

Table of Contents

Preface and Conference Organization

Chapter 1: Development and Utilization of Solar Energy

Analysis of Limit Angle Deviation for the Spot of Solar Simulator J.Y. Zhang, J.C. Li and H.L. Niu	3
Development of Wind-Solar-Diesel-Battery Integrated Seawater Desalination Device X.W. Liu, C.Y. Pan, H.C. Su, Y.S. Xiao and T. Feng	9
The Solar-GSHP System Applied in the Administrative Regiona of a TYPICAL Port J. Zhang, J.F. Zhai and J. Chen	16
Comparative Analysis of Inverter Topology for Highly Efficient Single-Phase Photovoltaic Generation System	
L. Huang, S.S. Shi, Y.B. Yang, J.S. Liu and D. Wang	20
Design and Research of Integrated PV and Storage Grid-Connected Generation System X.D. Qin, R.R. Zhou, L. Xia and L.H. Xu	24
Solar Temperature Difference of a Complementary Power Generation Device for Automotive Applications J.Y. Guo	30
Strategy for Grid-Connection Control of Photovoltaic System J.B. Wang, X. Yang, W. Bao and W.L. Xu	35
Study on the Heat Transfer Mechanism of Ceramic Solar Collector G. Zhou, Y.M. Lin and C.H. Liu	39
Development Status and Measures of China's Photovoltaic Power Industry under the International Background Q.H. Chen, H. Jiang and K. Lu	44
Optimization of Photovoltaic Array Configurations in Photovoltaic System W.T. Jia, X.Y. Wei, J.H. Zhang and Y.F. Meng	48
Study on Automatic Control Method of Photovoltaic Power Systems H.L. Zhang and E.H. Zhang	52
Study on Solar Photovoltaic Tracking System Based on Servo Control W.J. Zhang	56
The Effect of Digital Process of Single-Phase Photovoltaic Grid Connected Inverter H.T. Shan and B. Zhou	60
The Feasibility Study of Distributed Photovoltaic Power Generation System in Western Region of China	<i>C</i> 1
G.Š. Li, Y.N. Zhang, L. Xia and C. Zhou	64
The Influence of Distributed Photovoltaic Access to Distribution Network on Voltage Profile C.X. Yang, H.J. Yang, P. He and Y.L. Niu	68
Chapter 2: Development and Utilization of Biomass Energy	
Thermogravimetric and Pyrolysis Kinetic Analysis of Elmwood Y.Z. Cui, M.T. Tang, L.H. Zhang, P. Gao and G.K. Zhang	77
Conversion of Biomass-Derived Glycolide to Ethylene Glycol over Cu S. Zhang, Z.B. Huo, L. Li, J. Fu, J. Luo and F.M. Jin	81
Development of the Straw Based Power Generation in China: A Critical Analysis H. Lv, H. Ding, D.Q. Zhou and Q. Zhang	85
Influence of Catalyst on Direct Ethyl Lactate Production from Glucose and Ethanol D.Z. Ren, Z.B. Huo, J. Fu, J. Luo, L. Li and F.M. Jin	91
Analysis and Optimization of Fuel Delivery Advance Angle of Waste Cooking Oil Biodiesel	
Using MATLAB J.G. He, J.H. Zhang, M.W. Xiao and Z.B. Chen	95

Cellulolytic Enzyme Lignin Efficiently Blended with Polycaprolactone: Thermal, Mechanical Properties and Morphological Evaluation	
W.Z. Ouyang and Y. Huang	100
Biodiesel Production from Waste Cooking Oils by Using Immobilized Microorganisms as Whole Cell Catalysts G.X. Zhou, G.Y. Chen and B.B. Yan	107
Effects of Silage Additives on Biogas Production of Hybrid Penisetum R. Xu, B.Y. Zhang and F.Y. Yang	112
Isolation and Preliminary Identification of Cellulose-Decomposing Microorganisms Form Bamboo Forest	121
Y.J. Jiang, X.J. Yu and X.X. Li Selective Depolymerization of Sulfuric Acid Pretreated Wheat Stalk under Microwave-	121
Irradiation J.J. Fang, W. Zhao, C. Zhao, K.X. Zhou, Q. Lei, J. Zhao, Y.P. Ren, S.L. Chen, D. Liu and C. Sheng	126
Torrefaction of Biomass: Effect of Temperature on the Properties of Liquid and Gaseous Products	121
D.Y. Chen, Q. Li, Y. Chen, Y. Sun and X.L. Sun Biomass Energy – Effective Utilization of Crop Straws	131
X.X. Li	136
Thermodynamic Analysis of Ethanol-Diesel Oil and Waste Heat Recovery for Diesel Engines M.Y. He, H.T. Gao and W. Liu	140
Thermogravimetric Study on the Co-Pyrolysis Characteristics of Bituminous Coal and	140
Wheat Straw X.P. Yan, J.S. Bai, X. Zhou and S.H. Lin	146
Triglycerides Catalytic Hydroconversion into Bio-Aviation Fuels Based on Temperature by One-Step Y.Y. Zhao, Y.B. Chen, S.P. Yang, W.D. Zhang and Y.N. Gao	152
Effect of Carbon Sources and Fe ³⁺ on the Growth and Lipid Accumulation of <i>Monoraphidium</i> sp. FXY-10 under Mixotrophic Culture Condition H.M. Jiangwang, L. Huang and X.Y. Yu	157
Chapter 3: Development and Utilization of Wind Energy	
"Source to Source" Active Coordinated Control Technique Based on Large-Scale Wind Power Connecting to the Grid X.W. Fu, W.Y. Liu, W.Z. Wang and P. Xia	167
A Probability Distribution Model to Simulate Wind Power Output Fluctuation C. Li, C. Liu and Y.H. Huang	171
Effects of Surge on Rotor Aerodynamics of Offshore Floating Wind Turbine J.C. Liu, K. Sun, J.H. Zhang, Y.N. Zhao and M.H. Pan	177
Study on Influence of High-Energy Load Accommodating to Wind Power by Layer on Network Loss	102
H.Y. Li, W.Y. Liu, J.J. Zheng, A.Q. Liang, P.D. Du and D.D. Zhu Analysis of Stakeholders' Behaviors in the Development of China's Wind Power Industry	183
C.X. Xu, J.T. Lin and Y. Lu	187
Containing Wind Farm Power System Probabilistic Optimal Power Flow Calculation Using the Method of Combined Cumulants and Gram-Charlier Expansion M.J. Chen, Y.Q. Chen, W.C. Dong and B. Wu	193
Mechanism Research about Impact of Large-Scale Wind Power Integration on Grid Loss Z.T. Wei, W.Y. Liu, F.C. Liu and J.Z. Zhuo	200
Research on Inverter Side Steady Operation of Direct-Drive Permanent Magnet Synchronous Wind Power System	
R.F. Cheng, L.H. Chen, X.H. Yu and Y.P. Ma	204
A Review on Low Voltage Ride-Through Solutions for PMSG Wind Turbine M. Zhang, H.Q. Xue and S.L. Zhou	209

Analysis on the Wind Turbines Current Influenced by the Impedance Variation of Low Voltage Ride through Test Device	
S.Y. Zhang, W.W. Gong, Y.F. Zhao, F. He, Y.Y. Wang and D.H. Xin	216
Analysis of System Key Variables under Power Fluctuation from Wind Power Cluster L. Lin, C.C. Wu, J. Wan, H.G. Zhang and J. Qi	220
Coordinated Reactive Power and Voltage Control Based on Doubly-Fed Wind Farm Cluster	
L. Lin and K. Li	224
Doubly Fed of Induction Generators Wind Turbine Frequency Control Based on Power Curve of Inertia Control and Pitch Angle Control X.Y. Zhang and S.W. Li	228
Equivalent P-v Model of Wind Farm Based on Measured Data X.H. Wang, X.X. Pan, J. Wan and J. Qi	233
Generator-Side Converter Control Strategies of Synchronous Wind Turbines Based on the MPPT C. Chen, H. Liu, S.S. Li and S.J. Gao	238
Optimization of Large Scale Energy Storage System for Relaxing Wind Power Centralized Transmission Bottlenecks	230
G.G. Yan, Z.B. Wang, J.H. Li, H.B. Li and Y.L. Yang	243
Regional Wind Energy Resource Forecasting Based on SVD and Support Vector Machine H. Zhou, J.Q. He and Z.B. Chen	247
Research of Bidirectional Power Flow Algorithm of Micro-Grid Based on the Improved Zbus Method	
C.L. Gu, J.W. Ji, L. Liu and A.R. Xu	253
Research on Short-Circuit Current of Wind Power System and its Impact on Relay Protection H.B. Shi, Z. Chen, G. Li and B. Zhou	258
Sharing of Unbalanced Loads in an Isolated Distributed Generation System with Droop Controlled Doubly Fed Induction Generator	236
B. Zhou, H. Nian, G. Li and H.B. Shi	264
Study on Identification of Wind Turbine Power Characteristic Curve by Genetic Algorithm J.A. Zhang, X.Y. Meng, L.L. Wu, H.X. Xu, N. Liu, H.F. Liu, X. Li, Y.H. Gao, Z.M. Sun and S.N. Zhang	270
Study on Transient Stability Simulation of District Grid Containing High Proportion of Wind Power	
L. Lin, S. Zhao, M.Z. Yu and B.J. Ding	275
Vulnerability Assessment for Large-Scale Wind Farm W. Zheng, R.D. Ge, W.Y. Liu, D.D. Zhu and H.Y. Li	279
Wind Speed Change and Influence on Wind Energy in Recent 50 Years over Hexi Corridor Y.Z. Zhang, B. Zhang and Y.Y. Liu	284
Economic Operation Research of Wind and Pumped Storage Co-Generation System D.X. Li, X.Y. Lv, X.F. Chang and W.X. Pan	291
An Adaptive Chaos Quantum-Behaved Particle Swarm Optimization Algorithm for Real- Time Dispatch in Power System with Wind Generation	
Z.K. Wu, C.H. Deng, Y. Xiao, W.X. Zhao and Q.S. Xu	297
Assessment of Offshore Wind Resource in China Using CFSR Data S.L. Jin, S.L. Feng, B. Wang, J. Hu, Z.Q. Ma and Z.P. Song	303
Detached Eddy Simulation of the Flow over Bolund S.C. Liang, X.D. Zhang, S. Kang and Y.F. Zhao	309
RBF Neural Network Wind Power Prediction Based on Chaos Theory L.D. Zhang, S.S. Li and X.D. He	315
Time Sequence Coordination Frequency Control Strategy Design of Wind Farm Z. Xu, H.T. Wang and C.M. He	319
Wind Power Fluctuation Smoothing of Double-Fed Induction Generator by Using Confining Factor	
B. Chen and Z.Q. Wu	327
Risk Assessment of Power System with Wind Farm Considering Weather Impacts D. Lin, J.H. Zhang, H.N. Li and M. He	336

A Study on the Application of Abandoned Wind Electricity in Thermal Power Plant's Heat	
Recovery System Z.H. Xiao and X.L. Hua	343
Chapter 4: Nuclear Energy and other Energy	
A Comparative Study on Long-Term Energy Efficiency of Two Kinds of Ground-Source Heat Pump Systems	240
F. Lei and P.F. Hu Use of Nuclear Energy and Sustainable Development F. Chen and Q. Yao	349 353
Preliminary Core Design and Optimization Analysis of Travelling Wave Reactor D.X. Shen, Y.L. Zhang and Q.X. Guo	357
Analysis of Negative Sequence Operation Characteristics for Nuclear Half Speed Steam Turbine Generator C.Y. Dong, B.J. Ge, Y.L. Lv and D.J. Tao	361
Analysis of Nuclear Power Industry's Sustainable Development in China from the Perspective of Innovation Ecosystem	
X.L. Liu, X.M. Ma and S.M. Qiu	367
Chapter 5: Energy-Saving and Energy-Storage Technology	
Application of Distributed Energy Storage L. Wang, Z.J. Shi, J.J. Li, X.M. Yu and H.J. Zhu	373
Research of Large LNG Tank Structure T.K. Li, J.D. Li, L.F. Xiao and W. Li Study on the Effect of Foreign Direct Investment and Foreign Trade on Energy Efficiency	378
in the Yangtze Delta Region Using Stochastic Frontier Analysis Approach X.W. Yang	383
Investigation into the Application Prospects of Energy Storage Technologies Proposed for West Inner Mongolia Power Grid W.W. Gong, D.H. Xin, B. Wang, Y. Cong and C. Li	388
The Study of Fuel-Saving Technology of GSI J.H. Xu, M.Q. Gao, J.Q. Gao and X. Bao	392
Analysis of Operations Optimization of a 600MW Coal-Fired Power Plant C.B. Lu, J. Xiao, R.Y. Sun, J.L. Ding, E.X. Zhang, S.Q. Gao and Y.L. Gao	398
Efficiency Analysis of Low-Grade Energy Recovery System Based on Scroll Expander J.D. Wang, G.T. Si and J.Y. Wei	402
Optimal Capacity Allocation for Supercapacitor Energy Storage System in Power Grid Primary Frequency Regulation J.Y. Huang, X.R. Li, T.T. Zhou, F. Ke, Q. Zhang and W.J. Liu	407
Research on Application of Energy Storage Technology in Renewable Energy Source Generation J. Chen and C.L. Guo	418
Super-Cooling Suppression of Microencapsulated PCM S. Lv and Z.Z. Qiu	422
Energy Saving Potential on Centrifugal Water Chillers with Frequency Converter System: A Case Study in China Y. Liu, Q. Wang and P. Song	427
Heat Recycling of PCS Power Inverter on Energy Storage Device P.P. Li, H. Liu and Z.Q. Zhang	431
Study on Dispersion Behavior of TiO_2 Nanoparticles in PCM for Air-Conditioning System X.Y. Li and Q.Q. Zhao	435
The Numerical Prediction and Safety Analysis of Alternative Fuels Leakage Accident during Storage and Transportation Z.J. Wang, J. Ding and P.F. Weng	439

Study on Charging and Discharging Characteristics of Energy Storage System in Wind Storage Power Plant under the Condition of Black Start F. Sun, Y. Zhao, G. Wang and X.X. Lu	443
An Operating Control Strategy of Zinc Bromine Flow Battery Energy Storage Systems in Microgrid X.Z. Feng, Y.B. Tao, J.H. Hu and Q. Li	449
Chapter 6: Energy Chemical Engineering, Energy Materials and Fuel Cell	
High Reversible Capacity of Nitrogen-Doped Graphene as an Anode Material for Lithium- Ion Batteries C.J. Fu, S. Li and Q. Wang	459
Polyaniline@MnO ₂ /Graphene Oxide Ternary Composites for Electrochemical Supercapacitors C. Pan, L. Dong and H.T. Gu	465
Research Progress in Gasochromics Mechanism of Tungsten Oxide Thin Films M.H. Wang, H. Lei, J.X. Wen, Y. Sawada, Y. Hoshi, T. Uchida and Z.X. Hou	471
Effects of Post-Annealing Temperature on the Structure and Electrical Properties of N-Doped ZnO Films	
X.M. Zhao Modulation of Low Bias Negative Differential Resistance in a Molecular Device by	475
Adjusting Anchoring Groups L.H. Wang, H.F. Meng, B.J. Ding and Y. Guo	479
Novel Two-Dimensional Carbon Nanomaterials: Synthesis and Excellent Lithium Storage Properties Y.Q. Yang, H.K. Deng, L. Jin, Y. Liu and Y. Lu	483
SFA-SDC Composite Cathodes Fabricated with Glycine-Nitrate Process for Intermediate- Temperature Solid Oxide Fuel Cells X.L. Yu and M.F. Shi	488
A Review of Graphene Supported Electrocatalysts for Direct Methanol Fuel Cells Q. Liu, Q.J. Xu, J.C. Fan, Y. Zhou and L.L. Wang	492
Combustion Behavior and Combustion-Supporting Mechanism of KMnO ₄ on Mixing Pulverized Coals and Semicoke in Blast Furnace Injection Z.Y. Yang, D.C. Wang and J.L. Jiang	497
Desulfurization Effect of High-Sulfur Weibei Coal of Assisted by Microwave Irradiation and Ultrasonic Wave	5 0.4
Z.Y. Yang, S.T. Wang, C. Tan and Y.H. Li Analysis on Failure of Oxide Layer of T91 High Temperature Superheater Tube	501
S.S. Zhang, G. Chen, C.M. Li and D. Hu Chemical Kinetic Research on Flame Characteristics of Ethylene under High CO ₂ Concentration Atmosphere	505
D.D. Zhou, C.J. Li, R. Zhao and D.S. Xia Corrosion Failure Analysis and Corrosion Performance Comparison of Condenser Copper	512
Tubes J.L. Zhang, L. Liang, X.L. Li, S.H. Liu and Y. Zhao	517
Effect of Oxygen Gas on Corrosion Behavior of Electro-Polymerization PANI Coating in PEMFC Environments W.Q. Zhou, X. Li, T.T. Huang, J. Wang, S.G. Xin and H.B. Zhang	521
Fast Charging Lead-Acid Battery Technology Theory Analysis K.C. Li, Z. Liu, Y.L. Liu and Y. Liu	525
Hierarchically Porous Carbon/MnO ₂ Nanocomposites as High-Performance Electrode for Asymmetric Supercapacitors Y.R. Liu and J. Liu	530
Influence of Nitric Acid Oxidation on the Supercapacitive Performance of Mesoporous Carbons with Different Pore Symmetries Y.R. Liu	534
Influencing Factors and Techniques of Carbon Nanotube Assembly by Dielectrophoresis P. Zhang, L.B. An, Z.X. Han and Y. Chen	539

Progress of Research on Li-Rich Cathode Materials xLi ₂ MnO ₃ ·(1-x) LiMO ₂ (M=Ni, Co, Mn) for Li-Ion Battery	
X.N. Liu, Q.J. Xu, X.L. Yuan, X. Jin and L.Z. Zhou	543
Study on the Effects of Hydrogen Addition on Ignition Delay of Surrogate Fuel for RP-3 Kerosene	540
Y. Liu, W. Zeng, H.A. Ma and K.Y. Deng Superior Cycling Performance of Sulfurized Polyacrylonitrile Cathode Assembled with In	549
Situ Polymerized Gel Polymer Electrolyte Z.J. Wu, B.R. Wu, Y.H. Ren, D.B. Mu and X. Zhao	553
The Experiment of Flushing Gelled Crude Oil which Stick on the Wall during Hydraulic Suspension Transportation F.Z. Li, Y. Liu, Z.H. Wang, C.Y. Wu and X.Y. Liu	559
Pulverized Coal-Fired Flame Temperature and Emissivity Measurement Based on Spectral Analysis and the Two-Color Method Y.P. Sun	564
A Review on Low-Temperature Oxidation of Lignite: Oxygen Transport, Effects of Drying and Measures for Restraining Coal Oxidation H. Zhao, J.S. Liu, J.L. Yu, B.B. Xin and X.Z. Geng	571
A Variable Frequency Pulse Fast Charging Technique for Li-Ion Batteries Based on Fuzzy Control	
M.M. Yang, T.Z. Wu, X.M. Wu and Y.S. Zeng	577
Improvement of Si-Betavoltaic Batteries Technology V.N. Murashev, S.A. Legotin, S.I. Didenko, O. Rabinovich, A.A. Krasnov and S.U. Urchuk	585
Stretching Induced Crystalline-Phase Transition in Energy-Conversion Poly(Vinylidene Fluoride) (PVDF) Films F. Wang, Z.Y. Huang and J. Li	589
Thermoelectric Performance of Twisted Graphene Nanoribbons W.J. Liu, S.H. Cai and M.S. Deng	594
Performance InGaN and AlGaInP LED Characteristic Dependence on Quantum Wells O. Rabinovich, S. Didenko and S. Legotin	600
Calculation of Complexion in Chemical Precursor for ZnSe as Buffer-Window Layer of CIGS Solar Cell L.Y. Chen, C. Fang and X.Q. Chen	604
Study on Preparation of CdS Quantum Dots for Dye Sensitized Solar Cells X.Y. Wan, X.A. Mei, Y.H. Tian, D.H. Xu and Y. Xiong	608
Research for Photoelectric Property of SnO ₂ Vacancy Doped Cu B.J. Zhang and F. Miao	612
An Investigation on Dye-Sensitized Solar Cell Performance Influenced by Radiant Intensity and Illuminated Area in Concentrating Photovoltaic System W.B. Xiao, J. Dai, G.H. Tu and H.M. Wu	616
Photovoltaic Performance and Long-Term Stability of Hybrid ZnO/TiOPc Solar Cells with DH-α6T as an Electron Blocking Layer	
R.B. Ye, M. Yanagida, K. Ohta and M. Baba Study on the Electrical Properties and the Ac Conductance Response of ZnO-Based	620
Varistor X.T. Zhao, R.J. Liao and J.Y. Li	625
Synthesis and Characterization of 5-Hexyl Benzothiadiazole Y.F. Yu, Z.C. Hu, X.J. Wang, H.J. Lv, L. Liu, A.B. Chen, F. Jing and X.D. Yang	630
Research on the Depositon of CdS Quantum Dots on TiO ₂ Inverse Opal X.A. Mei, X.Y. Wan, Q.H. Cheng, D.H. Xu and Y. Xiong	634
Chapter 7: Power System and Automation	
Analysis and Design of Temperature Monitoring Device for Switchgear Cabinet Based on Resonant Coupling Wireless Energy Supply	٠ ـ ـ ـ ـ
K. Li, G.Q. Zhang and R.R. Guo	641
Analysis of Busbar-Line Transformer Economic Operation Mode A.Q. Liang, W.Y. Liu, P.D. Du and H.Y. Li	647

Assessment on Power System Black-Start Schemes Based on Entropy-Weighted and Improved Analytic Hierarchy Process Algorithm D.X. Liu, J.H. Zhang and B. Cao	651
Optimal Allocation Research of Distributed Generation Based on Improved Particle Swarm Optimization Algorithm P.C. Li, Z.X. Cong, J.X. Ou and Z.W. Peng	657
Analysis and Improvement of the Power Flow Transferring Identification Method Based on DC Sensitivity Factors X. Yan, H. Ping and C. Cheng	666
Analysis on Line Differential Protection Based on Transient Saturation Characteristics of TPY-Type Current Transformer W. Wei, L. He, W. Zhen and X.B. Liang	671
Application of Fault Location Method Based on Multi-Source Fault Information in Repair of Distribution Network J. Zhou, X. Zhang and C. Jia	678
Chapter 7: Power System and Automation	
Based the Active Defense Substation Domain Strategy Control Method to against Blackout Q.W. Zhang, S. Yang and Y. Dai	687
Implementation of Power Network Disturbance Identification System G. Chen, G. Li, Y.F. Teng, H. Zhang and L.J. Ding	693
A Cross-Platform Assistant System for 110kV Transformer's Differential Protection Calibration Based on Mobile Terminal G.X. Lin, X. Zhang and B.F. Qian	700
A Multi-Dimensional Method for Nodal Load Forecasting Z.Y. Pan, C.N. Liu, J. Wang and Y. Wang	708
A New Fault Location Method for Distribution Network Based on Traveling Wave Theory J. Wang, X. Liu and Z.Y. Pan	718
A New Method of Three-Phase Unbalanced Load Harmonic Current Detection H. Zheng, Y. Zhang, J. Huang and Z.Y. Wang	726
A Novel Adaptive Preconditioner Based CPF-GMRES Algorithm H. Zheng, J.Q. Zhao, K. Men, J.H. Yin and C. Hong	731
An HBase-Based Platform for Massive Power Data Storage in Power System Z.J. Yan, P. Sun and X.M. Liu	739
Application of Power Quality Disturbance Location Based on MUDW H. Zhang, Z.G. Lei, Y.C. Guo and Z.Y. Pian	745
Application of Speech Interactive Technology in the Future Grid Scheduling System X.M. Liu, Z.J. Yan and H. Zhang	749
A Method of Acquiring and Processing GIC Signal in High-Speed Rail Track Circuit Y.F. Ma and W. Zong	755
A Method of Dispatching Automation Master System Software Testing Based on Cloud Computing Technology	
Y.J. Li, Q.B. Yang, J. Hua, F.C. Di and L.X. Li Application of Modbus Protocol in the Automatic Safety Device	759
Q.H. Si, H.B. Xu, J. Xu, G.Y. Xu and Z.F. Ye Design of the Architecture of Power Grid's Device Monitoring System	765
L. Zhang, Y.G. Zhang, Y. Wu, W.J. Zhuang, J.Q. Zhao and G.P. Wang	770
Fault Location Method Based on Transient Frequency in Non-Effectively Grounded Distribution Network L.L. Zhang, L.S. Li and Y. Sun	774
Harmonic Analysis of Non-Sinusoidal Harmonic Signals in Electric Power System D. Luo, Y. Xiao and J.N. Zhou	779
Implementation of Newton Method for Power System Points of Collapse Evaluation	
G.S. Shabalin and V.A. Taschilin Modeling & Simulating of Hami-Zhengzhou UHVDC Transmission Project and Security &	785
Stability Analysis of Send-Side Power System T. Xia, X.X. Qi, L.J. Deng and Y.X. Sun	790

Optimal Placement of DG Unit in Distribution System X. Wang and G. Chen	797
Parallel Program Design and Development of Large-Scale Grid Topology Analysis Y.D. Luo, J. Li, J. Xu, C.L. Dou and Y.P. Jia	804
Reactive Power Optimization for Distribution Network with Distributed Generators Based on Semi-Definite Programming L. Dong, A.Z. Tian, T.J. Pu, Z. Fan and T. Yu	809
Research on Grid Structural Vulnerability Based on Improved Electrical Betweenness H. Qu, X. Xian, S.Q. Ding, S.S. Wen, T. Lin and F. Tao	815
Research on Optimal Allocation of Microgrid System Based on Two Layers of Coordinated Dispatch X.C. Zhu and H.B. Wu	010
Short-Circuit Current Calculation of a Power System with a Grid-Connected Inverter W. Cao, C.N. Do, J.L. Cao and J. Sun	819 823
Study and Application of Integrated Online Check of the Counties Y.T. Qiu, J.Z. Zheng, Y. Wang, T.J. Hu, Y. Dong and X.D. Li	829
The Theoretical Line Loss Calculation Software of Graphical Distribution Network Based on the Secondary Development of Visio	025
X.H. Liu, H.O. Yan, H. He, L. Ma, Y. Cheng, J.H. Li, Y.S. Shi, Y.J. Wang and N. Li Power Flow Method for Distribution Systems Based on the Current Network Equation	835
X.X. Ye, X. Xie and F.Z. Wang	839
Fast Algorithms of Line Outage Distribution Factors with Cascading Failures X.L. Fan and J.Q. Zhao	843
Fast Search of Dangerous Lines in Power Flow Transferring in Power System Y. Xu and J. Zhi	849
Faulted Section Identification Method Based on the Transient Current Distribution for the NUGS	
B.R. Pan, K.S. Yu, G.Q. Xie, Z.D. Xu, J. Zou, R.X. Fan and J.B. Xin	855
Fluctuation Magnitude Calculation and Oscillation Probability Analysis of Tie-Line Active Power in Interconnected Power System H.S. Zhao, W.B. Chen, J. Wang, D.J. Yang, J.Y. Xu, Y. Liu and Z.Q. Liu	861
Implementation Mode of Distribution Automation at Switching Station H.D. Li, H.Q. Zou and W. Li	869
Research on the WAMS Real-Time Data Processing Based on the Message Bus J.M. Hou, C.K. Zhang, X.P. Shi and Y.C. Huang	874
Speed Control System Model Parameter Error Evaluation Based on PMU Data W.C. Zhang, X.P. Gu, H.P. Liang, Y.Q. Hao and S. Wang	880
Study on the Control of Distributed Generation System J.X. Zhao and M.X. Shangguan	888
Study on the Optimum Location of PSS in Power Systems F.X. Wu, J.R. Gong, J. Xie and Y.J. Wu	892
Comparative Analysis of the Calculation Results of Online Short-Circuit Current Based on PSASP and Fault Wave Recording	
G.M. Lu, W. Zhang, J.F. Yan, Y.J. Yu, Z.H. Yu, Y.H. Qin, Y. Lv, W. Li, S.M. Sun, C. Xie and H.Y. Dai	897
Study on Blackout Model for Power Grid Growth Process Q. Yu, Y. Ma, M. Zhang and L. Shi	902
Effect of Wind Power Integration on the Self-Excitation Risks in Weak Interconnection Power Grid Y.L. Mei, Y.F. Teng, R.X. Lin, B. Zhou, L.J. Ding and H. Zhang	909
Determination of Voltage Stability Margin by PQ Curve for Wind Power Integrated System	207
X.Y. Zhang and P. Zhang	915
Mechanism Research about Impact of Transmission Channel Power Constraint on Grid Loss with Large-Scale Wind Power Integration P. Xia, W.Y. Liu, F.C. Liu and X.W. Fu	919
Penetration Capacity Analysis of Distributed Generation Considering Overcurrent Relay	
Protection and Flux-Coupling Type FCL P. Sun, M.W. Luo, Z.X. Sun, T.C. Liu, C.H. Deng, L. Chen, H. Pan and F. Zheng	923

Sensitivity Model to Power Flow Control Capability Using Controllable Series Compensators	
M.J. Chen, B. Wu, S.H. Li and Y.Q. Chen	929
The Application of Electronic Communication Relay Protection in Distribution Network with Distributed Generation S. Zheng, Z.H. Xu, J.J. Liu and Q. Fu	938
Probabilistic Load Flow Based on Cumulant Method Considering Multi-Slack Balance F. Shi, Y.J. Yu, S.H. Feng, J. Zhou, P. Xu and L.W. Wang	943
Method of Cluster Zoning for Voltage Regulation in Nodes of Power System E. Bunkova	952
Risk Assessment of Substation Main Connection Based on LCC Management Y. Xu, C. Cheng and H. Ping	956
An Universal Realization of Power Dispatching Operation Expert System S.F. Chen, H.M. Ma and M. Tao	961
Comprehensive Evaluation of Grid-Connected Distributed Generation Operation Y. Wei, Y.C. Chen, Z.Q. Yuan and B. Liu	965
Research and Development of Disturbance Source Positioning System Based on WAMS Data V. D. Shir, W. G. Zhang, Z. Chang, D. Chang, D. Li, J. H. Wigned D. L. Shang, D.	072
X.P. Shi, W.C. Zhang, Z. Chen, B. Chen, B. Li, J.H. Xi and D.J. Shao	972
A Study on Bilateral Trade Model for Shanghai Grid under the Constraints of Mandatory Environmental Indicators D.N. Liu, Y. Zhao, Y.H. Ying and L. Li	979
System Transient Stability with Distributed Generation	
D. Chechushkov	983
Chapter 8: High Voltage Equipment and Insulation Technology	
Study on Overvoltage and Insulation Coordination of DC Filter for UHVDC Project G. Huang, H.Y. Zhang and Y.M. Yang	989
The Study of Denoising Algorithm for Partial Discharge Signal Based on the Wavelet L. Li, G.Q. Jiang, T.Y. Niu, Y. Wang, Y. Lu, Q. Lan, L. Chang, Y.L. Liu and C. Chen	994
The Study on TiO ₂ Nano-Powder's Influence on the Power Frequency Breakdown Properties of Transformer Oil Q. Lan, T.Y. Niu, G.Q. Jiang, L. Li and Z.J. Wang	1001
A Load Test Research on Large Power Transformers	
H.B. Zheng, J.H. Han, W. Wang, L.N. Wang, Y.Q. Li and X.G. Li Design of 110kV/2kA High Temperature Superconducting Cable Termination Stress Cones	1007
M. Song, Z.S. Wang, L. Ren, Y. Zhang, S.F. Shen, N.N. Hu, K.N. Cao, X.Z. Deng and J.D. Li Insulation Optimization of ±1000kV DC Wall Bushing	1011
H.W. Li, Z.Y. Pan, J. Wang and P.T. Dong	1016
Power Transformers Health Index Calculation Method Based on Cloud Model and Fuzzy Evidential Reasoning	
D.H. Cai, X. Yang, R.C. Wang, C.Z. Ma, J. Cheng and X.L. Zhang Shunt Reactors Compensation Research of UHV Accessed to Jiangxi Power Grid	1021
Y.G. Zhang, K.X. Chang and Y.C. Su	1029
Study on Protection Configuration of Power Supply in 220kV Electric Railway Traction Substation X. Li, J.L. Yu, X.J. Guo and Y.B. Mao	1035
Testing and Diagnosis of Extra High Voltage Power Cables Using Damped AC Voltages	1033
Combined with Distributed Partial Discharge Measurement B. Yan, L. Zhou, J. Chen, F.B. Tao and J. Zhang	1039
Simulation Research of the Impact on Sensitivity by Structural Parameters of Disc-Type Inner UHF Sensors Used for GIS PD Detection Y.Y. Jia, J.G. Yang, L. Rong and K. Zhao	1044
Analysis on Lightning Withstand Level of Back Striking Flashover for Double-Circuit	1077
Transmission Line S.J. Xie, J.M. Li, Y.H. Jiang and Y. Zhang	1050

Study on Technical Parameters for 220/20kV SF ₆ Gas Insulated Transformers Z.Y. Wang, Z.Y. Dai and H.X. Tu	1056
Study on Typical Diversion Structures and Fault of 220kV Cable-Conductor Bushings P. Wu, N. Xue, C. Yu, Y.C. Lu, J.S. Li and Y.M. Wu	1066
Research on Field Management of Relay Protection Device Based on RFID Technology Z.G. Xiao, J. Tong, Y. Wang and X. Gao	1071
Study on Movable Equipment for Realizing Seamless On-Shore Seamless Power Supply for Berthing Vessels L.M. Xiao, Y.Q. Song and J. Li	1077
Electromagnetic Parameters Extraction of Electronic Current Transformer Based on Finite Element Modeling X.B. Liang, F. Tang, J. Wu and W. Zhen	1085
Research on Error Characteristic of the Protective Current Transformer in High	1003
Remanence Environment W. Wei, W. Zhen, M.Z. Liu, X.B. Liang and C.Y. Chen	1092
Analysis of the Influence of Magnetic Field on Voltage Error of Three-Phase Three-Element Combined Transformer G. Liu, B. Jiang, L.D. Ren, G.C. Lei, F.Z. Zhang and W. Jiang	1105
Direct Power Control of Doubly Fed Induction Generator Based on the Estimated Stator	
Flux J. Wang and X.D. Wang	1111
Predictive Direct Capacitor Power Control Based on Fractional-Order PID Controller of Three-Phase Voltage Source PWM Rectifiers X.Y. Zhang and X.J. Ma	1115
Research of Test Data of Critical Process Parameters Regarding Tension Stringing Construction of 1250mm ² Large-Section Conductor	1113
C.H. Hu, Y.J. Xia and C. Wen	1119
Research on Project Test Tensioning of 1250mm ² Large-Section Conductor C.H. Hu, Y.J. Xia and W.M. Mei	1123
Residual Life Assessment of Power Transformer Based on Random Fuzzy Theory S.Y. Wang	1127
The Research of Mobile LVRT Testing Device in High Altitude Area B. Yu, L.T. Ji, D.S. Wang, G.H. Hua, A.L. Kong, X.L. Zhang and S.L. Zhao	1133
	1133 1138
B. Yu, L.T. Ji, D.S. Wang, G.H. Hua, A.L. Kong, X.L. Zhang and S.L. Zhao Characteristics Simulation of Ultra-High Frequency Electromagnetic Wave Excited by Equivalent Partical Discharge Mathematical Model in GIS G.K. Xu, W.W. Zhang, Z.H. Zhu, N. Wang and F.Q. Zhao Comparison of Application of SVC and STATCOM on Suppressing Subsynchronous	
B. Yu, L.T. Ji, D.S. Wang, G.H. Hua, A.L. Kong, X.L. Zhang and S.L. Zhao Characteristics Simulation of Ultra-High Frequency Electromagnetic Wave Excited by Equivalent Partical Discharge Mathematical Model in GIS G.K. Xu, W.W. Zhang, Z.H. Zhu, N. Wang and F.Q. Zhao Comparison of Application of SVC and STATCOM on Suppressing Subsynchronous Oscillation Q.L. Chen and C.L. Guo	
B. Yu, L.T. Ji, D.S. Wang, G.H. Hua, A.L. Kong, X.L. Zhang and S.L. Zhao Characteristics Simulation of Ultra-High Frequency Electromagnetic Wave Excited by Equivalent Partical Discharge Mathematical Model in GIS G.K. Xu, W.W. Zhang, Z.H. Zhu, N. Wang and F.Q. Zhao Comparison of Application of SVC and STATCOM on Suppressing Subsynchronous Oscillation Q.L. Chen and C.L. Guo Problem Analysis and Solutions in Transformer Field Verification J.L. Wang, J.H. Xu, H. Jing and W. Yuan	1138
B. Yu, L.T. Ji, D.S. Wang, G.H. Hua, A.L. Kong, X.L. Zhang and S.L. Zhao Characteristics Simulation of Ultra-High Frequency Electromagnetic Wave Excited by Equivalent Partical Discharge Mathematical Model in GIS G.K. Xu, W.W. Zhang, Z.H. Zhu, N. Wang and F.Q. Zhao Comparison of Application of SVC and STATCOM on Suppressing Subsynchronous Oscillation Q.L. Chen and C.L. Guo Problem Analysis and Solutions in Transformer Field Verification J.L. Wang, J.H. Xu, H. Jing and W. Yuan Characteristic Analysis of Ship Transformer Magnetizing Inrush Current and its Suppression Method	1138 1144 1150
B. Yu, L.T. Ji, D.S. Wang, G.H. Hua, A.L. Kong, X.L. Zhang and S.L. Zhao Characteristics Simulation of Ultra-High Frequency Electromagnetic Wave Excited by Equivalent Partical Discharge Mathematical Model in GIS G.K. Xu, W.W. Zhang, Z.H. Zhu, N. Wang and F.Q. Zhao Comparison of Application of SVC and STATCOM on Suppressing Subsynchronous Oscillation Q.L. Chen and C.L. Guo Problem Analysis and Solutions in Transformer Field Verification J.L. Wang, J.H. Xu, H. Jing and W. Yuan Characteristic Analysis of Ship Transformer Magnetizing Inrush Current and its Suppression Method D. Xiang and F. Yu Calculation of Electric Field under Overhead Lines with a Human Body Existing	1138 1144 1150 1154
B. Yu, L.T. Ji, D.S. Wang, G.H. Hua, A.L. Kong, X.L. Zhang and S.L. Zhao Characteristics Simulation of Ultra-High Frequency Electromagnetic Wave Excited by Equivalent Partical Discharge Mathematical Model in GIS G.K. Xu, W.W. Zhang, Z.H. Zhu, N. Wang and F.Q. Zhao Comparison of Application of SVC and STATCOM on Suppressing Subsynchronous Oscillation Q.L. Chen and C.L. Guo Problem Analysis and Solutions in Transformer Field Verification J.L. Wang, J.H. Xu, H. Jing and W. Yuan Characteristic Analysis of Ship Transformer Magnetizing Inrush Current and its Suppression Method D. Xiang and F. Yu	1138 1144 1150
B. Yu, L.T. Ji, D.S. Wang, G.H. Hua, A.L. Kong, X.L. Zhang and S.L. Zhao Characteristics Simulation of Ultra-High Frequency Electromagnetic Wave Excited by Equivalent Partical Discharge Mathematical Model in GIS G.K. Xu, W.W. Zhang, Z.H. Zhu, N. Wang and F.Q. Zhao Comparison of Application of SVC and STATCOM on Suppressing Subsynchronous Oscillation Q.L. Chen and C.L. Guo Problem Analysis and Solutions in Transformer Field Verification J.L. Wang, J.H. Xu, H. Jing and W. Yuan Characteristic Analysis of Ship Transformer Magnetizing Inrush Current and its Suppression Method D. Xiang and F. Yu Calculation of Electric Field under Overhead Lines with a Human Body Existing Z.G. Liang, C. Li and Y.Z. Jiang A New Method for Partial Discharge Signal Processing	1138 1144 1150 1154 1159
B. Yu, L.T. Ji, D.S. Wang, G.H. Hua, A.L. Kong, X.L. Zhang and S.L. Zhao Characteristics Simulation of Ultra-High Frequency Electromagnetic Wave Excited by Equivalent Partical Discharge Mathematical Model in GIS G.K. Xu, W.W. Zhang, Z.H. Zhu, N. Wang and F.Q. Zhao Comparison of Application of SVC and STATCOM on Suppressing Subsynchronous Oscillation Q.L. Chen and C.L. Guo Problem Analysis and Solutions in Transformer Field Verification J.L. Wang, J.H. Xu, H. Jing and W. Yuan Characteristic Analysis of Ship Transformer Magnetizing Inrush Current and its Suppression Method D. Xiang and F. Yu Calculation of Electric Field under Overhead Lines with a Human Body Existing Z.G. Liang, C. Li and Y.Z. Jiang A New Method for Partial Discharge Signal Processing H.Q. Li and K.H. Wang Influence of Corona Discharge on SAW Temperature Measurement System	1138 1144 1150 1154 1159 1163
B. Yu, L.T. Ji, D.S. Wang, G.H. Hua, A.L. Kong, X.L. Zhang and S.L. Zhao Characteristics Simulation of Ultra-High Frequency Electromagnetic Wave Excited by Equivalent Partical Discharge Mathematical Model in GIS G.K. Xu, W.W. Zhang, Z.H. Zhu, N. Wang and F.Q. Zhao Comparison of Application of SVC and STATCOM on Suppressing Subsynchronous Oscillation Q.L. Chen and C.L. Guo Problem Analysis and Solutions in Transformer Field Verification J.L. Wang, J.H. Xu, H. Jing and W. Yuan Characteristic Analysis of Ship Transformer Magnetizing Inrush Current and its Suppression Method D. Xiang and F. Yu Calculation of Electric Field under Overhead Lines with a Human Body Existing Z.G. Liang, C. Li and Y.Z. Jiang A. New Method for Partial Discharge Signal Processing H.Q. Li and K.H. Wang Influence of Corona Discharge on SAW Temperature Measurement System L. Zou, X.Q. Zhang, X.H. Zhao, C. Tian and H. Duan Software Design and Implementation of Measuring System of Transmission Lines Based on Wireless Communication Y. Cheng, S.M. Sun, Y. Meng, R.Q. Wang and P.T. Dong Calculation and Optimization of Cable Connector Electric Field Intensity in High Speed	1138 1144 1150 1154 1159 1163 1167
B. Yu, L.T. Ji, D.S. Wang, G.H. Hua, A.L. Kong, X.L. Zhang and S.L. Zhao Characteristics Simulation of Ultra-High Frequency Electromagnetic Wave Excited by Equivalent Partical Discharge Mathematical Model in GIS G.K. Xu, W.W. Zhang, Z.H. Zhu, N. Wang and F.Q. Zhao Comparison of Application of SVC and STATCOM on Suppressing Subsynchronous Oscillation Q.L. Chen and C.L. Guo Problem Analysis and Solutions in Transformer Field Verification J.L. Wang, J.H. Xu, H. Jing and W. Yuan Characteristic Analysis of Ship Transformer Magnetizing Inrush Current and its Suppression Method D. Xiang and F. Yu Calculation of Electric Field under Overhead Lines with a Human Body Existing Z.G. Liang, C. Li and Y.Z. Jiang A New Method for Partial Discharge Signal Processing H.Q. Li and K.H. Wang Influence of Corona Discharge on SAW Temperature Measurement System L. Zou, X.Q. Zhang, X.H. Zhao, C. Tian and H. Duan Software Design and Implementation of Measuring System of Transmission Lines Based on Wireless Communication Y. Cheng, S.M. Sun, Y. Meng, R.Q. Wang and P.T. Dong	1138 1144 1150 1154 1159 1163 1167

Chapter 9: Electrical Machines and Apparatus, Power Drives

Diagnosis of Bearing Faults of Induction Motors by Spectral Analysis of Stator Currents N.R. Safin, V.A. Prakht, V.A. Dmitrievskii and A.A. Dmitrievskii	1187
Static Characteristics Analysis for Induction Motors Y.J. Wu	1191
Extension Comprehensive Assessment of the Operating State of Turbo-Generator M.D. Wang and Z.H. Xu	1196
An Adaptive Speed Control Approach for Sensorless Brushless DC Motors F.C. Cao and J.X. Shi	1202
The Complex Equivalent Circuit of the Multiple Three-Phase Synchronous Motor P. Lin, B.J. Ge, Y.L. Lü and P. Xin	1206
Application of Fuzzy-PI Controller in the Asynchronous Motor G.Z. Li	1210
Research on Identification Model of Stator Core Temperature Rise of a Generator D. Xiang, H. Xiong, N.B. Liu, Q. Wu and G.W. Meng	1216
Study on Optimal Dynamic Braking Resistor of Induction Motor C.K. Zhu and S.H. Dan	1222
A Complete Decoupling PI Control of UPQC in α-β Coordinate System Z.Q. Luo, W.W. Han, J.R. Wan and S.L. Huang	1228
Sliding Mode Variable Structure Direct Instantaneous Power Control of Grid-Connected Converter with an LCL Filter	
Z.Q. Luo, Y.Q. Wang, J.R. Wan and S.L. Huang	1234
Simulation Analysis of Snubber Circuit for SiC MOSFET Inverter L.J. Xie, X.Z. Liu, J.Y. Li and K.S. Yu	1241
Analysis of PCC Point Harmonics Caused by Nonlinearities of Grid-Tied PV Inverters Y. Zhao, Z.L. Yang, D.F. Cao, Y.B. Wang and H.H. Xu	1246
Harmonic Characteristic Analysis of Five-Phase Space Vector PWM F. Yu and D. Xiang	1253
Research on Constant Frequency Electrical Angle Start Method of LCI L.T. Ji, D.S. Wang, B. Yu, S.L. Zhao, A.L. Kong, X.L. Zhang and G.G. Han	1258
The Development of Multi-Functional Multi-Level Variable Voltage Variable Frequency Power Supply	
D.S. Wang, G.G. Han, X.L. Zhang and B. Yang	1263
Optimization of PI Control Parameters for Shunt Active Power Filter Based on PSO D.C. He, L.Z. Wu, T.Z. Wu and X.W. Jiang	1268
Two-Level Grid-Connected Discharge Inverter System of Power Battery Based on LLC Y. Yu, Q. Yin, M.X. Xie and X.D. Ren	1278
Simulation on Multi-Level Current Source SVG S.Y. Zhang, B.F. Yang, H. Zhang and J.K. Wu	1282
Design of Current Lead for 50MVA HTS Transformer M. Song, Y. Zhang, Z.S. Wang, N.N. Hu, K.N. Cao, L. Ren and S.F. Shen	1287
Design and Magnetic Field Simulation of Giant Magnetostrictive Bone Conduction Pronunciation Vibrator	
Z.L. Zhao, Z.B. He, D.W. Li, G.M. Xue and Z.S. Yang	1291
Chapter 10: Smart Grid and Microgrid Technologies	
Micro-Grid Economic Operation Contains Electric Boiler F. Liu and X. Yang	1297
Research and Application on Visualization of Discrete Spatial Grid Resource Data J.Y. Li, Y.J. Zhong and H. Zhou	1302
Micro-Grid Multi-Objective Optimizing Operation F. Liu and X. Yang	1307

Research on Dual-Mode Control Strategy of Energy Storage System in Microgrid G.J. Li, B.Y. Sang and Y. Zhang	1312
Research on Smart Grid Effects on the Intelligent Response Behaviors of Industrial Users J. Li	1318
Smart Grid Control Technology of Multi Diesel Generator Set W. You, L.H. Wu, Y.N. Yuan and G.N. Xi	1322
Summary of Micro-Grid Control Technology J.J. Jiang and R. Ju	1326
The Online Power Marketing Development Research under the Background of Smart Grid $J.\ \mathrm{Li}$	1335
Comprehensive Evaluation Index System and Method of Smart Distribution Grid H. Chen, C.M. Yang, J.X. Yang, Z. Lu, Z.Y. Lu, H. Liu, S.J. Wang and J. Chen	1339
Model Research on the Whole Industry Chain Value Analysis of Strong and Smart Grid Y. Zou, X.H. Xu, Y. Wang, B. He and H. Huang	1346
The Analysis of Micro-Grid Investment Income for Different Operating Modes W. Yang, J.H. Zhou, X.Y. Zhang, Z.H. Lv and M.Y. Wang	1355
Concept of URT Traction DC Microgrid and its Application Feasibility Study X.J. Shen, C.B. Yu and S.M. Zhao	1361
System Modeling and Simulation of Intentionally Islanded Reconfigurable Microgrid M.S. Khalid, X.N. Lin, J.W. Sun, Y.X. Zhuo, N. Tong, F.T. Zeng and A. Waqar	1366
The Research on Commercial Modes of Smart Grid Value-Added Services Based on BSC Theory	
L. Liu, B. Hu, H. Huang and Z.N. Kan The Research on Relay Protection Settings On-Line Verification System Application in	1371
Smart Grid H.L. Tian, J.F. Liu, Y.K. Liu, Y. Fang, W.H. Chen and L. Gao	1378
Multi-Objective Dispatch of a Microgrid with Battery Energy Storage System Based on Model Predictive Control V. Zhang, T. Zhang, B. Canada V. C. Cai	1204
Y. Zhang, T. Zhang, B. Guo and Y.C. Cai	1384
The Development about Multifunction Merging Unit Used in Smart Substation C. Fan, Y.M. Ni and G.Q. Zhao	1391
The Improvement about the Reliability of Sampling Based on Process Bus in Smart Substation C. Fan, Y.M. Ni, R.H. Dou, X. Xu, Z.Q. Yao and G.Q. Zhao	1398
Study on the Main Electrical Connection Optimization of Smart Substation Based on Coordination between Power Grid and Substation	1270
Y.Q. Huang, N. Liu, J.H. Zhang and X.H. Qin	1405
Research on Clock Synchronization Scheme of Intelligent Substation Based on EPON Technology	1.100
P. Ma, M. Zhu, J.L. Gao, Y. Li and B. Feng The Research of Electronic Transformer Data Synchronization Method Based on Newton	1409
Interpolation T.Y. Liu, L. Gao and Y.D. Zhang	1413
The Research and Application on Design Method for "Virtual Terminal" of Smart Substation	
H. Ren, Q.W. Du, R.H. Dou and Z.Q. Yao	1418
Chapter 10: Smart Grid and Microgrid Technologies	
Application and Architecture of Power Dispatching & Distribution System Using Big Data Technology	
R.C. Yuan, H. Yan, X.M. Zhou, F.C. Di and L.X. Li	1425
The Research of the Distributed Grid Model Maintenance Technologies Based on Logical Unify	
H. Zhang, W.J. Zhuang and S.H. Feng	1430

Chapter 11: Power Systems Management

A New Method of Power System Load Forecasting Based on Intelligent Optimization Algorithm	
Z.X. Cong, P.C. Li, J.X. Ou and Z.W. Peng	1439
A Study on Factors and Causal Loop of Chinese Residential Electricity Price Policy Z. Chen, B. Luo and C.Y. Huang	1446
A Study on Key Factors and their Conduction Path of Chinese Rural Residential Electricity Price	4.450
B. Luo, Y.F. Zhang and Z. Chen	1450
A System Dynamic Simulation Model for Chinese Residential Electricity Price B. Luo, C.Y. Huang and Z. Chen	1456
Construction and Application of Coordination Scheduling System of Distributed Energy P. Wang, H. Liu and Y.L. Liu	1462
Power Purchase Optimization Model Based on the External Cost of Power Generation D.N. Liu, Q.Q. Chen, C.C. Luo, X.Q. Li and Q. Wang	1468
The Influence of Wind-Solar Hybrid Generation System on Transmission Service Rate H.J. Kan and L.N. Tan	1472
The Mechanism Design to Direct Power-Purchase Transaction Considering Market Supply and Demand	
W.M. Zeng, D.N. Liu, J.P. Liu, T.Q. Tang, X.G. Yang and M. Fan	1477
Application of Low Low Temperature ESP Technology in Thermal Power Plant Y.Y. Fu and K. Ma	1481
Fuzzy Comprehensive Evaluation of Trading Regulatory Risk for a Unified and Interconnected Electricity Market in China Y. Fang, Z.Q. Zhao, C.C. Gao, Y. Dai and S.H. Shi	1486
Implementation Effect Evaluation of Tiered Electricity Pricing for Residents Based on Fuzzy Analytic Hierarchy Process J. Hu, T.R. Li, C.H. Zhao, L. Sun, H.Y. Li, X. Chen and Z.Q. Chen	1491
Load Clustering Based on SVC Algorithm X.Y. An, J.C. Liu, Y.L. Sun, G. Li and J.Y. Liu	1500
Potential Analysis of Demand Response Based on Peak and Valley Time Price L.J. Liu, J.C. Liu, H.S. Deng, G. Li, Y.L. Sun and J.Y. Liu	1506
Research and Application of Static Security Check for Monthly Maintenance Schedule C.C. Zhang, C.H. Yan, S. Dai, D. Xu, Y. Zhu and W. Dong	1511
Research on Surveillance Risk Index System of Unified and Interconnected Electricity Market in China	
C.C. Gao and S.H. Shi	1516
The Business Optimization Analysis of the Virtual Power Plant Based on the Large-Scale BESS System	
T. Yan, Z.Z. Qu, D. Hui, Y.J. Liu, P.F. Jia and X.K. Lai	1524
Characteristic Analysis of the Electricity Price Fluctuation: An Empirical Analysis Based on California's Day-Ahead Market P.J. Xie, C.C. Huang and X.Y. Pan	1534
Investigation the Possibility of Using SVD to Select the Direction Input the Operation Point	1331
into the Feasible Region S. Yuferev, K. Gerasimov and K. Gerasimov	1541
Research of Loss Reduction Efficiency Based on DEA X.Q. He, Q.J. Xian and P. Yan	1545
Analysis of Influence Factors of Power Consumption Fluctuations in the Process of China	
Urbanization P.J. Xie, C.C. Huang and W.H. Zhu	1549
Research of Demand Response Strategy Simulation and Evaluation Based on Gridlab-d X.J. Ge, L.Q. Zhao, N.S. Chen and D. Li	1555

Chapter 12: Electrotechnics, Low Voltage Electronics and Power Supply

Calculation of Electric Field under Overhead Lines with Complex Ground by Two Dimension Surface Charge Method Y.Z. Jiang, Z.G. Liang and D.W. Jiang	1563
The Study of High Pressure Pulse Circuit in Ultrasonic Nondestructive Testing H.Y. Wang and P. He	1567
Weighing System Design Based on Single Chip Microcomputer Q. Zhuang	1572
Hardware Modification for Watt-Hour-Meter Field Calibrator to Reject Interference of Temperature	
S.H. Yang, S.F. Lu, M.M. Chen and M.R. Xu	1576
Implementation and Design of Voltage-Mode PWM Control CMOS Boost Power Converter with Protection Circuits M.C. Lee, M.C. Hsieh and Y.R. Lee	1580
Small-Signal Equivalent Circuit Modeling and Controller Design of DC/DC Converter Based on Matlab	
X.L. Xiao, X.J. Lu, J.W. Yi and X.H. Ding	1586
Chapter 13: New Energy Vehicles and Electric Vehicles	
Optimization Control of Engine Working Points Adjustment for HEV Bus Z.G. Kong, C. Yu and Z.N. Tang	1595
Risk Evaluation of Charging Facilities of Electric Vehicles Based on Fuzzy Analytic Network Process	1600
J. Dong, G.Y. Xue and B.J. Wang The Structure Design of a Small Electric Vehicle with Dual Functions of Climbing-Stairs	1000
and Driving over Roads X.J. Gan	1609
Using LLC Resonant Converter for Designing Electric Vehicle DC/DC Converter T.L. Wu, K.H. Wang and J.J. Yang	1614
Design of Magnetic Integrated Transformer for LLC Resonant Converter T.L. Wu, K.H. Wang and J.J. Yang	1621
Establishment and Research of Semi-Physical and Real-Time Simulation Platform for V2G Electric Vehicle Charging System T. Yan, Z.Z. Qu, P.F. Jia, D. Hui and Y.J. Liu	1625
Research on Coordinated Charging Strategy for Electric Bus Battery Swapping Stations S. Su, X.C. Jiang, J.C. Jiang, W. Wang, M. Huang and V.G. Agelidis	1632
Study on Charging Business Operation Model of Electric Vehicle L. Huang, Y.B. Yang, B.R. Pan, H. Gao, D. Wang and X.Y. Jiang	1637
Economic Comparison of the Energy Saving and New Energy Vehicle – Taking China, US and Belgium as Examples W. L. W. L. L. Zhu and E. K. Wan	1640
W.J. Wu, L.J. Zhu and E.K. Wen Analysis of Transformer Overload Problem with EV Charging Load Z.F. Li and C.L. Guo	1642 1648
Distribution of Electric Field for EMU's Post Insulators Based on the Finite Element	1010
Method Q.B. Mu, Z.H. Zhang, B.C. Jia and J.Q. Ma	1652
Study on Multi-Objective Optimal Planning of Electric Vehicle Charging Stations with Alternative Sites G. Chen, Z.R. Song, P. Dai, Y. Liu and Y. Ma	1656
The Impact of Fast Charging for EVs on Distribution System W. Chen and C.L. Guo	1664
Design on Electric Power Wheel Control System	
J. Ma	1668

Braking Energy Recovery Research for Electric Vehicles W.B. Zhu and F.Z. Ji	1672
Chapter 14: Engineering Thermodynamics and Thermal Engineering in Designing of Energy Equipment	
Applicability Research on Evaporative Cooling Technology in Hunan Province Q. Ouyang, G.X. Kou and M. Ouyang	1679
Effects of Fuel Flow inside the Nozzle on Spray Characteristics of Butanol/Diesel Blends J. Wu, Y. Hua, W.W. Shang, Y.B. Liu and B. Xu	1684
Heat Exchanger Working Condition under Low Temperature and Simulation Z.Y. Wang and L. Wang	1690
Model for Leakage Fault Diagnosis of Pipe Network of Hot-Water District Heating M. Guo and S.J. Zhou	1696
Study on Low-Carbon Catalytic Combustion Furnace of Natural Gas and the Application in Pottery Industry X.Y. Wang, L.Q. Zhu and S.H. Zhang	1700
Thermal Analysis and Design Applications of the Spiral Groove Tubes in Condensers X.L. Wang and D.Y. Huang	1705
Application of Expert System PID Algorithm to Heat Exchange Station S. Meng, Y.Q. Liu, X.J. Han, Z.Y. Ge and S.L. Wang	1709
Characteristic of Low Calorific Fuel Gas Combustion in a Pressurized Porous Burner G.Q. Wang, D. Luo, N. Ding and J.R. Xu	1713
Characteristics of Heat and Mass Transfer in Condesation Process of Gas-Liquid Cross Flow F.Z. Zhang, X. Ma, H. Yang, X.Y. Liu and H.M. Du	1718
Discussions on the Methods of Preventing Heat Transfer Fluids from Oxidation in Open Heating System Based on Liquid-Phase Organic Heat Transfer Fluids Heater G.X. Kou, R.R. Lu, J.H. Yang, L.L. Cai and P.N. Shang	1713
Influence of Integrating Induced Fan and Pressurization Fan on Energy-Saving of 300 MW Coal-Fired Power Units W.G. Zheng and B. Liu	1727
Numerical Investigation on Leading Edge of Film Cooling Blade with Different Turbulence and Blowing Ratios S.H. Li, G. Wu and L. Zhang	1731
Test Research on Natural Gas Engine's Thermal Balance	
Y. Li, C.W. Qin, W.Z. Zhang, C. Wang, S.N. Kang, Q.S. Tan and F.L. Zhou Energy Efficiency Measurement in Coal-Fired Power Plant Using DEA and PCA X.L. Wang, C.Y. Qu and H.Y. Liu	1735 1739
Experimental Investigation of Temperature Difference Ratio of Trailing Edge Film Cooling Downstream of Pressure Side Split with Internal Spacer Arrays C.M. Ling, C.H. Min, M.F. Chen, J. Li and D.M. Zhao	1743
Impacts of Ignition and Jet Timing on Natural Gas Engine Start Process B.W. Zou, J.B. Li and J.G. Liu	1748
Numerical Simulation of Turbulence-Chemical Interaction Models on Combustible Particle MILD Combustion B.X. Shen and W.Q. Liu	1752
Optimization of Centrifugal Fan Load Regulating in a Commercial CFB Boiler J.J. Li, Z.N. Zhao, Z.G. Li and Q.F. Zhang	1758
Performance and Operation Analysis of a Quadra Sectors Rotary Airheater Adopted by CFB Boiler	
Z.G. Li, Z.N. Zhao and Z.Q. Wen Research and Develop on Series of Cryogenic Methanol Coil-Wound Heat Exchanger	1764
Z.W. Zhang, Y.H. Wang and J.X. Xue Research and Develop on Series of LNG Coil-Wound Heat Exchanger	1769
Z.W. Zhang, Y.H. Wang and J.X. Xue	1774
Thermoeconomic Optimization for a Ferroelectric Ericsson Refrigerator L.S. Wu, J.M. Wu and H.S. Yang	1780

Fuel Consumption Modeling for Medium Speed Marine Diesel Engine L. Guo, Z.Z. Wang and H.Z. Lin	1785
Effects of Different Working Fluid by Using of Waste Heat Obtained from Coal-Fired Units	1703
in Organic Rankine Cycles W.T. Jiang, X. Zhao, W.G. Pan, X.Y. Zhang, J.W. Xiong, H.J. Gu and Z.H. Ren	1790
Heat Balance of Extinguishing Process of Flammable Liquid by Sprayed Water D.A. Korolchenko and A.F. Sharovarnikov	1794
Key Problem Analysis and Solution on Intake Water and Heat Transfer of Sewage-Source Heat Pump System	
H.Y. Bi, Y.M. Shang and X.H. Gu	1799
Laminar Heat Transfer Performances in a Tube with Center-Cleared Twisted Tape of Alternate Axes L.X. Chen	1803
Organic Rankine Cycle Simulation Based on Aspen Plus H. Lv, W.T. Jiang and Q.Z. Zhu	1808
Fluid-Structure Interaction of Ship Painting Workshop under Radiation Heat Transfer Condition	
S.W. Shang, B.H. Liu and G.W. Guo	1812
Research and Develop on Series of Cryogenic Liquid Nitrogen Coil-Wound Heat Exchanger Z.W. Zhang, Y.H. Wang and J.X. Xue	1817
Chapter 15: Details and Units of Power Machines	
A Quasi-Dimensional Model of Diesel Engine Working Process in Hardware-in-the-Loop	
Simulation System K.P. Qi, J.S. Hu and W.Q. Long	1825
Analysis and Research on the Influence Factors of the Spark Plug Ion Current in Spark Ignition Engine	
C.Q. Song, J. Li and D.W. Qu	1831
Efficiency and Emissions of Spark Ignition Engine Using Hydrogen and Gasoline Mixtures W.B. Shi and X.M. Yu	1835
Study on the Effects of Coal Base Fuels on Diesel Engine Performance X.D. Wang, C.H. Xiong, C.B. Lu, F. Wang, G. Wang and F.C. Liu	1840
Study on the Shutdown State of CNG Engine S.C. Yang, Y.F. Gao, M. Li, Y. Gu and W. Liu	1844
Study on the Stress Distribution of the Piston Rod Fillet Based on the Nonlinear Finite Element Method X.Y. Wang	1848
Discussion and Realization on Quality Control Methods of Power Steam Turbine-Generator	1040
Unit Installation D.Y. Jia	1852
Multi-Field Coupling Modeling and Analysis for Cylinder Liner of Slow Speed Two Stroke	1032
Marine Diesel Engine H. Xing, L. Guo and J. Wu	1856
Wind Turbine Planetary Gearbox Fault Analysis Based on Bispectrum Y.X. Feng, W.P. Zhang, T. Yang, X.W. Deng and S. Liu	1861
Lift Limit of Horizontal Axis Wind Turbine H.B. Jiang, Y.P. Zhao and Z.Q. Cheng	1869
Research on a Welding Power Supply Based on Double PWM Power Feedforward W. Liu, J.F. Zhang, S.W. Sun and Q.C. Ji	1874
Study on Performance Promotion of Lift Type Wind Turbine Z.Z. Zhao, T.G. Wang, J.R. Chen and B.F. Xu	1879
Numerical Simulation of the Unsteady Aerodynamic of Wind Turbine under Yaw Condition	
X.M. Chen and S. Kang	1883
Research of Wind Shear Dynamic Characteristics of Wind Wheels X.M. Chen, S. Kang and W. Zuo	1888

Use of AE Testing Data for Condition Monitoring in Wind Turbine Gearbox H.W. Qin, F.C. Cao, Q.Y. Fan and M.J. Aishan	1893
Modeling and Simulation of Ship Generator Sets D. Xiang, H. Xiong, N.B. Liu, Q. Wu and G.W. Meng	1898
Feedback Particle Swarm Optimization for Shipboard Power System Restoration Y. Chen, Y.C. Liu and C. Wang	1902
Dynamic Response Analysis of Stop Log Gates in Power Station's Running Process M.Z. Zhou, T.C. Li, Y. Ding and Y. Guo	1906
Spray Distribution of Plain Orifice Atomizer in Preheated Air Flow J.X. Qian, Y.Y. Liu, Y. Xie and Z.W. Peng	1911
Mathematical Model of Refueling Emission for Gasoline Vehicles and Influencing Factors Analysis	1017
J. He and R. He Model Research on Energy-Saving Potential of Engine Energy-Saving Technology	1917
L.Q. Shao, H.B. Zhang, Q. Ding and J.X. You	1925
Main Oil Pipeline APCS with PWM-Controlled Valves and VFD Pump D.P. Starikov, E.A. Rybakov and E.I. Gromakov	1930
Chapter 16: Fluids and Flow Engineering in Designing of Energy Machines	
CFD Analysis of Impeller Internal Flow Field in Multistage Pump with Inducer L. Zhang, P.J. Huang, H.Q. Li and Y.P. Diao	1937
Feature Extraction of Vibration of Centrifugal Fan Based on LLE Y.H. Liao and B. Liu	1941
Pulsation in Bag Breakup of Round Liquid Jets in Crossflow P.F. Liu, Y. Huang, Z.L. Liu and L. Sun	1945
An Appraisal of Turbulence Dissipation Rate Estimation Methods Using Large Eddy Simulation J. Chen and Y.L. Chen	1951
A Study on the Effects of Blade Thickness on the Performance of Low Specific Speed Centrifugal Pump Y.X. Jin, W.W. Song and F. Jie	1957
Numercial Simulation of a Special Valve in Pneumatic Conveying Pipelines X.B. Huang, S.Y. Zhang, Y.F. Luo and W.B. Zhang	1963
Numerical Simulation of Flow Characteristics about Lateral Tooth Steam Seal W. Sheng, Z.C. Li, D.J. Guan and Z. Ma	1967
Study Method for Low Speed Flow Basic on Precondition L. Li, G.P. Cheng, G.Q. Zhu and W. Zhang	1972
Vertical Mixed Jet Behavior of Orifice Nozzle L. Peng, D.J. Kim and H.C. Yang	1978
Development of Methods and Instruments of Measuring Liquid-Phase Heat Transfer Fluids' Viscosity G.X. Kou, P.N. Shang, J.H. Yang, R.R. Lu and L.L. Cai	1982
Chapter 17: HVAC, Air Conditioning and Refrigeration	
Central Plant Control Optimization with a Thermal Chilled Water Energy Storage System: A Case Study in a High-Tech Building Y.L. Lin, W. Yang and M.S. Liu	1989
Performance Prediction of Mechanical Draft Wet Cooling Tower Using Artificial Neural Network	
Z.T. Xu, J.C. Mao, Y.Q. Pan and Z.Z. Huang	1994
Experimental Study on Effect of Meteorologic Parameters on Evaporative Cooling System Performance	
X.F. Zhou, X.P. Miao, J. Yang and F. Jiang	1998

Intelligent Fault Diagnosis System of Plate Heat Exchanger Based on GIS Y.P. An	2002
Study on the Influence of Neighbour Room Heat Transfer on the Indoor Thermal Environment in a Heating Room Y. Wang, T. Zou and W.T. Hu	2006
Application of the Self-Adjusting Fuzzy Control in Water System of Central Air-Conditioner for Saving Energy Y.Y. Zhang and Y.N. Shen	2010
Numerical Simulation of the Odor Spreading in a Factory C.X. Cui	2017
Numerical Simulation and Optimization of Air Distribution in Large Space Z.H. Du, C.H. Liu and G. Zhou	2021
Chapter 18: Computer Applications and Mathematical Modeling	
Research on PTN Networking Planning Technology Y.Q. Fan, C. Li and J.Y. Wang	2029
Research on the Time Synchronization Technology of Wireless Sensor Network Y.Q. Fan, J.Y. Wang and S.T. Liu	2033
Research on Images Restoration Method under the Foggy Environment H. Liu and X.B. Liu	2037
Watershed Image Segmentation Based on PSO and FCM G.S. Yu and K. Li	2041
A Fast Threat Assessment Model of Aerial Targets for Submarine B.W. Zhao, F.X. Lu, B. Xie and W.X. Wang	2045
A Heuristic Reduction Algorithm Based on the Feature Weight X.X. Xing, L.M. Du and W.W. Shang	2051
Entropy and Distance Measure of Intuitionistic Fuzzy Soft Sets Y.Y. Li	2056
Moving Target Tracking Based on Trajectory Prediction Y.B. Dong, Y. Sun and M.J. Li	2062
Multi-Relational Naïve Bayesian Classification Based on the Selection of Relations J. Zhang, J.J. Bi, N. Sun and X.G. Hu	2066
Parameter Estimation of Weibull Distribution Model Based on Ant Colony Algorithm X. Ji, H. Wang, C.Q. Zhao and X.T. Yan	2073
Vehicle Operating Fault Regularity and its Application in Inspection and Maintenance X. An, X.M. Qiao, C.L. Zhao, S.T. Liu, H.H. Zhang and G.D. Han	2079
The Fault Diagnosis Method of Support Vector Machine Based on Kernel Fuzzy C-Means Membership J.C. Zheng and Y. Qin	2083
Research on Conditioning and Application for the F ² N ² Z.N. Li and L. Zhou	2083
Knowledge-Based Defect Prevention Research for Electric Power Information System	2091
Typical Defects Sample Selection Methods Research for Electric Power Information System X. Ji, X. Shi, Q. Li, D.H. Zhang and D.Y. Men	2101