

# Table of Contents

## Preface and Conference Organization

## Chapter 1: Development and Utilization of Solar Energy

<b>Application of Improved Invariant Moments and SVM in the Recognition of Solar Cell Defects</b> Y.Q. Wang, D. Tian, D.Y. Song and L. Zhang	3
<b>Case Analysis of the Solar Heating System Assisted by Condensing Wall-Mounted Gas Heater</b> G.X. Kou, L.L. Cai, Y.J. Ye, R.R. Lu and P.N. Shang	7
<b>Case Study: Environmental, Techno-Economic Feasibility Analysis of Grid-Connected Photovoltaic Power Plants in China Using RETScreen</b> D.P. Chen, L. Zhao, H.L. Li, C.L. Zhou and W.J. Wang	13
<b>Design and Application of a Seasonal Solar Soil Heat Storage System Applied in Greenhouse Heating</b> L. Zhang, P. Xu, J.C. Mao and X. Tang	21
<b>Design and Development of Intelligent LED Plant Light Supplement System Based on Solar-Powered for Facility Agriculture</b> Y.W. Wang, B. Zhang and C. Kai	26
<b>Development of Solar Cell Module Cooling Device Using Coolant Circulation and Control System</b> Y.K. Cho, J.J. Lee and W.J. Song	30
<b>Development Prospect of Chinese Photovoltaic Industry with Scenario Analysis</b> L. Pan and L.X. Xing	38
<b>Economic and Environmental Assessments of Two Installation Types of Photovoltaic Systems in Shanghai</b> X.F. Wu, Y.S. Liu, J. Xu, X.D. Si, W. Lei and W.L. Du	44
<b>Electrical Performance Results Comparison of Photovoltaic Module between Two ISO 17025 Certified Laboratories</b> H.T. Liu, X.J. Zou and Y.H. Zhai	48
<b>Experimental Investigation on a Grid-Connected Photovoltaic Air Conditioning System</b> T.X. Jin and X.F. Xu	54
<b>Feasibility Study of Distributed Roof Photovoltaic Generation Technology Applications in Shanghai</b> Q.Y. Gu, X.Y. Li, L.Y. Li, C.Y. Wu and N.H. Shu	61
<b>Operation and Control of a Microgrid Containing PV Cells and Battery</b> X.R. Song, X.J. Chen, M. Wang, Y. Bai, J.H. Lin and Z.K. Li	66
<b>Research on Application of Intelligent Solar System in Stadium</b> J.W. Zhao, L. Tian, Z.M. Ding and B. Li	71
<b>Study of Photovoltaic Energy Storage EMS Based on LabVIEW Data Acquisition</b> Y.F. Wang, D. Zhao, X. Xu and H. Xue	75
<b>Study on the Control Strategy of PV-Energy Storage Microgrid Working in Islanded Mode</b> K. Fang, J.L. Li and D. Hui	79
<b>The Performance of a Novel Solar Cooling and Power System with Different Working Fluids</b> H. Lei, J.F. Yang and D.J. Han	86
<b>The Research on the Planning of Distributed PV Systems in Connection with Urban Distribution Network</b> J. Wang	94
<b>The Research Progress of Solar-Driven Humidification-Dehumidification Desalination Technology</b> X.H. Liu, M.M. Zhu and X.C. Zhang	99
<b>Design of Solar Tracker Based on Square Structure and Camera Device</b> Y. Liu, J. Liu, Y.W. Song, D.W. Zhao, L. Zhao, Z.R. Song and L.D. Wang	105

<b>Experimental Investigation of Using Solar Chimney to Induce Natural Ventilation</b> C.X. Hao, H.P. Zhang and M.X. Hao	109
<b>Feasibility Study about Solar Energy-Air Source Heat Pump System in Cold Region Rural Residential Applications</b> K.R. Ma, L. Jin and L.J. Yan	113
<b>Research on Detection Technology of Distributed Grid-Connected Photovoltaic Power Generation</b> Y.B. Yang, L. Huang and L. Chen	117
<b>The First Solar Power Tower System in Saudi Arabia</b> N.H. Abu-Hamdeh and K.A. Alnefaie	123
<b>Designing and Realization of a Water Quality Detecting Instrument Based on Solar Power</b> Y.W. Wang, B. Zhang, F. Feng and Z. Shuai	127
<b>Design and Application of a Medium/Low-Power Stand-Alone/Grid-Connected Dual-Mode Inverter for Solar Photovoltaic System</b> Y.W. Wang, B. Zhang, C. Kai and Z. Shuai	131
<b>Research on Intelligent Control Technology of PV Grid-Connected Inverter</b> Y.B. Zhang	135

## Chapter 2: Development and Utilization of Biomass Energy

<b>Bio-Oil Production from Fast Pyrolysis of Corn Stalk in a Fluidized Bed</b> P. Fu, Z.H. Li, X.Y. Bai and W.M. Yi	143
<b>Comparison of Capacity for 2,3-Butanediol Production from Corn Cob Hemicellulose Hydrolysate Fermentation by <i>Klebsiella oxytoca</i> HD79 and <i>Klebsiella pneumoniae</i></b> J.P. Ge, S.F. Huang, X.L. Li, C. Pan and W.X. Ping	147
<b>Effects of Hydrothermal Pretreatment on the Content and Structure of Lignin Extracted from Corncob</b> X.Y. Guo, L. Zhang, S.T. Shu and J.Y. Hao	154
<b>Effects of Temperature on Mixed-Culture Fermentative Hydrogen Production from Corn Stover Hydrolyzate</b> K. Zhang and N.Q. Ren	159
<b>Hot Air Ignition Characteristics of Cotton and Corn Straw Pellet Based on TG-DTG</b> Y.Z. Cui, Y.X. Qu, M.T. Tang, P. Gao and G.K. Zhang	164
<b>Study on Mechanisms of Liquefied Corn Bran by FT-IR</b> W.M. Zhang, W.X. Li, N. Li and X.W. Li	168
<b>Study on the Saccharification Conditions of Fuel Ethanol from Corn Straw</b> M. Zhang, J.Y. Li and H.B. Fu	172
<b>Experiment Research on the Purification Technology of Biogas as Engine Fuel</b> K. Wang, Z.H. Fang, Y. Sun, H.B. Xu and J.M. Wu	177

## Chapter 3: Development and Utilization of Wind Energy

<b>5MW Offshore Wind Turbine Control Based on Pitch Joint Torque Controller</b> X.J. Yao, H.F. Xie, J.S. Zhu, X.D. Wang, Y.M. Liu and H.Q. Li	185
<b>An Online Rolling Dispatch Optimization Strategy for the Access of Intermittent New Energy</b> J.B. Wang, W.Y. Liu, W.Z. Wang, F.C. Liu and X.W. Jiang	190
<b>Application of Recurrence Plot to Wind Power Predictability Study under Different Sampling Intervals</b> M. Yang and Y. Qi	195
<b>Applied Research of Convertible Wind-Solar Hybrid System on Matlab</b> H.Y. Xu	199
<b>Comprehensive Evaluation Index on Voltage Fluctuation and Stability Considering Wind Power Generators</b> D.D. Li and Z.C. Liang	206
<b>Define China's Wind Power Industry Life Cycle Based on the Compartz Curve Model</b> H. Li and L. Wu	213

<b>Design of the Superconducting Excitation Winding for 12 MW Direct-Drive Wind Generator</b>	
L.S. Su, Q. He, J. Shi, L. Ren, J. He, T. Jin and S.P. Zhou	217
<b>Dynamic Torsional Load Control of Double-Fed Wind Turbine Drive-Train Based on Three-Mass Shaft Model</b>	
X.D. Wang, H.Q. Li, Y.M. Liu, J.S. Zhu, Z.M. Xu and X.X. Ma	222
<b>Effect of Large-Scale Wind Power Integration on Inter-Area Oscillation of Power System</b>	
X.Z. Luo, H.F. Li, H.D. Sun, A.S. Wang and D.Z. Chen	227
<b>Energy Management and Coordinated Control Strategies of Isolated Micro-Grid with Wind Turbines and Seawater Desalination Devices</b>	
S.T. Fan and Q. Liu	233
<b>Kems kaya Wind Power Plant in Karelia</b>	
G.I. Sidorenko	240
<b>Optimal Wind Power Planning Considering Power System Adaptability and Economy</b>	
K. Luo, W.H. Shi and H. Zha	246
<b>Planetary Gear Train Used in Wind Driver Generator Based on TCA</b>	
K. Xu, P. Jia, M. Qiu and J.J. Yang	251
<b>Study on Application of STATCOM in Dynamic Reactive Power Compensation of Wind Farm Integration</b>	
Z.J. Liu, Z.Q. Zhao and B. Li	255
<b>Study on Dispersed Wind Power Connected to Power Grid</b>	
W. Xu, X.N. Xiao and Z.C. Zhou	262
<b>Study on Wind Power Heating Mode and Operating Characteristic</b>	
H. Zha, W.H. Shi, H.B. Zhao and X.C. Wu	269
<b>Technical and Economic Analysis on Grid-Connected Wind Farm Based on Hybrid Energy Storage System for Active Distribution Network</b>	
Y. Feng, L.J. Shao, B.L. Zhang, M.J. Wu, Y.P. Shao, Q.Q. Liao, G.D. Zhou and B. Sun	274
<b>Technology of Wind Power Forecasting Accuracy Assessment and Curtail Quantity Estimation with Power Capacity Limited</b>	
X. Cao, P.P. Peng, H. Zhou and X. Cheng	280
<b>The Development of the Wind Power Industry in Western Jilin</b>	
H.Y. Cui	286
<b>The Research of Wind Power Accommodated Capacity Based on Power Balance</b>	
Z.J. Liu, S. Chen and P. Wang	290
<b>Three-Column Floating Wind-Current Generator and the Analysis of Performance</b>	
Y. Ma, H. Zhou, L. Zhang, S. Chen and Y.C. Zhi	295
<b>Wind Data Anomaly Detection and Interpolation of Missing Data</b>	
M. Yang and J.C. Dong	302
<b>Wind Speed Forecasting in Wind Farm</b>	
H.P. Liu, X.D. Zhang, H.S. Li and Q. Wang	306
<b>Wind Power Development in Power Grid and Study on Dispatching Strategy</b>	
Y. Zhang, F. Zhang and L. Tang	310
<b>Dynamic Multi-Objective Power Dispatch Considering Load and Wind Power Variations in Wind Power Integrated System</b>	
C. Li and Z.J. Hu	316
<b>Dynamical Analysis of Wind Turbine Helical Gear System Based on Flexible Supporting</b>	
Y.F. Yin, Y.L. Na and Y.J. Li	320
<b>Economic Comparison of VSC-HVDC and HVAC Systems for Connections of Offshore Wind Farms</b>	
J. Zhang, X.L. Zheng, G.Z. Chen, Z.G. Zhang and B.B. Xu	325
<b>Modal Research on the Low-Frequency Oscillation of AC/DC System with DFIG-Based Wind Farms</b>	
J.B. Wang, X.W. Abuduwayiti, Q. Chao and Q. Luo	331
<b>Multi-Object Optimization Research about Wind/Solar Hybrid Generation System</b>	
Z.H. Liu, H.Y. Liu and X.J. Gao	337
<b>Containing Small Hydropower and Wind Power System Optimal Spinning Reserve</b>	
Z.J. Liu, N. Liang and D.D. Wang	342

<b>Impact of Wind Farm Output Fluctuation on Static Stability of Grid</b> G. Yang, B. Chen, H.L. Jiang and S.Q. Zheng	351
<b>Quantifying the Risk of Wind Power Forecasting Error on Power System Optimal Dispatching</b> H. Ren, J.Q. Fan, D. Watts and D. Wei	355
<b>Research of Robust State Estimation Method and Program Implementation Considering Large-Scale Wind Power Integration</b> Y.D. Luo, J. Li, Z.M. Guo, G.R. Shi, D.S. Wang and B. Yan	361
<b>Research on the Peaking Gap of Power System with Large-Scale Wind Power Integration</b> X.W. Jiang, W.Y. Liu, J.J. Zheng, P.D. Du and J.B. Wang	367

## **Chapter 4: Nuclear Energy and other Energy**

<b>Calculation on the Distribution of Ex-Core Neutron Flux during Reactor Start-Up</b> C.Y. Liu and B.M. Elghazali	375
<b>Effects of Groundwater Heat Pump Systems on the Temperature and Quality of Groundwater in Recharged Aquifer</b> B.H. Li, X.J. Cao, L.C. Liu, F.D. Zheng and N. Zhang	379
<b>Efficiency and Performance Analysis of Tidal Current Energy Turbine Basing on the Unidirectional Fluid-Structure Interaction</b> X.F. Liu, J.B. Wang, M.L. Tian and Z.B. Tang	386
<b>Experimental Study of the Temperature Field in Fire Caused by Sodium Leakage in Sodium-Cooled Fast Reactor Loop</b> H.M. Wu, Y. Huo, C.L. Liu, Z.G. Zhang, R. Zhou and X. Wang	392
<b>Fabrication of Titanium Doped Hollow Glass Microspheres for Inertial Confinement Fusion Targets by Dried Gel Method</b> F. Li, J.H. Feng, J. Li, B. Li and Z.W. Zhang	396
<b>Novel Trapezoidal-Loop Piezoelectric Energy Harvester</b> B. Jiang, S. Yuan, X.H. Xu, M.S. Ding, Y. Yuan and H.Q. Zhang	402
<b>Optimal Design of the Mooring System for a Floating Hybrid Ocean Renewable Power Generation System</b> M. Lin, Y. Ma and L. Zhang	407
<b>Research on Geothermal Power Generation Technology and its Development Trend</b> Y.P. Zhang, S.Z. Wang, Z.F. Jing, M.M. Lv and Z.D. Zhai	413
<b>Safety Performance Evaluation of Nuclear Power Station Containment</b> Y.L. Wang	418
<b>Status and Trends of Renewable Energy Harvesting</b> Y.W. Zou, W.H. Ji and Y.J. Sang	422
<b>Studies on Geothermal Heating and its Related Issues</b> Y.P. Zhang, S.Z. Wang, M.M. Lv, Z.F. Jing and X.R. Luo	427
<b>Study on a New Array of Oscillating Wave Energy Converter</b> M. Shao, H.D. Shi, F.F. Cao, K. Zhu, Z.Q. Zhang and J.W. Sun	432
<b>Study on Operation Strategies of a Hybrid Ground-Source Heat Pump System with Surface Water Heat Exchangers for an Exhibition Building</b> Y.D. Liu, G.X. Hu and Y. Qu	436
<b>The Monitoring Data Analysis of the Running Condition in Winter in Line with the Demonstration Project about Soil Source Heat Pump in Severe Cold Regions</b> K.L. Huang, M. Chen and Y. Liu	441
<b>Wave Data Analysis for Wave Energy Power in Naeae Coast</b> B.H. Kang and K.H. Kim	446
<b>Environmental Assessments for Wetlands and Estuaries Management near Tidal Power Plant Using of Mass Balance Simulation</b> B.S. Shin and K.H. Kim	453
<b>Prospect and Suggestions on the Development of Wave Energy Resource in the South China Sea</b> C.W. Zheng, J. Pan and C.Y. Li	459
<b>Research on the Development and Utilization of Geothermal Energy</b> Y.P. Zhang, S.Z. Wang, Q. Luo, X.R. Luo and Z.F. Jing	467

<b>Optimization Technique for Allocation Scheme and Hydro Power Plant Parameters with Respect to Regional Peculiarities</b>	
G.I. Sidorenko and A.S. Alimirzoev	472
<b>The Balance of Power System Peak Load Regulation Considering the Participation of Nuclear Power Plant</b>	
J. Zhao, Y.H. Tang, L. Wang and D.C. Liu	477

## **Chapter 5: Energy-Saving and Energy-Storage Technology**

<b>A Newly Energy-Saving Movable Piezoelectric Carpet</b>	
L.Y. Wang and C. Liu	485
<b>A Study on Supply with Consideration on Expectation Level of Energy-Saving Technology and Consumption Pattern of Consumers – Focusing on Boilers</b>	
A.N. Won and W.H. Hong	489
<b>An MILP Formulation for the Thermal Unit Commitment Problem Considering Start-Up and Shut-Down Power Trajectories</b>	
J. Deng and H. Wei	493
<b>Applying Research on Campus Energy-Saving Power Monitoring System</b>	
L.M. Wei and P. Xu	499
<b>Cost-Benefit Analysis Model of Single and Hybrid Energy Storage System in Active Distribution Network</b>	
Y. Feng, L.J. Shao, B.L. Zhang, J.Y. Xie, B. Sun, Q.Q. Liao and G.D. Zhou	503
<b>Damper Optimization Design of High-Speed Energy Storage Flywheel Shafting with a Single Point Flexible Support</b>	
C.L. Tang, D.J. Han, J.F. Yang and X.J. Dai	509
<b>Data Center Room Air Conditioning Energy Consumption Analysis</b>	
L.F. Song, T. Li, Q.F. Li, L.H. Zhao, X. Zhao, L. Zhang, J.L. Zhao and J.J. Xu	518
<b>Energy Saving Operation Strategy of an Existed Indoor Ice Rink</b>	
B. Sun, H. Wang, X. Wu, Y.F. Ma, Y. Zhao and Y.Q. Jiang	522
<b>Optimal Method of Energy Storage Configuration Considering Operation and Penalty Cost</b>	
J.H. Li, X.C. Feng, X.Z. Cui, G. Mu and W.H. Luo	529
<b>Preparation of Ternary Composite Phase Change Storage Mortar</b>	
Q. Wang, T.J. Wu, Z.Y. Ding and C.B. Zhang	533
<b>Study on Door &amp; Window Energy-Saving Technology at Hot-Summer and Cold-Winter Zone</b>	
J. Li and F. Wang	538
<b>Study on Energy Saving from Intermittent Operation of Air-Conditioning System</b>	
H.W. Jin	542
<b>Energy Performance of External versus Internal Shading Devices in Residential Buildings</b>	
Y.Y. Ye, P. Xu and J.C. Mao	546
<b>Energy Saving at Home</b>	
N. Vatin and O. Gamayunova	550
<b>Energy-Saving Analysis about Control Strategy of District Heating System</b>	
C.X. Hao, H.P. Zhang and C.P. Lu	554
<b>Numerical Simulation of Heat Transfer outside the Tube of the Evaporative Air Cooler</b>	
H.J. Liu, L.C. Chen and J.Q. Zhang	558
<b>Finite Element Analysis of the Magnetic Field Simulation of High Temperature Superconducting Magnet</b>	
Y.H. Luo and J.J. Wang	562
<b>Pumping Action of Heat Transfer for Free Convection Flow in a Ventilated Facades</b>	
M.V. Petrochenko, K.I. Strelets, M.R. Petrichenko and E.B. Yavtushenko	567
<b>Research of Architecture Based on Distributed Source Plug and Play</b>	
M.Z. Guo, Y. Wang, F.P. Bu and M.Y. Dong	571
<b>Autonomous Energy Efficient Co-Generation Units</b>	
M. Petrichenko, D. Tseytin, D. Nemova and N. Kharkov	580

## Chapter 6: Chemical Engineering, Energy Materials and Fuel Cell

<b>A Three-Dimensional Model for Mass Transfer in Vanadium Redox Flow Battery</b> S.Y. Liu, M.F. Yu, Y. Wan and H. Sun	587
<b>Amorphous Alloy Ni-Fe-B: Preparation, Characterization and its Catalytic Ability for Hydrogen Generation</b> J. Zhang, H.R. Yao, H.B. Li, X.K. Bai and J.J. Li	592
<b>Analysis of Temperature Field in an Oil-Shale Retorting Furnace with Gas Heat Carrier Based on CFD</b> J.R. Bai, S.Y. Xin, Q. Wang and H. Qin	597
<b>Contrastive Study on Microwave Pyrolysis Products of Coal under N<sub>2</sub> and Non-N<sub>2</sub> Atmosphere</b> Z. Yang, J. Zhou, Q.L. Zhang, X.Z. Lan and X.C. Zhao	601
<b>Degradation and Performance of SOFC Cathode</b> R.R. Liu, D.J. Wang, L. Jing and L.L. Wang	605
<b>Fe-C-N Catalysts Prepared by Magnetron Sputtering for Oxygen Reduction Reaction in a Neutral Solution</b> J.Y. Chen, X.G. He, H.Y. Qi, H.C. Shi and F. Gao	609
<b>Heteropolyanion Substituted Layered Double Hydroxide as Recoverable Catalyst for the Oxidative Desulfurization of Simulated Fuel Oil and Diesel</b> F.L. Yu and Y. Lu	613
<b>High-Pressure Design of Composite Vessel for Hydrogen Gas</b> M. Badida and M. Hurajt	619
<b>Hot Water Extraction and Fixed Bed Pyrolysis for Bitumen Recovery of an Indonesian Oil Sand</b> D.M. He, F. Nie, J. Guan, H.Q. Hu and Q.M. Zhang	624
<b>How to Advance the Hydrogen Production Efficiency by Adding Rare Earths in the Process of Electrolysis of Water?</b> J.C. Kuang	628
<b>Hydrated Proton Transfer in Nafion117 Membrane</b> Z.J. Li, F.H. Zhang, H. Sun and Y. Wan	634
<b>Hydrothermal Synthesis and Electrochemical Performance of LiNi<sub>0.5</sub>Mn<sub>0.5</sub>O<sub>2</sub> as Lithium-Ion Battery Cathode</b> H. Zhao, Z.B. Hu, X.L. Xiao and X.F. Liu	638
<b>Lithium Ion Battery Efficient Thermal Management Numerical Simulation Research</b> S.M. Sun, X.Y. Zhang and M.Q. Yang	646
<b>Lithium Ion Battery Temperature Field Numerical Simulation Research</b> S.M. Sun, X.Y. Zhang and M.Q. Yang	652
<b>Oxygen Reduction Reaction on Pt Surface in PEM Fuel Cell Cathode Based on the First-Principles Molecular Dynamics</b> W.S. Song, L. Lian, X. Wang and H. Sun	657
<b>Preparation of Pd-Cu-Ce Hydrogen Separation Membrane Alloys</b> H. Zhao and J.Q. Liu	661
<b>Pyrolysis of Hailar Lignite: Experiments with a Tubular Reactor and a Continuous Screw Kiln Reactor</b> H.J. Gao, Y.Z. Zhu, H.J. Chen, C.H. Liao, Y. Du and H. Wu	665
<b>Research on the Microwave Pyrolysis of Coal under N<sub>2</sub> Atmosphere</b> J. Zhou, Z. Yang, W.Z. Shang, Y.H. Song and X.Z. Lan	672
<b>Research Progress on Polyoxymethylene Dimethyl Ethers as the Additive Component of Diesel Fuel</b> G.J. An, X.D. Wang, C.B. Lu, C.H. Xiong, Y.J. Zhou, Y.W. Liu and H.Y. Shang	676
<b>Simplified Least Squares - Support Vector Machines for Lead-Acid Batteries SOC Estimation</b> L.C. Zheng, L.X. Li, Y.H. Zheng, X. Wang, J.M. Zhao and H.T. Chen	680
<b>Study on Synthesis of Alkynoxymethyl Benzyl Quaternary Ammonium Salt and its Corrosion Inhibition for Blast Furnace Gas Pipeline</b> H. Zhang and F.R. Zhou	684

<b>Study on Synthesis of Polycarboxylate Superplasticizer at Room Temperature</b> G. Wang and L.X. Liang	688
<b>Synthesis of <math>\text{La}_{1-x}\text{Sr}_x\text{Ga}_{1-y}\text{Mg}_{y-z}\text{M}_z\text{O}_{3-\delta}</math> (M=Cr, Mn, Fe, Ni, Co) Electrolyte for IT-SOFCs by Laser Rapid Sintering</b> J. Zhang, L.J. Pan and C. Yuan	691
<b>Synthesis, Electrical Conductivity and Electrochemical Properties of <math>\text{SrFe}_{1-x}\text{Sb}_x\text{O}_{3-\delta}</math> as Cathode Materials for IT-SOFCs</b> X.L. Yu and X. Li	696
<b>The Application of High Temperature Foam Surface Active Agent Used in Heavy Oil Thermal Recovery</b> E.H. Liu	700
<b>The Core System Design for New Kilowatt Aluminum-Air Battery</b> Y.J. Zhou, C.B. Lu, F. Zheng, Z.J. Hu, F. Wang, G. Wang and F.C. Liu	704
<b>The Effect of Temperature on the Morphology and Electrochemical Performance of <math>\text{Li}_3\text{V}_2(\text{PO}_4)_3</math> Cathode Material</b> C.Y. Lai, J.J. Wei and Z. Wang	708
<b>The Structural and Hydrogen Storage Properties of Al-Doped Boron Nitride Nanotube</b> S. Zhang, B. Wu, X.K. Wu and T. Jing	712
<b>Update Progress of Pressurized Entrained-Flow Gasifier with Coal Slurry in China</b> X.D. Liu, T.Y. Hao, Y. Zhang and X.Y. Gu	716
<b>Research on the Effect of Movable Gel Flooding after Polymer Flooding</b> R.W. Liu	723
<b>A Separated-Frequency Parameters Identification Method of Li-Ion Battery Model for Electric Vehicles</b> D.Z. Mu, Z.H. Dong and M.F. Wang	727
<b>Synthesis of Nanosized ANNT Series Ceramic Powder by Citrate Wet Chemical Method</b> Y.Q. Yan, Y.G. Wen and C.F. Sun	731
<b>Aqueous Two-Phase System in the Synthesis of Starch Graft Acrylamide Polymer</b> M. Zheng and L.X. Liang	734
<b>Swelling and Antibacterial Properties of Chitosan/Poly(vinyl alcohol) Hybrid Hydrogels</b> J.J. Zheng and X.L. Gui	737
<b>Parametric Optimization of Organic Rankine Cycle by Genetic Algorithm</b> S. Bian, T. Wu and J.F. Yang	741
<b>SF6 Byproducts in Simulated Electric Equipment of Overheating Faults in High Humidity</b> Y. Wang, L. Li and Y.Y. Zhou	746

## Chapter 7: High Voltage and Insulation Technology

<b>Analysis of the Influence of Electric Field on Current Error of High-Voltage Three-Phase Three-Element Combined Transformer</b> G. Liu, B. Jiang, L.D. Ren, F.Z. Zhang, B. Ai and W. Jiang	755
<b>Analysis of Trip Faults and Protection Measures on 10kV and 20kV Distribution Lines</b> Y.L. Lu, F.B. Tao, Z.C. Zhou, S. Gao and J. Chen	762
<b>Effect of Electrical Aging on the Trap Parameter of HVAC XLPE Cable Insulation</b> W.W. Li, Q. Shi and C. Wu	769
<b>Electric Field Analysis Based on FEM and Corona Test of 330 kV Dampers</b> T.X. Xie, Z.R. Peng, Z.C. Zhou and Y. Ma	773
<b>Research of Influence of Tower Type on Lightning Back-Flashover Performance at High Soil Resistivity Areas</b> D.J. Wang and Z.S. Wang	778
<b>Research on Corrosion Diagnostic Model of Grounding Grid Based on Tellegen's Theorem</b> X.A. Wu, L.X. Li, Y.H. Zheng, X. Wang, D.M. Cui and J. Sun	783
<b>Simulation Study of Partial Discharge UHF Wave Transmission Characteristic in GIS Typical Structure</b> J.G. Yang, Y.Y. Jia, K. Zhao and S. Gao	787
<b>Study on DC Bias Magnetic Properties of Transformer with Different Structures</b> Y.H. Huang, Q. Xie, M. Gao, Z.H. Zhou and X. Liu	793

<b>Study on the Identification of Lightning Over-Voltage Based on ATP-EMTP</b> X.G. Li, L.X. Li, Y.H. Zheng, X. Wang, J.Y. Yu and J.B. Yang	799
<b>Study on Typical Compact Structures and Faults of 220kV Cable-Conductor Bushings</b> P. Wu, N. Xue, Y.C. Lu, C. Yu and Y.M. Wu	803
<b>The Design of High-Voltage Cable Partial Discharge On-Line Monitoring System Software</b> X.L. Zhang, Z.H. Wang, Z.Y. Huang and X.J. Han	810
<b>The Dynamic Galloping Characteristics of Icing Guyed HVDC Tower</b> H. Zhu, D.T. Xu and H.R. Zhao	814
<b>The Dynamic Influence of HV Controllable Reactor on Net Loss</b> D.D. Zhu, W.Y. Liu, W.Z. Wang, F.C. Liu and C. Liu	818
<b>The Hardware Design of Partial Discharge On-Line Monitoring System in High Voltage Cable</b> Z.H. Wang, D. Pang, X.L. Zhang, Y. Zhou and X.J. Han	822
<b>The Influence of Main Components in PM2.5 on Composite Insulator Contamination Flashover Characteristics</b> H. Liu, Y.S. Quan, N. Chen and P.X. Shi	827
<b>The New Development Trend of Distribution Transformer</b> Y.C. Lu, L. Wei, W. Chao and W. Peng	831
<b>The Whole Simulation Analysis and Measurement of the Power Frequency Electric Field in 500kV Substation</b> L. Peng and L.Y. Ming	837
<b>Effect of Substation Network on Transformer PD Monitoring</b> Y.Y. Man, C. Zhang, N. Wang, L.M. Zhang and H.M. Wang	842
<b>Experimental Study on Short-Circuit Withstand Capability of 110kV Power Transformer</b> C. Wei, P. Wu and Y.C. Lu	848
<b>Functions and Theoretical Basis of Partial Discharge On-Line Monitoring System for High-Voltage Cables</b> D. Pang, X.L. Zhang, Z.H. Wang, D. Zhang and X.J. Han	854
<b>Experimental Investigation on Breaking Characteristic of Load Switch in Medium High Voltage Ring Network Cabinet</b> Q. Shi, W.W. Li and B. Ai	858
<b>A Power Flow Method for VSC-Multi-Terminal Hybrid System Based on Asynchronous Iteration Algorithm</b> K. Zhao, Q. Li, X. Yang, L. Li, Y. Zou, Y. Zhang and C.L. Dou	863
<b>Analysis and Countermeasures of Value Side Bushing Fault of Converter Transformer in Gezhouba to Nanqiao HVDC Transmission Project</b> Y.H. Huang, L.H. Hu, J.W. Li and H.F. Xia	870

## **Chapter 8: Electrical Theory and Power Electronics**

<b>Cell Analytic Application Based on Dielectrophoresis Microchip</b> Y.J. Zhang	879
<b>Design and Implementation of LDPC Encoder / Decoder in the Atmospheric Laser Communication</b> L.M. Chang, Q.W. Dong and Y. Zhan	883
<b>Design and Simulation of Booster's Controller Based on Matlab</b> X.L. Xiao, X.H. Ding and H. Zhang	888
<b>Design for the Controller of Desktop 3D Printer</b> R.D. Huang, X. Wang, Y.H. Zheng, L.X. Li, X.K. Sheng and H. Wu	894
<b>Design of Intelligent Lighting Control System Based on C-Bus</b> X.J. Sun	898
<b>Effect of Traffic Flow on Characteristics of Piezoelectric Harvesting Unit</b> C.H. Sun and G.Q. Shang	902
<b>Study on Loss Calculation for Inverter Based on 1200V SiC MOSFET</b> L.J. Xie, J.Y. Li and K.S. Yu	906
<b>Study on Power Supply of the Feeder Terminal Equipment</b> H.M. Hu, Y.J. Shi, Y.H. Zhang and Y.L. Fu	914



<b>The Design of Cascade Switching Power Charger Based on PFC</b> Y.L. Liu, Z. Liu and K.C. Li	920
<b>The Research of Communication System of Civil Defense Engineering Based on Siemens PPI Bus</b> M.X. He, W. Wang, C.Y. Liu and Y. Zhang	929
<b>A Numerical Least Squares Analysis of Electromagnetic Compatibility</b> H. Xue, H.X. Li and Y.F. Wang	936
<b>New Design of Selective Leakage Protective System in Underground LV Distribution Network</b> L.F. Zhang	940
<b>Multi-Resonant Compensation Analysis of Contactless Electrial Power Transfer System</b> W. Zeng, B. Wang, B. Jiang, Y.G. Hao and R.X. Fan	945
<b>Reactor Effects on the AC Governor System Transformer Grid Side Harmonics</b> J.Z. Wang and J.H. Tong	950
<b>Reliability Analysis of Distribution Network with Integrated Photovoltaic Power Generation</b> K. Huang, X. Wang, Y.H. Zheng, L.X. Li and Y.L. Liu	956
<b>The Design and Research of Three-Phase Inverter Dual-Loop Control</b> W. Cao, J. Sun, H. Su and D.P. Yang	961
<b>Waveform Recognition Technology in Distributed Fault Location of Transmission Line</b> J.L. Ding, Y.H. Zheng, L.X. Li, X. Wang, K. Li and L. Liu	968
<b>Control of CSR PWM Outer Current Loop Based on Fuzzy Algorithm</b> Z. Wang and Z. Qing	972
<b>Research on Point Estimate Method and its Application to Calculation of Grounding Current under DC Bias</b> Z.L. Mao, G.J. Deng, G. Chen and H. Zhou	977
<b>Design and Analysis of PCB Rogowski Coil Current Transformer</b> B. Su, L.X. Li, Y.H. Zheng, X. Wang, Y. Liu and C.L. Dang	984

## **Chapter 9: Power System and Automation**

<b>A Classification Management Method of Non-Emergency Reserve under ‘Source-Grid-Load’ Interactive Condition</b> J.T. Liu, Y.J. Liu, G. Li and S.H. Feng	991
<b>A Comprehensive Evaluation Method of Primary Frequency Regulation Based on Wide Area Measurement System Data</b> S.S. Li, T. Hao and Z.Y. Liang	996
<b>A Distribution Network Reconfiguration Method Considering Weather Conditions</b> Y.J. Wu, Y.B. Yao and B. Cao	1001
<b>A Network Topology Corrective Switching Algorithm for Eliminating Line Overloads</b> X.Y. Yi, W.M. Guo and Z.R. Liang	1007
<b>Controller Parameters Optimization of PWM Converter Based DFIG</b> H. Zhu, D.T. Xu and H.R. Zhao	1012
<b>DC Protective Measurement and Control Device for Mass Transit Based on VxWorks</b> Q.Z. Zeng, J.C. Song and S.Z. Wu	1016
<b>Design and Development of HLA-Based Operation-Maintenance Integration Training Simulation System</b> X.H. Yang, Y.P. Huo, Q. Tian, X.E. Zhang and F. Gao	1022
<b>Linear State Estimation Based on Measured Quantity Transformation and Calculation of Transmission Losses</b> G.H. Lin, T. Wang and Y.Y. Wang	1027
<b>Maximum Integration Capacity Analysis of Distributed Generator in Distribution Power System</b> F. Zhou, Z.L. Piao, K.Y. Liu, W.X. Sheng and J. Meng	1032
<b>Operation State Evaluation of Distribution Network Based on Attribute Mathematics</b> M. Cai, X.Y. Chen, J. Liu, K. Yu, D. Chen, Y. Liu and W.Y. Zhang	1037

<b>Optimal Power Flow Considering Generator Number Constraint on Regulation of Active Power Output</b>	1042
Y.D. Yang and P.X. Qu	
<b>Optimization of Relay Graph Splicing Based on Repulsion-Tension Algorithm</b>	1048
X. Gao, L.Y. Du and X.D. Li	
<b>Previous Research of Real Time Power System Dynamic Monitoring Master Station System Test Specification</b>	1054
L.J. Chen, Z.M. Guo, K. Zhao, H. Zhang, C.H. Yan, B. Yan and X.P. Li	
<b>Quantitative Analysis of the Fluctuation Reasons of Grid Line Loss Rate</b>	1060
Y.Z. Zhang, W.Y. Liu, W.Z. Wang and J.J. Zheng	
<b>Research on Bus Coupler Charging Protection Problem</b>	1066
G.H. Lin, Y.Y. Wang and T. Wang	
<b>Smoothness Prior Approach to Removing Nonlinear Trends from Signals in Identification of Low Frequency Oscillation Mode</b>	1070
Y.J. Wang, J. Li, H. Xu, H.O. Yan, J. Yuan, J.H. Li, X.H. Liu, Q. Zhou and N. Li	
<b>Spatial Load Forecasting Based on Load Forecasting Reliability</b>	1075
B. Xiao, H. Wang and G. Mu	
<b>Study on Power Flow Calculation Using PSASP</b>	1081
X.R. Zhang and L. Zhi	
<b>Study on System Loss in Distribution Network with DG</b>	1085
J. Meng, Z.L. Piao and F. Zhou	
<b>Substation Locating Method in Integrated Relay Graph Splicing Based on Improved Genetic Algorithm</b>	1090
X. Gao, L.Y. Du and X.D. Li	
<b>The Analysis Method of Potential Loss in Gansu Power Based on DEA</b>	1095
Y.L. Sun, W.Y. Liu and F.C. Liu	
<b>The Improved Five-Zone Control Theory with Considering Dynamic Reactive Power Compensation Device</b>	1100
L.E.G. Qi, D.C. Liu and J. Wu	
<b>Numerical Investigation on Transmission Line Conductor Icing</b>	1105
X. Yi, H.J. Huang and Z.H. Zhou	
<b>Experimental Analysis and Engineering Design of Laser Removing Technology for Extra Matters on Overhead Lines</b>	1109
G. Chen, Y. Liu, Y. Ma, J. Chen, Z.C. Zhou and H.Z. Li	
<b>Optimal Distributed Generator Allocation in Active Distribution Network Considering Reconfiguration</b>	1117
Y.D. Yang and H.B. Xie	
<b>Divergence Law of Ground Current about DC Transmission System</b>	1123
Z.C. Ren and G.N. Wu	
<b>Study on Coordinated Control of Multi-Distribution Static Var Compensator</b>	1127
M.J. Zhang, X.L. Zhang, Z.H. Wang and L. Wang	
<b>Optimal Planning on Reactive Power Compensation of Distribution Network Based on Back/Forward Sweep Method and Tabu Search Algorithm</b>	1132
X.W. Wang and Y.H. Zhao	
<b>Interference on Geoelectrical Resistivity Observation from DC Power Transmission Line</b>	1137
X.X. Wang, P.D. Wang, L. Shi and J.L. Rao	
<b>Performance Comparison of Typical Built-In UHF Sensors Used for GIS PD Detection</b>	1143
Y.Y. Jia, J.G. Yang, L. Rong and F.B. Tao	
<b>Power Transformer Life Analysis Based on Risk Assessment</b>	1151
Y.Y. Sun, X. Wang, Y.H. Zheng, L.X. Li and Q.S. Xu	
<b>The New Methodology of Diagnosis for Transformer Inter-Turn Short Circuit Based on Wavelet Analysis</b>	1155
Y.S. Quan, N. Chen, Z.J. Wang and P.X. Shi	
<b>The On-Line Monitoring of the Winding Deformation of Transformer Based on the Improved Ultrasonic Ranging Method</b>	1159
W.J. Liu, X. Wang, Y.H. Zheng, L.X. Li, Y.B. Lang and F.P. Shao	

## **Chapter 10: New Energy Vehicles and Electric Vehicles**

<b>Electric Load Forecasting of Electric Vehicles in Charging</b> W. Liu, T. Wei, M.X. Zhao, D. Xu and C. Gao	1165
<b>Energy Harvesting Shock Absorbers for Vehicles: Design, Modeling and Simulation</b> W.W. Chen and Z.T. Zhang	1169
<b>Fast Service Restoration of Multi-Source Active Distribution Network with Microgrids and Electric Vehicles</b> G.M. Fan, L.X. Guo, W. Liang and H.T. Qie	1175
<b>Research on the Optimum Continuous Mileages under the Pure Electric Mode of Plug-In Hybrid Electric Vehicles</b> D.M. Bu and C. Zhu	1179
<b>The Optimization Model of Planning Electric Vehicle Charging Station</b> S.Q. Zhao and Z.W. Li	1183

## **Chapter 11: Motor and Electric**

<b>Analysis of the Sensorless PMSM Control Technique in the Full Speed Section</b> H.G. Li, C.F. Li, R.J. Zhao, D.L. Liu and H.H. Zhu	1191
<b>Analysis of the Stator Current Change on QFQS-200 Synchronous Generator Loss of Field Procession</b> Y.L. Lv, C. Teng and W.H. Chen	1197
<b>Design of Drive Circuit for Permanent Magnet Brushless DC Motor</b> H.M. Zhou	1201
<b>Design of Locomotive Intelligent Watt Hour Meter Based on STM32</b> H.J. Yu, Z.W. Zhou, C.B. Chen and J.H. Gu	1205
<b>Designed Controller of Permanent Magnet Brushless DC Motor Based on DSP</b> G.Y. Zhan	1210
<b>Efficiency Optimization in Speed-Sensorless Control of Induction Motors</b> H.F. Yu, P. Gao and S.J. Han	1214
<b>Experiment Research on Five-Segment Type Space Vector Pulse Width Modulation for Permanent Magnetic Brushless DC Motor</b> Z.L. Liao, X.L. Cai, H.P. Jia and W.D. Shi	1219
<b>Lissajous Curve of an Auxiliary Winding Voltage Park Components for Diagnosing Multiple Open Switches Faults in Three Phase Inverter</b> L. El Menzhi and A. Saad	1224
<b>Simulation of Permanent Magnet Synchronous Motor Field Oriented Vector Control System</b> W.Z. Chen, X.Y. Zhang and X.M. Sui	1234
<b>The Establishment of Time-Varying Parameter Model of the Synchronous Generator Loss of Field</b> Y.L. Lv, H.Z. Bai, W.H. Chen and C. Teng	1238
<b>Three Phase Induction Motor Inverter Defects Diagnosis Using Voltage Spectrum of an Auxiliary Winding</b> L. El Menzhi and A. Saad	1244
<b>Research on Speed Sensorless Vector Control of Induction Motor</b> A.R. Xu, L. Zhang, Y. Gao, C.L. Gu and C.Y. Meng	1253
<b>Calculating the Maximum Penetration Capacity of Distributed Generation Considering Current Protection</b> L.J. Wu, X.Y. Chen, J. Liu, K. Yu, S.Y. Xu and F. Mo	1257

## **Chapter 12: Power Grid Technology**

<b>Analysis Method of Power Flow in Urban Power Grid with Distribution Generation Based on Dynamic Probability Model</b> M.Y. Yao, X.Y. Chen, J. Liu, K. Yu, H.J. Shi and J.X. Wang	1265
--	------

<b>CIM Extensions for the Distributed Energy Resources Integration</b> G.X. Lv, Y.M. Lu, H.T. Liu, H. Yu, Y. Chen and X.H. Zhang	1270
<b>Micro-Grid Energy Optimization Base on Installing Heat Storage Tank to Decouple “Heat-Load-Based” Running Constraint of CHP</b> S.S. Shi, F. Liu and X. Yang	1274
<b>Modified Suggestions for Distribution Automation Standards to Coping with DG Connected to the Power Grid</b> X.R. Jing, Q. Fu and B. Yang	1281
<b>Networked Intelligent Perception Technology and its Application in Smart Distribution Grid</b> X.L. Chen, J. Liu and Y. Guo	1288
<b>Rapid Double-Layer Identification Method of Multi-Relevant Bad Data in Large-Scale Power Grids</b> Z. Kun, X. Ying, J. Xu, Y. Zhang, Y. Lei and X. Dong	1294
<b>Research and Application of Comprehensive Evaluation Index System in Micro-Grid’s Construction and Operation</b> S.S. Wu, P. Wang, Y. Li and Y. Hui	1301
<b>Research and Application of Integrated Standardization Theory in the Smart Grid Scheduling and Controlling System</b> Z. Kun, T. Liu, L.T. Tan, Y. Zou, Q. Li and L. Li	1307
<b>Research on AC-DC Power Flow to Solve the Instability of Micro-Grid</b> X. Xu, H.T. Chen and L. Feng	1314
<b>Research Status of Key Technologies of Seamless Switching in Micro-Grid</b> G.N. Xi, W. You, C.X. Wang, Y.N. Yuan and Y.M. Qian	1318
<b>Scenario-Based Stochastic Programming Strategy for Microgrid Energy Scheduling Considering Uncertainties</b> H.P. Li, C.Z. Zang, P. Zeng, H.B. Yu and Z.W. Li	1322
<b>The Controller Parameters Optimization for Droop Controlled Distributed Generators in Microgrid</b> Z.W. Li, C.Z. Zang, P. Zeng, H.B. Yu and H.P. Li	1329
<b>Two-Layer Optimize Algorithm for Microgrid Economic Dispatch</b> Y. Ding, R. Jia, K.S. Dong, Z. Li, W.C. Shen and Y. Zhao	1336
<b>Research on Supporting Role of Smart Grid in Wisdom City</b> L. Meng, W. Wang, Y.L. Wang and Q. Wang	1342
<b>Security and Stability Control System Testing Platform for Guangxi Region Power Grid on RTDS</b> Z.Y. Sun, T. Ding and M.S. Liu	1347
<b>Discussion about the Critical Business Demand of Smart Distribution Grid and Utilization</b> Y.B. Yang, S.M. Xu, L. Huang, X.Y. Chen, K. Yu, Y.C. Liao and L.J. Wu	1353
<b>Micro-Grid Energy Optimization Include Battery-Swapping-Station</b> L. Shu, F. Liu and X. Yang	1358
<b>The Implementation Pattern of Smart Distribution Grid and Utilization</b> S.M. Xu, Y. Liu, X.Y. Chen, L. Huang, Y.B. Yang, K. Yu and Y.C. Liao	1364
<b>New Method of Overhead Line Icing Online Monitoring</b> H.M. Zhou, H. Wu, Y.S. Quan and Z.J. Wang	1369
<b>Close-Operation Overvoltage of No-Load Transmission Line with Fault Current Limiter</b> H.S. Liu, T.T. Lv, M.M. Han, L. Zou, L. Zhang and Q.Q. Li	1373
<b>Study of the Winding Temperature Distribution for Distribution Transformers</b> Y.S. Quan, L.J. Fang, Z.J. Wang and P.X. Shi	1380

## **Chapter 13: Power Systems Management**

<b>Analysis of the Characteristics and Effects for Sichuan Province Electric Power Consumption</b> C. Chen and X.Q. He	1387
<b>Analysis on Power Grid Investment Base on Cointegration Theory and VAR Model</b> G.J. Deng, Z.L. Mao, K. Sun, H. Zhou and T.T. Zhang	1393

<b>Intellectualization and Reliability Evaluation of Distribution Network Based on Principal Component Analysis</b>	
Y.Q. Feng, J.H. Yang, L. Huang, B. Ji and J. Su	1400
<b>Medium and Long-Term Load Forecasting Using Grey Theory Based on Rough Sets</b>	
H. Zhang, Z.G. Lei, Y. Cheng and Y.M. Wang	1405
<b>Research on Optimization Model of Overseas Investment for Power Grid Enterprise</b>	
T. Liu and Y. Zhang	1409
<b>Short Term Load Forecasting Based on Fuzzy Clustering</b>	
Y.J. Wang, C. Lu and D.W. Li	1413
<b>Study on Application of Multi-Kernel Relevance Vector Machine in Data Validation of Thermal System in Power Plant</b>	
Y. Zhao, F.Q. Si and Z.G. Xu	1421
<b>Study on Dynamic Bayesian Game of Power Grid Crisis Management</b>	
S.H. Li	1425
<b>Study on the Theoretical Basis of Power-Grid Crisis Management</b>	
S.H. Li	1429
<b>Advanced Progress in Diagnosing the Reliability of Electrical Equipments by Infrared Thermography</b>	
F. Wang, J. Shi, L. Jun, R. Zhang and H. Tian	1433
<b>Application of Service Flow Technology Based on IEC 61970/61968 to Electric Power Information System</b>	
S.D. Zhang, Z.M. Shao and L.S. Li	1437
<b>Research on Reliability Evaluation Methods of Distribution System</b>	
Y.Q. Ou, L.F. Cheng, J.Z. Wen, X.Y. Qiu and T. Yu	1441

## **Chapter 14: Engineering Thermodynamics and Thermal Engineering**

<b>Flow Boiling Enhancement by the Surface Quenched in Nanofluid</b>	
W.B. Cui, Z.Q. Zhang, C.J. Song, F.M. Su and H.B. Ma	1449
<b>Numerical Analysis of Distribution of Ion Concentration Affected by Flame Temperature behind a V-Gutter Flameholder</b>	
X.J. Luo and W.J. Fan	1454
<b>Numerical Simulation for Heat Transfer and Fluid Flow Performances of Thin Film Evaporation in the Micro Rectangular Groove</b>	
J.M. Dong, C.L. Kang, H.C. Yuan and X.X. Pan	1459
<b>Numerical Simulation on Effects of Variable Specific Heat Ratio on Floating Ejector Nozzle</b>	
G.L. Zhou, Q. Wang and H.Y. Hu	1465
<b>Optimization of Parameters of Heat Exchangers of Air Heating Systems</b>	
A. Melekhin and A. Melekhin	1471
<b>Overview on the Determination Method of Viscosity Parameter of Organic Heat Carrier</b>	
G.X. Kou and L. Li	1481
<b>Research on Double-Stream Coil-Wound Heat Exchanger</b>	
J.X. Xue, Z.W. Zhang and Y.H. Wang	1485
<b>Research on Heat Storage-Release Property of Rectangular Array Tube Encapsulated Heat Storage Device</b>	
H.C. Tian and J.H. Niu	1496
<b>Research on Operation Optimization of Industrial Boiler by Principal Component Analysis</b>	
W.B. Wang, L. Chen, X.D. Wang and J.B. Pei	1501
<b>Simulation Investigation on Structural Parameter of Hot Air Igniter of Biomass</b>	
Y.Z. Cui, M.T. Tang, L.H. Zhang, P. Gao and G.K. Zhang	1506
<b>Study on the Basic Characteristics of Low Oxygen Air Combustion with Natural Gas in Glass Tempering Furnace</b>	
J.Q. Xia, G.H. Liu, Y.S. Wang and H.P. Li	1510
<b>Test and Research for Mercury Emission of Boilers in 700 MW Units</b>	
F.S. Liu, Y.L. Zhong, R. Xu, L.G. Chen and Y.J. Xia	1514
<b>The Study of Heat Transfer between Adjacent Units on Household Heat Metering</b>	
J.G. Yang and N.Y. Zhan	1519

<b>Numerical Simulation Analysis of the Optimized and Transformed 200MW Pulverized Coal Fired Boiler Burner</b> T. Lv and S.Z. Zhao	1524
--	------

## **Chapter 15: Power Machinery and Engineering**

<b>Active Predictive Control of Turbine Tip Clearance for Aero-Engine</b> K. Peng, D. Fan, R.R. Wu and Y.Q. Teng	1531
<b>Analysis of the Movement of the New Wave-Energy Dynamoelectric Equipment</b> H.P. Liu, W.T. Ma, A. Luo, L.K. Wang, Y.Y. Wang and Q.H. Zhang	1535
<b>Based on Concept of Generalized Instantaneous Space of Dynamic Performance Analysis</b> A.X. Liu, J. Wang, J.X. Kang, Q. Zhang, J. Sun and Q.L. Shu	1540
<b>Compressor Performance Curve Extrapolation Method Based on the Similarity Theory</b> Z.T. Wang, B. Bai, S.Y. Li, Q.C. Yang and M.Q. Wang	1545
<b>Finite Element Analysis of Large-Size Yaw Bearings with Supporting Structure in Wind Turbine</b> Z.G. Shang, Z.C. Ma and Z.S. Sun	1550
<b>Harmonic Balance Analysis for the Oscillations of Magnetic Levitation</b> Z.Y. Wang	1554
<b>Multiple Models Fuzzy PID Controller Design in Ship Power System</b> H. Jiang, X. Wang and L.M. Wang	1558
<b>MV “CRYSTAL STAR” Diesel Turbocharger Surge Cause Analysis and Troubleshooting</b> B. Li and S.J. Zhang	1562
<b>Research on Fast Driving Control Technology of Electric-Control Injector for Marine High Pressure Common Rail Diesel</b> Y.F. Kong, G.Y. Ouyang, Z.M. Liu and L. Li	1568
<b>Research on the Measuring and Calculating Methods of the Relative Internal Efficiency for Steam Turbine</b> J.G. Jin, W.T. Cui and J.W. Yu	1574
<b>Study on the Effects of Oxygenated Fuels on Diesel Engine Performance</b> X.D. Wang, C.H. Xiong, G.J. An, H.Y. Shang, F. Wang, G. Wang and F.C. Liu	1580
<b>Performance Model Development for the Adjustable Blades Axial Flow Fan Based on Multivariate Polynomial Fitting</b> D.H. Song, L.P. Hua and S.H. Li	1584
<b>Application of Siemens T3000 System Self Startup Control for Thermal Power Plant</b> Z.Y. Liang, R.F. Xu and Y.W. Li	1588
<b>Research Progress in Natural Frequency Calculation of Heat Exchanger Tube Bundles</b> G.N. Xi, C. Shi, S. Zou, Z.Y. Cheng and Y. Deng	1592
<b>Mechanism Analysis of a Boiler Economizer Corrosion</b> X.X. Xu, W.Y. Li, Y.T. Feng, X.G. Niu, Q. Wang and J. Ouyang	1596
<b>Economic Analysis of Water Source Heat Pump Using Thermal Power Plant Circulating Water Waste Heat</b> T.Y. Sun, J. Zhang, Q.Y. Wang and J.X. Ren	1600
<b>The Tooth Profile Design and Examination of Circular-Arc Gear Pump</b> Y. Zhou, S.H. Hao and M.H. Hao	1604

## **Chapter 16: Fluid Machinery and Engineering**

<b>Hydraulic Steering Gear Failure Analysis and Troubleshooting for MV “TANSUO HAO”</b> S.J. Zhang and B. Li	1611
<b>Hydro Turbine Nonlinear Model Parameter Identification Based on Improved Biogeography-Based Optimization</b> J. Zhao, L. Wang, Y.H. Tang, D.C. Liu and W.T. Sun	1617
<b>Simulation and Experiment of Residence Time Distribution in Short-Contact Cyclone Reactors</b> Y.C. Zhang and W. Zou	1622

<b>Study of Coupling Numerical Flow Field Simulation of Low-Pressure Last Stage Exhaust Passage in Steam Turbine</b>	1626
Z. Song, J.Q. Xu, L.P. Sun and M.T. Liu	
<b>Study of Pressure Characteristics in PWM Controlled Variable Rate Spraying System</b>	1633
H.H. Liu, X.H. Wei, J.F. Du and J.B. Huang	
<b>Floating Ring Balance Analysis of Journal Floating Ring Hybrid Bearing in Turbulent Regime</b>	1637
H. Guo and S.L. Zhang	
<b>Research on Supersonic and Subsonic Field of Externally Pressurized Gas Lubricated Bearing</b>	1642
C.T. Chen, J.F. Yang and D.J. Wang	
<b>The Mixed Modeling of the Steam Turbine Flow Characteristics Based on Improved Particle Swarm Optimization Level</b>	1650
N. Zhao, Y.M. Chen and H.J. Wang	
<b>Numerical Optimization for Bottom Structure of ZGM Medium Speed Mill</b>	1656
X.R. Zhu, C.Y. Liu and L. Cheng	

## **Chapter 17: HVAC, Air Conditioning and Refrigeration**

<b>Analysis on Thermal Comfort of Air-Conditioned Buildings in Malaysia: Case Study of Universiti Tenaga Nasional</b>	1665
I. Asadi, I. Hussein and K. Palanisamy	
<b>Dynamic Behavior of Air Condition System and Temperature Control Analysis</b>	1670
J. Wang, S.B. Geng, X. Han and H. Zhang	
<b>Entropy Analysis of a R32/CO<sub>2</sub> Cascade Refrigeration Cycle</b>	1676
J. Xiao and Y.F. Liu	
<b>Experimental Research on Small-Scale Variable Flow Refrigeration System for Data Cabinets</b>	1680
Y. Wang, F. Wang, Y. Qu, P. Wang, D.D. Yang and J.W. Zhang	
<b>Experimental Study on Throttling Refrigeration System Using Mixed Refrigerants</b>	1684
Z.F. Meng, F. Wang, Y. Qu, Y.L. Zhao and T. Li	
<b>Research Based on the Actual Project of Central Air Conditioning Intelligent Frequency Conversion System</b>	1688
Y.L. Lv, C. Teng and W.H. Chen	
<b>Simulation Analysis on Dynamic Load of Air-Conditioning System of Ocean-Going Ship</b>	1693
Z.C. Zhao, H. Cheng, W.X. Feng and B.J. Qin	
<b>Simulation Study on Ventilation &amp; Cooling for an Indoor Substation</b>	1700
R. Xu, Z.M. Mei and T.F. Yu	
<b>Study on Performances of Refrigeration-Type Compressed-Air Dryers Using Environmentally-Friendly Refrigerants R717, R290 and R600a</b>	1708
H. Liu and H. Xiao	
<b>The Application of Genetic Algorithm on the Regulation of Central Heating System</b>	1712
L.H. Zhang, D. Yang, L. Liu and T.T. Chen	
<b>The Load's Control of Central Air Conditioning System Based on Comfort</b>	1717
J.T. Fei, X.Y. Chen, S.M. Xu, L. Chen, Y.C. Liao, G. Wang and K. Peng	
<b>The Research of Constant Temperature and Humidity Air-Conditioning System of Underground Cellar</b>	1722
W. Wang, M.X. He, C.Y. Liu and Y. Zhang	
<b>Baseline Load Models of Air-Conditioning in Commercial Buildings Considering Temperature and Seasons</b>	1729
L. Chen, Y.B. Yang and Y. Shi	
<b>Experimental Study on a New Type of Shipping Container Refrigeration Unit</b>	1735
K.T. Hua, W.S. Yu and W. Chen	
<b>Research on the Application of Alternative Refrigerants R407C and R410A in Refrigeration-Type Compressed-Air Dryers</b>	1739
H. Liu, J.H. Li and H. Xiao	
<b>The Development of Device for On-Line Monitoring Circulating Cooling Water Stability</b>	1743
L.Q. Zhang, M.J. Sun, T. Zhang, Z. Li and H.W. Wang	

<b>CFD Simulation of Capillary Network Radiation Heating Comfort</b> S. Bin and J.L. Zhang	1748
<b>A Study of Cooling Load Calculation of Stratified Air Conditioning System for Large Space Based on the Simultaneously Solving Model</b> N. Cai and C. Huang	1755

## **Chapter 18: Mechatronics and Automation**

<b>Design and Simulation to Composite MPPT Controller on the Stratospheric Airship</b> K.W. Sun, M. Zhu, G.M. Liang and D.D. Xu	1765
<b>Impedance Control Based Sliding Mode for Lower Limb Rehabilitation Robot</b> F.C. Cao and L.M. Du	1770
<b>Optical Microscope Automatic Focusing Methods Research</b> L.X. Zhu, W.W. Yang, Z. Wang and Q.F. Liu	1774
<b>The Design of Depth Drill Machine Based on Automatic Control AC Servo System</b> X.W. Wang and H.W. Qin	1779
<b>Research Progress in Electro-Hydraulic Position Servo Controller</b> G.N. Xi, J. Li, C.Y. Sun, Y.Y. Zhang and T.M. Tang	1783
<b>Intelligent Control of Heating Systems in Public Building</b> W.B. Wang, D.D. Mu, X.D. Wang and S.Y. Wang	1787

## **Chapter 19: Green Building Materials, Energy-Efficient Buildings and Construction Technology**

<b>The Ecological Characteristics of Chinese Traditional Architecture</b> F.W. Tan	1793
<b>Analysis of Equilibrium and Carrying Capability of the Octahedral Truss Structure</b> A. Luo, Z. Kun, J.H. Song, H.P. Liu, T. Xiao and L.Y. Kong	1797
<b>Analysis of the Settlement in Rigid Pile Composite Foundation</b> J.F. Shan and X.S. Ge	1802
<b>Applied Research on Energy-Saving Technology of Buildings in Hot Summer and Cold Winter Regions of China</b> J. Li and F. Wang	1806
<b>Building Electrical Design and Energy-Saving Measures</b> L. Fang	1811
<b>Combined Support Technology with Bolt, Steel Mesh and Anchor Applied in Baoxin Coal Mine</b> B.S. Song, D.Y. Jing, S.T. Zhu and L.L. Chen	1818
<b>Experimental Investigations on Alkali-Activated Slag Cementitious Material</b> X.W. Sun, W.Y. Niu and L.L. Wang	1823
<b>Investigation Progress of Phase Change Building Materials</b> H.Y. Ni, X.Q. Zhu, J. Hu, Y. Bie, L. Chen and L.M. Chen	1828
<b>Review of Crumb Rubber Concrete</b> W. Li, Z. Huang, X.C. Wang and J.W. Wang	1833
<b>Road Performance of Silane Coupling Agent Modified Rubber Concrete</b> W. Li, Z. Huang, X.C. Wang and J.P. Zhang	1838
<b>The Relationship between Architectural Materials and Human Settlements</b> L.X. He, Q. Zhang and T. Jiao	1843
<b>The Study on Promotion of Chinese Green Energy-Saving Buildings</b> W.F. Li	1847
<b>Crack Resistance Design for the Circular Hydraulic Tunnel Lining Structures</b> W. Shen	1851
<b>Heating and Cooling Load Characteristics Comparison between Normal Building and Low Energy Consumption Building</b> Y. Su, F.L. Wang and Y. Fan	1855



<b>Key Technologies and Trends of Passive Buildings</b> L.Z. Shi and Y.M. Zhang	1859
<b>Relaxation Laws of Anchor on Pressure Dispersive Retaining Wall</b> J.Q. Wu, Y.Y. Li, H.B. Zhang, X.G. Song, Q.Y. Meng and S.F. Zhang	1863
<b>CCHP System Operating Strategy Optimization Research in one of Shanghai Office Building</b> L.H. Zhao, Q.F. Li, H.B. Ren, L.F. Song, X. Zhao, J.L. Zhao, J.J. Xu and L. Zhang	1868
<b>Research on Improved CCHP System Based on Comprehensive Performance Evaluation Criterion</b> F.X. Chen, J.Q. Xu, Z.Y. Li and M.T. Liu	1873
<b>Research on the Pass Optimization Design of Sintered Shale Porous Brick</b> J.L. Liu, J.N. Xie, P. Liu and M.Y. Huang	1879
<b>Experimental Study on Additives for the Reduction of Alkalinity for Ecological Concrete</b> Y. Zhuang, M. Wang and L.K. Zheng	1885
<b>Study on the Dynamic Response of Prestressed Concrete Beam under Explosive Load</b> Y.L. Wang and Y.Z. Li	1890
<b>Three-Point Flexural Normal Stress Analysis of Wood-Bamboo Sandwich Composite</b> X.F. Wu, J.Y. Xu, J.X. Hao, R. Liao and Z. Zhong	1894
<b>Research on Technology for Producing Green and Environmental - Friendly Silicate Glass</b> Y.Q. Tan, L. Tian, H.F. Tan and S.X. Cao	1899
<b>Numerical Modeling of Thermogravitational Convection in Air Gap of System of Rear Ventilated Facades</b> M. Petrichenko, N. Vatin, D. Nemova, N. Kharkov and A. Korsun	1903

## **Chapter 20: Computational Mathematics and Modeling, Data Processing, Communication and Information Technologies**

<b>A Wavelet-Based Method for Automatic Location of Peaks in Gamma-Ray Spectra</b> C. Xiong, S.H. Liu, Y.H. Li, D. Tang and C.H. He	1911
<b>An Efficient Coverage Hole Patching Algorithm Based on Intersection Knowledge</b> H.J. Wu, Y.H. Yu, L.X. Guo, X.C. Meng and N.N. Qin	1920
<b>An Improved Method of Firewall Policy Anomaly Detection Based on Decision Tree</b> T. Zhang, Y.Y. Ma, W. Li, J. Shi and N. Wang	1925
<b>An Improved Trace Method for Moving Target under Occlusion</b> Y.B. Dong, G.L. Cheng and M.J. Li	1931
<b>Decomposing Complete 3-Uniform Hypergraph into 5-Cycles</b> G.R. Li, Y.M. Lei and Jirimutu	1935
<b>Gait Analysis and Trajectory Planning for Lower Limb Rehabilitation Training</b> F.C. Cao and X.X. Xing	1940
<b>Modeling and Evaluation in an Interworking of WLAN and WiMAX Network</b> Y. Wang, J. Niu, X.Y. Huang and Y.M. Cheng	1944
<b>Modeling of Content-Aware Based on Multi-Sources Heterogeneous Data Sensed in the Internet of Things</b> B.B. Yu and L. Hu	1949
<b>Multi-Focus Image Fusion Based on Pyramid Decomposition</b> Y.B. Dong, M.J. Li and G.L. Cheng	1954
<b>Project Design on the Monitoring and Early-Warning of Pork Market in Beijing Based on Multi-Source Data Integration</b> F.T. Kong, S.W. Xu, K. Xu and C. Shen	1958
<b>Radon Transform Removes Correlation Noise Produced by Vibroseis</b> J.Q. Wang, J. Lin and X.B. Gong	1964
<b>Reduction-by-Projection Method for Linear Programming Problems</b> X. Tong and J.Q. Wei	1968
<b>Study on Defogging Effect Evaluation Method in Atomization Image</b> Z. Chen and F. Wu	1972
<b>Study on Performance Comparison of OLSR and AODV Routing Protocols</b> Y.M. Cheng, J. Niu and T.J. Sun	1977

<b>The Design and Implementation of Android-Based Mobile Learning Platform</b> C.M. Li, L. Hang and R. Wang	1981
<b>The Design of Library Management System Based on Internet of Things and Hand Lines Recognition System</b> W. Fang	1985
<b>Abstracting Clinical Pathway Sequence with Genetic Algorithm</b> Y.P. Wu and S.F. Du	1991
<b>Based on the Human Eye Fatigue Detection System of Recognition and FPGA Technology</b> J. Wang, Q. Liu and H. Zhao	1995
<b>Method of Fuzzy Modeling in Reliability Prediction Algorithm</b> H.X. Tian, W.F. Wu, P. Wang and H.Z. Li	1999
<b>Research and Application of Information Hiding Algorithm</b> X.C. Ma and Y.B. Liu	2009
<b>Research on Caching Mechanism Based on User Community</b> L. Yan and Y.S. Qu	2013
<b>Research on Integrals of the Second Category Curved Surface</b> X. Xu and L.N. Wang	2017
<b>Wireless Thermal Printer Based on Internet of Things</b> W.M. Yang, R.Z. Ge and P.F. Meng	2021
<b>Application of Improved LMS Adaptive Algorithm in Acoustics Pyrometry</b> S.P. Zhang, G.Q. Shen and L.S. An	2025
<b>Application of Wavelet Analysis in Random Drift Signal Filtering of Fiber Optic Gyroscope</b> H.L. Liu, W.Y. Chen and Z.S. Xu	2029
<b>MCL and ACO Based QoS Routing Algorithm for WSN Used in Power Line Monitoring</b> L.F. Li	2033
<b>The Interference Impact of UWB Sensor on Mobile Station of 3G Mobile System</b> T.J. Sun, W.D. Yang, Y.M. Cheng, F.Y. Duan and H.T. Mi	2037
<b>Application and Research of Systematic Cluster in IED Switch Online Condition Monitoring</b> K. Ma, C.C. Hu, S.Q. Feng, S.F. Tan, X. Jiang and H. Chen	2041
<b>Star Simulator Base on Multiple LEDs, Optical Fiber and Integral Sphere</b> X.J. Gan and Y. Chen	2048
<b>The Communication Research between PLC and PID Temperature Controller</b> C. Chen, W. Chen and H.D. Qiu	2052

## **Chapter 21: Demand, Supply, Development, Management of Energies and Resources**

<b>A Theoretical Framework on the Resource Industry: From the Value of Resource in Economy</b> M.X. Zeng and M.X. Gao	2059
<b>Adjust Energy Structure, Promoting Chinese Environmental Protection</b> J.G. Li	2065
<b>Assessment and Optimization of the Low Carbon Benefits of the Technical Transformation Projects for Loss Reduction in Power Networks</b> J. Zhang, Y.F. Li and Y.H. Yang	2070
<b>Construction of the Factors Affecting China's Hydropower Projects and Overseas Investment Risk Assessment Index System</b> S.J. Ge and A.N. Shi	2077
<b>Energy Consumption Forecasting in Hong Kong Using ARIMA and Artificial Neural Networks Models</b> S.L. Lai, M. Liu, K.C. Kuo and R. Chang	2085
<b>Investment Decisions Based on the Postponed Options PROT Hydropower Project</b> J.X. Shen and X.J. Guo	2098
<b>On the Influencing Factors and the Continuous-Improving Mechanism of China's Energy Efficiency</b> Y.P. Jing and D.D. Wen	2106

<b>Research on the Utilization of Renewable Energy in Tianjin</b> L.L. Tian, T.T. Wang, X.J. Guan and Z.B. Liu	2112
<b>Structural Decomposition of China's Energy Use during 2000-2011 with World Input Output Table (WIOT) Data</b> R.X. Liu	2117
<b>Study on the Model of the Stability of International Energy Cooperative</b> C. Gong, H.L. Yang and Q. Wang	2122
<b>Study on the Opportunities and Challenges of Chinese Energy Investment in the Middle East</b> Y.L. Huang	2127
<b>The Characteristics of China's Hydropower Projects Overseas Investment Risk and Possible Countermeasures</b> A.N. Shi and S.J. Ge	2132
<b>The Research of Multiple Attribute Group Decision-Making Method Based on Cloud-PROMETHEE</b> Y.P. Zhang, Z.F. Gao and D.H. Peng	2140
<b>The Research on Index System of Economic Society Development Based on the Medium and Long-Term Power Demand Forecasting</b> S.S. Wu, X.Y. Han and W.L. Xue	2146
<b>The Strategic Choice of Hexi New Energy Base under the Framework of the Silk Road Economic Belt: Based on the SWOT Analysis</b> L. Yan	2153
<b>Total-Factor Energy Efficiency and Influence Factors Analysis in Regions of China</b> H.X. Zhao, H.L. Mu, X. Chen and X. Han	2158
<b>A Survey on Ownership of Home Appliances and Electric Energy Consumption Status According to the Number of Household Member</b> A.N. Won and W.H. Hong	2165
<b>Impacts of Electricity Price Reform on Energy and Residents' Life in China</b> Y. Wang, X. Jiang, Y.L. Xu, Y.T. Liu and A. Huang	2169
<b>Research on the Evolution of the Complex Network Theory Based on the International Coal Trade</b> Y.Y. He and L. Wang	2173
<b>Renewable Energy Promotion Policy for Elementary, Middle, and High Schools in Seoul</b> J.W. Ju	2178

## **Chapter 22: Industrial Engineering and Project Management**

<b>Device Risk Ranking Research Based on the Potential Life Loss</b> G.L. Yang, X.S. Hu and C.J. Lu	2185
<b>New Fuzzy Classified Model for Disaster Loss</b> L. Shao, T. Yu and Q. Xu	2189
<b>Public Facilities Design in Sustainable Ways for Reconstruction Work of Yushu Area</b> A. Li, S.B. Kan, X. Zhang, X.Y. Song and S.L. Zhang	2195
<b>Research on Choice of Logistics Mode of B2C Enterprises with FAHP</b> Y. Lv, H.S. Sun and X.F. Wang	2211
<b>Investment Control of Construction Project</b> T.T. Wan and H.M. Li	2217
<b>Accounting "Pure" Risks in Early Stage of Investment in Construction Projects with Energy Efficient Technologies in Use</b> A. Ginzburg and A.I. Ryzhkova	2221
<b>The Way of Allocating Short-Supplied Talents in Multi-Project Based on Queuing Theory</b> H.Y. Chen, C.B. Li and F.J. Li	2225
<b>Introduction of Complex Automation of Engineering Infrastructure for the Solution of Operational Problems in Public Sports Pools</b> A. Volkov and E. Romanenko	2231

## **Chapter 23: Engineering Education**

<b>Application of Research-Oriented Experimental Teaching in Biopharmaceutical Courses</b> L.P. An, G.Y. Xu, X. Han, P.G. Du and H.Q. Wang	2237
<b>College Students' Innovative Thinking Ability Training Process and the Observation Result</b> Y.L. Sun, T.R. Yu and J.H. Wang	2241
<b>Research of Distance Education Based on Virtual Reality Technology in Power System</b> Y.Y. Wang	2245
<b>Study on the Environmental Education of Hydraulic Engineering</b> X.Y. Meng and S.H. Li	2249
<b>Study on the Mode of Talent Cultivating for Electrical Engineering and Automation Profession under the New Situation</b> S. Yang and D.S. Feng	2253
<b>Application of IOT in Physical Teaching of Ethnic Colleges</b> C.C. Dang and Y.G. Li	2257
<b>Research on the Application of IT in Electrical Automation Technology Major Course Teaching</b> S. Yang and D.S. Feng	2261
<b>Good Teaching Spirit Connotation and Countermeasure Analysis</b> C. Sun, Z.M. Zhou and H.Y. Liu	2265
<b>The Impact of Information Technology on the Performance Evaluation System of Scientific Research in Universities</b> D.S. Feng and S. Yang	2269