

# Contents

## Computational Intelligence in Utilization of Clean and Renewable Energy Resources

Research on Wind Speed Vertical Extrapolation Based on Extreme Learning Machine . . . . .	3
<i>Hui Lv and Guochu Chen</i>	
Optimal Scheduling of Wind Turbine Generator Units Based on the Amount of Damage of Impeller . . . . .	12
<i>Kai Lin and Guochu Chen</i>	
A Short Term Wind Speed Forecasting Method Using Signal Decomposition and Extreme Learning Machine. . . . .	22
<i>Sizhou Sun, Jingqi Fu, and Feng Zhu</i>	
A Novel Method for Short-Term Wind Speed Forecasting Based on UPQPSO-LSSVM . . . . .	32
<i>Wangxue Nie, Jingqi Fu, and Sizhou Sun</i>	
Structure Design and Parameter Computation of a Seawater Desalination System with Vertical Axis Wind Turbine. . . . .	43
<i>Yihuai Hu, Kai Li, and Hao Jin</i>	
Inertial Response Control Strategy of Wind Turbine Based on Variable Universe Fuzzy Control . . . . .	52
<i>Le Gao, Guoxing Yu, Lan Liu, and Huihui Song</i>	
System Frequency Control of Variable Speed Wind Turbines with Variable Controller Parameters . . . . .	63
<i>Guoyi Xu, Chen Zhu, Libin Yang, Chunlai Li, Jun Yang, and Tianshu Bi</i>	
Base-Load Cycling Capacity Adequacy Evaluation in Power Systems with Wind Power . . . . .	74
<i>Jingjie Ma, Shaohua Zhang, and Liuhui Wang</i>	
MFAC-PID Control for Variable-Speed Constant Frequency Wind Turbine . . .	84
<i>Qingye Meng, Shuangxin Wang, Jianhua Zhang, and Tingting Guo</i>	
A Multivariate Wind Power Fitting Model Based on Cluster Wavelet Neural Network . . . . .	94
<i>Ruiwen Zheng, Qing Fang, Zhiyuan Liu, Binghong Li, and Xiao-Yu Zhang</i>	

Control Strategy for Isolated Wind-Solar-Diesel Micro Grid System Considering Constant Load . . . . .	103
<i>Xuejian Yang, Dong Yue, and Tengfei Zhang</i>	
Equilibrium Analysis of Electricity Market with Wind Power Bidding and Demand Response Bidding . . . . .	111
<i>Kai Zhang, Xian Wang, and Shaohua Zhang</i>	
Stability Analysis of Wind Turbines Combined with Rechargeable Batteries Based on Markov Jump Linear Systems . . . . .	126
<i>Xiao-kun Dai, Yang Song, Mira Schüller, and Dieter Schramm</i>	
Modeling and Simulation Study of Photovoltaic DC Arc Faults . . . . .	137
<i>Zhihua Li, Zhiqun Ye, Chunhua Wu, and Wenxin Xu</i>	
Data Management of Water Flow Standard Device Based on LabVIEW . . . .	147
<i>Shaoshao Qin, Bin Li, and Chao Cheng</i>	
Design and Research of Water Flow Standard Facilities Based on Field Service . . . . .	157
<i>Chao Cheng, Bin Li, and Shaoshao Qin</i>	
An Improved Multi-objective Bare-Bones PSO for Optimal Design of Solar Dish Stirling Engine Systems . . . . .	167
<i>Qun Niu, Ziyuan Sun, and Dandan Hua</i>	
Fault Diagnosis Method of Ningxia Photovoltaic Inverter Based on Wavelet Neural Network . . . . .	178
<i>Guohua Yang, Pengzhen Wang, Bingxuan Li, Bo Lei, Hao Tang, and Rui Li</i>	
Research on Expert Knowledge Base of Intelligent Diagnosis Based on Tubing Leakage of High-Pressure Heater in Nuclear Power Plant . . . . .	185
<i>Miao Zheng, Hong Qian, Siyun Lin, Bole Xiao, and Xiaoping Chu</i>	
Research on Intelligent Early-Warning System of Main Pipeline in Nuclear Power Plants Based on Hierarchical and Multidimensional Fault Identification Method. . . . .	195
<i>Hong Qian, Siyun Lin, Miao Zheng, and Qiang Zhang</i>	
The Early Warning System of Nuclear Power Station Oriented to Human Reliability . . . . .	206
<i>Shuai Ren and Hong Qian</i>	
Research on Energy Interconnection Oriented Big Data Sharing Platform Reference Architecture . . . . .	217
<i>Wei Rao, Jing Jiang, Ming Yang, Wei Peng, and Aihua Zhou</i>	

## Intelligent Methods for Energy Saving and Pollution Reduction

Study on Lightweight Design and Connection of Dissimilar Metals of Titanium Alloy TC4/T2 Copper/304 Stainless Steel. . . . .	229
<i>Shun Guo, Qi Zhou, Peng Xu, Qiong Gao, Tianyuan Luo, Yong Peng, Jian Kong, KeHong Wang, and Jun Zhu</i>	
Research on Warehouse Scheduling Optimization Problem for Broiler Breeding . . . . .	238
<i>Wenqiang Yang and Yongfeng Li</i>	
A Discrete Fourier Transform Based Compensation Task Sharing Method for Power Quality Improvement . . . . .	247
<i>Jianbo Chen, Dong Yue, Chunxia Dou, and Chongxin Huang</i>	
A Comprehensive Optimization of $PD^H$ Controller Design for Trade-off of Energy and System Performance. . . . .	257
<i>Ke Zhang, Min Zheng, Kang Li, and Yijie Zhang</i>	
Hierarchical Time Series Feature Extraction for Power Consumption Anomaly Detection . . . . .	267
<i>Zhiyou Ouyang, Xiaokui Sun, and Dong Yue</i>	
Prospect Theory Based Electricity Allocation for GenCos Considering Uncertainty of Emission Price. . . . .	276
<i>Yue Zhang and Shaohua Zhang</i>	
Neural-Network-Based Tracking Control of Offshore Steel Jacket Platforms . . .	287
<i>Zhi-Hui Cai, Bao-Lin Zhang, and Xian-Hu Yu</i>	

## Intelligent Methods in Developing Electric Vehicles, Engines and Equipment

Short-Term Optimal Scheduling with the Consideration of Electric Vehicle Driving Rules . . . . .	299
<i>Xiaolin Ge and Chenhao Pei</i>	
Dispatching Analysis of Ordered Charging Considering the Randomness Factor of Electric Vehicles Charging . . . . .	309
<i>Ling Mao and Enyu Jiang</i>	
A Contract Based Approach for Electric Vehicles Charging in Heterogeneous Networks . . . . .	319
<i>Huwei Chen, Zhou Su, Yilong Hui, Hui Hui, and Dongfeng Fang</i>	
Review of the Four Ports Electromechanical Converter Used for Hybrid Electric Vehicle . . . . .	329
<i>Qiwei Xu, Jing Sun, Meng Zhao, Xiaobiao Jiang, Yunqi Mao, and Shumei Cui</i>	

Research on Parameters Matching of Hybrid Electric Vehicle with Compound-Structure Induction Machine . . . . .	339
<i>Qiwei Xu, Xiaobiao Jiang, Meng Zhao, Xiaoxiao Luo, Weidong Chen, Yunqi Mao, and Shumei Cui</i>	
Location Model Research of Charging Station for Electric Vehicle Based on Users' Benefit . . . . .	351
<i>Fei Xia, Zhicheng Wang, Daogang Peng, Zihao Li, Zhijiang Luo, and Bo Yuan</i>	
Research on Double Fuzzy Control Strategy for Parallel Hybrid Electric Bus . . . . .	362
<i>Qiwei Xu, Xiaoxiao Luo, Xiaobiao Jiang, and Meng Zhao</i>	
Optimal Battery Charging Strategy Based on Complex System Optimization . . . . .	371
<i>Haiping Ma, Pengcheng You, Kailong Liu, Zhile Yang, and Minrui Fei</i>	
Experimental Research on Power Battery Fast Charging Performance . . . . .	379
<i>Jinlei Sun, Lei Li, Fei Yang, Qiang Li, and Chao Wu</i>	
A Novel RBF Neural Model for Single Flow Zinc Nickel Batteries. . . . .	386
<i>Xiang Li, Kang Li, Zhile Yang, and Chikong Wong</i>	
State-of-Charge Estimation of Lithium Batteries Using Compact RBF Networks and AUKF. . . . .	396
<i>Li Zhang, Kang Li, Dajun Du, Minrui Fei, and Xiang Li</i>	

### **Intelligent Computing and Control in Power Systems**

Design of Adaptive Predictive Controller for Superheated Steam Temperature Control in Thermal Power Plant . . . . .	409
<i>Hong Qian, Yu-qing Feng, and Zi-bin Zheng</i>	
Extended State Space Predictive Control of Gas Turbine System in Combined Cycle Power Plant . . . . .	420
<i>Guolian Hou, Tian Wang, Huan Du, Jianhua Zhang, and Xiaobin Zheng</i>	
Decentralized $H_\infty$ Load Frequency Control for Multi-area Power Systems with Communication Uncertainties . . . . .	429
<i>Yanliang Cui, Guangtian Shi, Lanlan Xu, Xiaolan Zhang, and Xue Li</i>	
Cyber Security Against Denial of Service of Attacks on Load Frequency Control of Multi-area Power Systems . . . . .	439
<i>Yubin Shen, Minrui Fei, Dajun Du, Wenjun Zhang, Srdjan Stanković, and Aleksandar Rakić</i>	

Detecting Replay Attacks in Power Systems: A Data-Driven Approach . . . . .	450
<i>Mingliang Ma, Peng Zhou, Dajun Du, Chen Peng, Minrui Fei, and Hanan Mubarak AlBuflasa</i>	
A Novel Dynamic State Estimation Algorithm in Power Systems Under Denial of Service Attacks . . . . .	458
<i>Mengzhuo Yang, Xue Li, and Dajun Du</i>	
Small-Signal Refinement of Power System Static Load Modelling Techniques . . . . .	467
<i>Gareth McLorn and Seán McLoone</i>	
$H_\infty$ Prediction Triggering Control of Multi-area Power Systems Load Frequency Control Under DoS Attacks . . . . .	477
<i>Zihao Cheng, Dong Yue, Xinli Lan, Chongxin Huang, and Songlin Hu</i>	
New Framework Mining Algorithm Based Main Operation Parameters Optimization in Power Plant. . . . .	488
<i>Wencheng Huang, Li Jia, and Daogang Peng</i>	
A Consensus-Based Distributed Primal-Dual Perturbed Subgradient Algorithm for DC OPF . . . . .	497
<i>Zhongyuan Yang, Bin Zou, and Junmeng Zhang</i>	
Model Predictive Control Based on the Dynamic PLS Approach to Waste Heat Recovery System . . . . .	509
<i>Jianhua Zhang, Haopeng Hu, Jinzhu Pu, and Guolian Hou</i>	
Optimized Control of Ship DC Electric Propulsion System with Energy Storage Unit. . . . .	519
<i>Feng Ding, Shuofeng Wang, and Shaohua Zhang</i>	
The Application of the Particle Swarm Algorithm to Optimize PID Controller in the Automatic Voltage Regulation System. . . . .	529
<i>Jing Wang, Naichao Song, Enyu Jiang, Da Xu, Weihua Deng, and Ling Mao</i>	
Research on the Bio-electromagnetic Compatibility of Artificial Anal Sphincter Based on Transcutaneous Energy Transfer . . . . .	537
<i>Peng Zan, Chundong Zhang, Suqin Zhang, Yankai Liu, and Yong Shao</i>	
The Role of Intelligent Computing in Load Forecasting for Distributed Energy System . . . . .	547
<i>Pengwei Su, Yan Wang, Jun Zhao, Shuai Deng, Ligai Kang, Zelin Li, and Yu Jin</i>	

Intelligent Control Methods of Demand Side Management in Integrated Energy System: Literature Review and Case Study . . . . .	556
<i>Yan Wang, Pengwei Su, Jun Zhao, Shuai Deng, Hao Li, and Yu Jin</i>	
Optimal Design and Operation of Integrated Energy System Based on Supply-Demand Coupling Analysis. . . . .	566
<i>Qiong Wu and Hongbo Ren</i>	
<b>Modeling, Simulation and Control in Smart Grid and Microgrid</b>	
Control Strategies for the Microgrid Control System with Communication Delays. . . . .	579
<i>Weihua Deng, Pengfei Chen, Kang Li, and Chuanfeng Li</i>	
Secondary Voltage Control of Microgrids with Distributed Event-Triggered Mechanism. . . . .	587
<i>Jing Shi, Dong Yue, and Shengxuan Weng</i>	
Frequent Deviation-Free Control for Micro-Grid Operation Modes Switching Based on Virtual Synchronous Generator . . . . .	597
<i>Yan Xu, Tengfei Zhang, and Dong Yue</i>	
A Novel Data Injection Cyber-Attack Against Dynamic State Estimation in Smart Grid . . . . .	607
<i>Rui Chen, Dajun Du, and Minrui Fei</i>	
A Novel Combination of Forecasting Model Based on ACCQPSO-LSSVM and Its Application . . . . .	616
<i>Nan Xiong, Minrui Fei, Sizhou Sun, and Taicheng Yang</i>	
Research on Power Terminal Access Control Technology Supporting Internet Interactive Service in Smart Grid. . . . .	626
<i>Song Deng, Liping Zhang, and Dong Yue</i>	
Research on Model and Method of Maturity Evaluation of Smart Grid Industry . . . . .	633
<i>Yue He, Junyong Wu, Yi Ge, Dezhi Li, and Huaguang Yan</i>	
An Improved Multi-objective Differential Evolution Algorithm for Active Power Dispatch in Power System with Wind Farms. . . . .	643
<i>Shu Xia, Yingcheng Xu, and Xiaolin Ge</i>	
Integration of the Demand Side Management with Active and Reactive Power Economic Dispatch of Microgrids . . . . .	653
<i>Mohammed K. Al-Saadi, Patrick C.K. Luk, and John Economou</i>	

Unit Commitment Dynamic Unified Active and Reactive Power Dispatch of Microgrids with Integration of Electric Vehicles . . . . .	665
<i>Mohammed K. Al-Saadi, Patrick C.K. Luk, and John Economou</i>	
Optimal Design and Planning of Electric Vehicles Within Microgrid . . . . .	677
<i>Mohammed Alkhafaji, Patrick Luk, and John Economou</i>	
Security-Constrained Two-Stage Stochastic Unified Active and Reactive Power Management System of the Microgrids . . . . .	691
<i>Mohammed K. Al-Saadi and Patrick C.K. Luk</i>	
Charging and Discharging Strategy of Electric Vehicles Within a Hierarchical Energy Management Framework . . . . .	704
<i>Mohammed Alkhafaji, Patrick Luk, and John Economou</i>	

### Optimization Methods

Optimization Allocation of Aerospace Ground Support Vehicles for Multiple Types of Military Aircraft . . . . .	719
<i>Fuqin Yang, Jinhua Li, and Mingzhu Zhu</i>	
Multi-level Maintenance Economic Optimization Model of Electric Multiple Unit Component Based on Shock Damage Interaction. . . . .	729
<i>Hong Wang, Yong He, Lv Xiong, and Zuhua Jiang</i>	
A Composite Controller for Piezoelectric Actuators with Model Predictive Control and Hysteresis Compensation . . . . .	740
<i>Ang Wang and Long Cheng</i>	

### Computational Methods for Sustainable Environment

Numerical Investigation of the Environment Capacity of COD, Inorganic Nitrogen and Phosphate in the Bohai Bay . . . . .	753
<i>Hao Liu and Zhi-kang Zhang</i>	
An Artificial Neural Network Model for Predicting Typhoon Intensity and Its Application . . . . .	762
<i>Ruyun Wang, Tian Wang, Xiaoyu Zhang, Qing Fang, Chumin Wu, and Bin Zhang</i>	
Analysis of Power Spectrum Feature Based on Slurry Noise in Electromagnetic Flowmeter. . . . .	771
<i>Jie Chen, Qiong Fei, Bin Li, and Xiaojie Zheng</i>	
A Two-Stage Agriculture Environmental Anomaly Detection Method . . . . .	779
<i>Lili Wang, Yue Yu, Li Deng, and Honglin Pang</i>	

Building a Virtual Reality System for Intelligent Agriculture Greenhouse Based on Web3D . . . . .	790
<i>Qun Huang, Li Deng, Minrui Fei, and Huosheng Hu</i>	
A Green Dispatch Model of Power System with Wind Energy Considering Energy-Environmental Efficiency . . . . .	800
<i>Daojun Chen, Liqing Liang, Lei Zhang, Jian Zuo, Keren Zhang, Chenkun Li, and Hu Guo</i>	
<b>Author Index</b> . . . . .	813



Advanced Computational Methods in Energy, Power,  
Electric Vehicles, and Their Integration  
International Conference on Life System Modeling and  
Simulation, LSMS 2017 and International Conference on  
Intelligent Computing for Sustainable Energy and  
Environment, ICSEE 2017, Nanjing, China, September  
22-24, 2017, Proceedings, Part III  
Li, K.; Xue, Y.; Cui, S.; Niu, Q.; Yang, Z.; Luk, P. (Eds.)  
2017, XX, 815 p. 407 illus., Softcover  
ISBN: 978-981-10-6363-3