational Analysis	617
<i>Li-Min Jiang, Hua-GuangYan, Jun-Xia Meng, Zhong-Dong Yin, Zhi Lin</i>	
Monitoring of Optical Power in Fiber Communication for Secondary Equipment in Smart Substation	622
<i>Jiaxu Guo, Qi Huang, Sinian Xiong, Shi Jing, Wei Zhen, Jie Ren</i>	
Design of Detection Supporting System for Smart Substation Maintenance Crew	629
<i>Sinian Xiong;Qi Huang; Jiaxu Guo;Shi Jing; Jie Wu;Jie Ren</i>	
Impacts of New Energy Generation Application on Power System Operation and Economic Benefit. N/A	
<i>Yang Fan, Liu Yingying, Zhang Zhang, Wu Xiao, Gao Pei</i>	

Quantitative Analysis Method for Electricity-Saving Benefit of Area Substations	639
<i>Shaohua Ma, Sen Ouyang, Xiang Huang</i>	
Multi-Area Generation Expansion Planning Model of High Variable Generation Penetration	645
<i>Bo Yuan, Shengyu Wu, Jin Zong</i>	
The Coordinated Operation Scheduling of Distributed Generation, Demand Response and Storage Based on the Optimization Energy Hub for Minimal Energy Usage Costs	649
<i>Lin-hao Ye, Bo Peng, Jin-bao Hao, Yong-jun Zhang</i>	
Stochastic Environmental and Economic Dispatch of Power Systems with Virtual Power Plant in Energy and Reserve Markets.....	N/A
<i>Wei qi Hua, Dan Li, Hongjian Sun, Peter Matthews, Fanlin Meng</i>	
"FIVE A" Synthetical Evaluation Method for Power Quality Assessment in New Energy Power.....	659
<i>Jingting Hu, Daming Zhu, Ye Yuan</i>	
Supportive Learning Tool for Electrical Machines Laboratory Using Video Clips	N/A
<i>Somboon Nuchprayoon</i>	
An Improved Power Planning Model Based on Electric Power and Clean Energy Substitution	671
<i>Yan Xiaoqing, Huang Xinting</i>	
Research on Modeling of Participating Entities in Demand Response System.....	N/A
<i>Kun Shi, Jie Fan, Gaoying Cui, Chao Lu, Bin Li, Bing Qi</i>	
Risk Warning of Important Power User Based on Electricity Load Characteristic.....	681
<i>Wei Zeng, Min Sun</i>	
Influence Analysis of Different Capacity Reduction Policies in Annual Power Generation Planning under Electricity System Reform in China	N/A
<i>Chen Zhang, Bo Hu, Cui-fen Bai, Huan-huan Li</i>	
Synchronized Estimation of NO _x Emission and Reheat Steam Temperature via a Multiple Output Version of Nonlinear PLS.....	693
<i>Xian-hua Gao, Xiang-jun Yu, Zhi-gang Su</i>	
A Novel Direct Distribution Method Based On Dynamic Characteristic Coefficient for Combined Heat and Power Dispatch in Single Extraction Units	698
<i>Chunchun Cai, Pei-hong Wang, Farong Shen</i>	

Microgrid Optimization and Scheduling

Blockchain Technology for Electricity Market in Microgrid	704
<i>Lei Xue, Yunlong Teng, Zhneyuan Zhang, Jian Li, Kunbing Wang, Qi Huang</i>	
Smooth Mode Transition Strategies of PV-BESS Microgrids.....	709
<i>Yujia Zhang, Ping Yang, Zhirong Xu, Jingfeng Chen</i>	

The Hybrid Energy Storage Microgrid Optimization Operation Considering the Battery Health State	717
<i>Ou Fan, Li Hengzhen, Wang Yunfei, Chen Sixiang, Dong Di</i>	
Microgrid Operation Control Technology Based on Lithium-Ion Capacitor	722
<i>Chen Daopin, Chen Bangfa, Huang Jing, Song Anqi</i>	
Study on Distributed Generators Optimization System in Island Microgrid	727
<i>Zhijun Wu, Gang Hu, Changchun Cai, Huiping Deng, Weiguo He, Guanghui Hua</i>	
Optimized Operation Mode of Coordination between the Flywheel Energy Storage and Generators for Pulsed Loads in Micro-grid	732
<i>Li He-Feng, Liang Jun, Yun Zhihao, Zhang Feng</i>	
Multi-Objective Optimization of Capacity Configuration for Grid-Connected Microgrid System.....	737
<i>Zhang Wentao, Zhou Youfu, Li Da, Zhang Yuhong, Yu Xueying, Li Huaqiang</i>	
Scheduling Optimization of Microgrid Considering Electric Vehicles	742
<i>Yuxin Zhang, Yunlong Teng, Zhenyuan Zhang, Jian Li, Ruoyu Jiang, Qi Huang</i>	
User-side Load Fast Precise Disptching Model Based on Contracts and Direct Load Control.....	747
<i>X.W. Wang, Y. F. Gong</i>	
A Design Of Rural Intelligent Household Micro-Grid	752
<i>Chen Tianzhu, Wang Linong, Song Bin, Li Enwen, Jian Siliang</i>	
Hierarchical Control Strategies for Islanded Microgrids Based on Modular Multilevel Converters (MMCs)	756
<i>Zhenyu Wu, Chang Lu, Zhifeng Zhou, Yulong Zhao, Yang Han</i>	

Mechanical and Industrial Control Systems

Study on Some Properties of Hydrodynamic Cavitation Damage	N/A
<i>Zhaocun Liu, Xiaoqing Wang, Weijia Fan, Kui Yv</i>	
Research on Axial Forces Balance of Stamping-welding Canned Motor Pump	N/A
<i>Tan Qianyan, Kong Fanyu, Bai Yuxing, Yuan Xin</i>	
Online Measurement System of Pulverized-Coal Concentration in Power Plant	N/A
<i>Pan Han, Wang Peihong</i>	
Optimal Control for A Boiler-Turbine System via Galerkin Method	776
<i>Jun Zhan, Zhi-gang Su, Yong-sheng Hao</i>	
Analysis of Internal Flow in Boiler Water Circulating Pump	N/A
<i>Tong Kai, Feng Zizheng, Kong Fanyu, Duan Xiaohui, Wang Kai, Dai Tao</i>	

Research on Pressure Fluctuation in Impeller and Guide Vane of Boiler Water Circulating Pump.....	786
<i>Zhao Fei, Duan Xiaohui, Xia Bin, Bai Yuxing</i>	
Modeling and Simulation of Low Carbon Supply Chain Based on the Product Attributes.....	N/A
<i>Luo Ming</i>	
Analysis of CO-Emission from Domestic Gas Cooker with Variation of Natural Gas Composition	N/A
<i>Zhiguang Chen, Chaokui Qin, Pengfei Duan</i>	

Electric Vehicle Design and Charging Equipment

Research and Simulation of Centralized Charge and Discharge Technology of EVs Based on MMC	800
<i>Zhuowu Yan, Zhongdong Yin, Xiaotian Yang, Kai Zhang, Jing Shi, Liqiang Wang</i>	
Research on the Harmonic Characteristics of Electric Vehicle Fast Charging Stations	805
<i>Tu Fujun, Xu Ruiheng, Chen Dong, Ren Lijia, Yuan Quanning, Zeng Yan</i>	
Research on Control Strategy of Suppressing Disturbance of Electric Vehicle Driving Motor.....	810
<i>Chunbin Gao, Liang Chu</i>	
Overview of the Development and Related Research of Electric Vehicles.....	814
<i>Wu Xiaoqin, Li Hu, Ren Qiaolin, Wang Yan, Xiong Wei</i>	
Summarization of Construction Planning Method for Electric Vehicle Charging Station	819
<i>Zheng Maosong, Zhang Wei, Ren Qiaolin, Xiao Sa, Xiong Wei</i>	
A Coordinated Charging Strategy for Electric Vehicles Based on Multi-objective Optimization	823
<i>Ruoyu Jiang, Zhenyuan Zhang, Jian Li, Yuxin Zhang, Qi Huang</i>	
An Economic Evaluation of Electric Vehicle Charging Infrastructure in Public Places in China	N/A
<i>Xueqi Huang, Xiao Li, Xinmei Yuan, Bo He, Juan Li</i>	
Research on Integrated Bidirectional Control of EV Charging Station for V2G	833
<i>Fucun Li, Feng Ji, Hongxia Guo, Hao Li, Zhenhua Wang</i>	

Photovoltaic Systems and Solar Engineering

Evaluation for Distributed Photovoltaic Generation System Efficiency	839
<i>Bo Hu, Yongqiang Gu, Shuxin Liu, Tao Wang, Fei Qu, Penghui Li</i>	
Simulation Analysis of Power Management Techniques for a Solar-Powered Embedded Device	845
<i>JiYoung Heo, Moonju Park</i>	

Simulation Studies of Hole Textured and Planar Microcrystalline Silicon Solar Cell at Different Zenith Angle	849
<i>Sana Zainab, Shahzad Hussain, Serra H. Altinoluk , Rasit Turan</i>	
Case Analysis on Economic Efficiency of Grid-Connected Photovoltaic Power Generation Project with Carbon Emission Measurement.....	N/A
<i>Peng Peng, Yubo Gao, Guoqin Yu, Xiaodong Lou, Yaping Dai, Zhonghu Che</i>	
Capacity Credit Evaluation of Grid-Connected Photovoltaic Generation Based on Improved Particle Swarm Optimization	858
<i>Chi Zhang, Jie Zeng, Wei Zhao, Guobin Zhong, Jingfei Zhao</i>	
Novel Control Strategy and Modeling of Air Source Heat Pump for Consuming PV Power	863
<i>Lu Jin, Xinyi Zhang, Ling Cheng, Ming Zhong, Guangbin Li, Liang Kong</i>	
Damped PR Controller Based Modeling and Simulation of Single Phase Grid Connected Photovoltaic System	869
<i>Zia Ur Rahman, Lidan Zhou, Jie Wang, Gang Yao, Dian Rui</i>	
Fault Detection of Photovoltaic Arrays Based on Support Vector Data Description	875
<i>Jiajia Lin</i>	
Maximum Photovoltaic Access Capacity Considering Voltage Deviation	882
<i>Chengli Zheng, Ping Yang, Ting He, Jie Zeng, Chi Zhang, Shaoxiong Zhou</i>	
Control Strategy of Photovoltaic Generation Inverter Grid-Connected Operating and Harmonic Elimination Hybrid System	886
<i>Xianyong Xu, Lu Fang, Xianghu Xu, Xinjie Lu</i>	
Study and Validation of Power Generation Predicting Based on Degradation Rate of PV Module in 25 Years	891
<i>Chaolu Xing, Bo Zhang, Weilun Cong</i>	
Study on Renewable Energy Integration with Electric Thermal Storage in Demand-side——Part I: Analysis for Output Characteristics of Wind Farms and Photovoltaic Plants	895
<i>Xiaoling Jin, Yan Zhang, Xianzhong Dai, Wei Wang, Ning Jiang, Gang Zhao</i>	
RTDS Simulation for HVDC Solid State Transformer with Photovoltaic Cells when Low Voltage Ride Through base on Dual Control Theory	900
<i>Zhang Yang</i>	
Shading Effects in Photovoltaic Modules: Simulation and Experimental Results	904
<i>Samuel Bimenyimana, Godwin Norensa Osarumwense Asemota, Mesa Cicilia Kemunto, Lingling Li</i>	

Series Phase-Shifted Full-Bridge DC-DC Converters in a New Type of Full Scale Photovoltaic DC Power Generation System	910
<i>Wei Zhang, Huiyong Li, Quandong Liang, Zhifeng Shi, Tao Zhang, Lang Huang</i>	
Location Specific Weighted Conversion Efficiency Coefficients for Solar Photovoltaic Inverter Using R	915
<i>Kapil Panwar, Kusum Agarwal, Satish Pandey</i>	
Maximum Power Point Performance Tracking Comparison between Incremental Conductance with Perturb and Observe Algorithms in Photovoltaic Power Systems	919
<i>Samuel Bimenyimana, Godwin Norensa Osarumwense Asemota, Lingling Li</i>	
Performance Analysis of Distributed Photovoltaic Generation Investment Associated with Urban Energy Internet	925
<i>Liang Zhang, Shiju Wang, Jing Xu, Xuedong Pan, Xuefei Zhang</i>	
Hourly Solar Radiation Forecasting Using LS-Based Volterra Filters	930
<i>L. Ma, K. Khorasania, Y. Xiao, N. Yorino, and F. I. Wahyudi</i>	
Contribution in the Study and Numerical Investigation of the Flow Characteristics in a Solar Chimney	N/A
<i>Khaled Mahdi, Nadir Bellel</i>	

Renewable Energy and Energy Engineering

The Distribution and Extraction of Biological Energy at Municipal Solid Waste Landfills	N/A
<i>HeHai-jie, Lan Ji-wu</i>	
Blockchain Technology Hyperledger Framework in the Internet of Energy	N/A
<i>Dongpo Zhang, Zhenyuan Zhang, Luan Chen, Shu Li, Qi Huang, Yihong Liu</i>	
Research on Operation Benefit of Urban Integrated Energy System under Typical Scenic.....	N/A
<i>Zhang Xuefei, Li Juan, Zhang Liang, Zhang Zhang, Wang Shiju, Xu Jing</i>	
An Improved Neural Network Method Based On the Differential Evolution Algorithm to Predict the Tidal Level in the Tidal Power Station.....	956
<i>Ye Qiu, Chaoruo Zhang, Zichao Guo, Haiyan Yi</i>	
Multi-level Fuzzy Statistics and Maximum Entropy Rule Based Comprehensive Evaluation Strategy for Development Level of Global Energy Interconnection.....	N/A
<i>Xi Ye, Quan Tang, Weiting Xu, Xi Zhang, Xiaoling Jin, Xianzong Dai</i>	
A Practical Classification Evaluation Approach for Comprehensive Competitiveness of Distributed Energy Supply Systems	N/A
<i>Xiang Huang, Sen Ouyang, Shaohua Ma</i>	

Harmonic and Interharmonic Detection Research under Clear Energy Application	N/A
<i>Wu Xiao, Ge Beichang, Liu Yingying, Zhang Zhang, Yang Fan, Xu Jing</i>	
Study On the Output Fluctuation of Intermittent Energy Source Based on NASA Data	976
<i>Yi Zhang, Hengxu Zhang, Fang Shi, Changhui Ma</i>	
Theoretical Framework and Strong Goal System of Urban Energy Internet	N/A
<i>Wang Shiju, Xu Ke, Xu Jing, Chi Fujian, Zhang Xuefei, Zhang Liang</i>	
Fixed Bed Combustion of Biomass: Particulate Matter Mitigation by Optimising Temperature and Fuel Particle Size	N/A
<i>Mesa Cicilia Kemunto, Enyu Wang, Xiang Gou, Ali Imran Shah, George Odhiambo Adwek</i>	
Research on Optimization Planning Method for the Safe and Reliable Integrated Energy System	N/A
<i>Wang Shiju, Xu Jing, Xu Ke, Zhou Changxin, Zhang Zhang, Li Na</i>	
Evaluation of Ancillary Service Market Mechanism to Facilitate High Penetration Renewable Integration in China	N/A
<i>Wang Caixia, Lei Xuejiao, Li Qionghui, Sun Yong, Cao Zheng, Li Baoju</i>	
Comparative Performance Evaluation of PLLs Based on Filtering Techniques for Grid-Integration of Renewable Energy Systems	1001
<i>Zhenyu Wu, Chang Lu, Yongjun Zhi, Aiting Jiang, Yang Han</i>	

Operation and Management of Smart Grid

Coupling Characteristics and Mechanism of the Dynamic Behaviors of High and Low Voltage Power Grid	1007
<i>Zhenhua Yuan, Hengxu Zhang, Fang Shi, Changhui Ma, Gang Liu</i>	
Research on Optimization of Power Grid Voltage Class Series Based on Rapid Load Growth.....	1013
<i>Liu Yingying, Gao Yi, Yang Fan, Zhang Zhang, Wu Xiao</i>	
Energy Balance Based DC-link Voltage Control of Grid Tied Battery Connected Multistage Bidirectional PV Inverter System	1017
<i>Awais Karni, Liwen Luo</i>	
Research on Weakness Identification of Regional Power Grid and Flexible Power Supply Allocation Requirements.....	1023
<i>Xia Dong, Han Jiarui, Wang Zhe, Chi Fujian, Xu Jing</i>	
Evaluation on Business Model of Smart Grid Value-added Service	1027
<i>Yang Wang, Yan Zhang, Junfang Wang, Kaijun Wang, Weimin Zheng, Ke Sun</i>	

Research on Control Strategy for PV Inverter under Unbalanced Power Grid.....	1036
<i>Wenjie Ma, Sen Ouyang, Qingpai Ke, Shaohua Ma</i>	
Explore the Implementation Path of the World - Class City Power Supply Network	1041
<i>Liu Yingying, Gao Yi, Yang Fan, Zhang Zhang, Wu Xiao</i>	
Research on Power Grid Fault Diagnosis Based on Artificial Fish Swarm Algorithm.....	1047
<i>Chen Liang, Xiaoyang Tong</i>	
Rationality Evaluation of Schedule Power Flow Data for Large Power Grid	1052
<i>Zhao Guoyong, Li Yalou, Lv Ying, Lu Guangming, Xie Chang, Yan Jianfeng</i>	
IEC61850 Extensions to Describe the Configuration of Feeder Automation and Metering Systems.	1057
<i>Yalan Wang, Ye Tian, Lihua Yang, Lin Liu, Guangzheng Yu, Zhengyi Zhu</i>	
A Summary of Research on Converged Communication Model of Power Network and Information Network.....	1062
<i>Mingfeng Xue, Kun Shi, Xiao Chen, Qian Wu, Bin Li, Bing Qi</i>	
Economic Analysis of Power Plants Under Different Loads Based on Structural Theory	N/A
<i>Huanhuan Bu, Pei-hong Wang, Farong Shen</i>	
Short-Term Harmonic Forecasting and Evaluation Affected by Electrified Railways on the Power Grid Based on Stack Auto Encoder Neural Network Method.....	1071
<i>Yan Pang, Haoguang Li</i>	
Review of Detection, Assessment and Mitigation of Security Risk in Smart Grid.....	1077
<i>Vasudev Dehalwar, Akhtar Kalam, Mohan Lal Kolhe, Aladin Zayegh</i>	
Lowering the Sintering Temperature of Low-Temperature Solid Oxide Fuel Cells with Sm^{3+} And Nd^{3+} Co-Doped Ceria Electrolyte	1082
<i>Xiaoyan Luo, Cancan Wang, Yang Yang, Yonghong Chen, Qi Huang, Bin Lin</i>	
Author Index	