

Contents

Pa01-01	Power Flow Calculation Using Integrated Circuit Simulator	1
Pa01-02	Study on Method of User's Comprehensive Energy Use Behavior Decision Based on Evolutionary Game	6
Pa01-03	Simulation Study on the Power Transmission Stability of HVDC-connected Offshore Wind Farms	12
Pa01-04	Research on Wind Power Optimal Dispatch Based on Model Predictive Control	17
Pa01-05	A Novel Cross Iteration Method for Dynamic Energy Flow Calculation of the Hot-water Heating Network in the Integrated Energy System	23
Pa01-06	Energy Demand Forecasting for an Office Building Based on Random Forests	29
Pa02-01	Optimized Configuration Scheme of Harmonic Measuring Device Considering Practical Situations of Grid Nodes and Monitoring Device	33
Pa02-02	A Novel Framework for Optimal Sizing of a DC Microgrid Considering Energy Management and Battery Degradation	39
Pa02-03	Rule-based Energy Management Strategies for a Fuel Cell-Battery Hybrid Locomotive	45
Pa02-04	A Direct Method Based on Incidence Matrix for Unbalanced Three-phase Distributed Network	51
Pa02-05	Stability Analysis of Stand-alone Photovoltaic System Considering Controller Time Delay	57
Pa02-06	Particle Swarm Optimization Based on Fuzzy C-means Cluster for Day-ahead Allocation Plan of Multiple Photovoltaic Distributed Generation	63
Pa03-01	Bus-bar Splitting on Enhancing Static Voltage Stability for the Base and Contingency Cases	68
Pa03-02	Modelling and Control of Wind-PV-SOFC-Battery Based DC Microgrid	74
Pa03-03	DLR based Preventive Dispatch for Mitigating Wind Power Uncertainty Induced Line Overloads	80
Pa03-04	Dynamic Parameter Optimization of STATCOM Based on Model Predictive Control	87
Pa03-05	Comprehensive Energy System Evaluation Method Considering Multi-index System	92
Pa03-06	Optimal Configuration of Multi-energy Capacity Based on Complementary Characteristics of Wind, Solar, Hydro, Thermal, and Battery Energy	97
Pa04-01	Estimation of Solar Power by Combining Ground Measured and Satellite Data Using Artificial Neural Networks	103
Pa04-02	Impact of Integrating Solar Generation in Power Systems with Battery Energy Storage	109
Pa04-03	Model of the Energy Internet Architecture Based on the Hetero-Functional Graph Theory	114
Pa04-04	Fast Power System Dynamic Simulations Based on Differential Transform Method	120
Pa04-05	LCC-HVDC System Dynamic Phasor Modeling Based on Improved Switch Function	126
Pa04-06	Frequency Response Characteristics of PMSG-based Wind Turbines	132
Pa05-01	Optimal Configuration of Pumped Storage Capacity in Power Systems with High Penetration of Wind Power	138
Pa05-02	Planning of Microgrid Based on Information Gap Decision Theory	144
Pa05-03	The Control Experience of the AC-DC Interconnected Power System in China and its Reference Significance to Brazilian Power System	150
Pa05-04	Study on the Necessity and Role of Inertia in Power System Frequency Response	155
Pa05-05	Optimal Control Parameters of Battery Storage System for Frequency Regulation and	160

	Economic Analysis	
Pa05-06	Integrated Routing of Medium Voltage Distribution Network Based on Power Supply Unit Partitioning	166
Pa06-01	A Novel Hybrid Optimization Method in Distribution Network Feeder Reconfiguration	172
Pa06-02	Flexibility Optimal Dispatch of the Distribution Network with Virtual Power Plant	178
Pa06-03	Optimal Scheduling Considering Wind-Solar-Pumped Storage Economy and Fairness under Non-cooperative Game	185
Pa06-04	Wide Frequency Range Suppression of Subsynchronous Oscillation for DFIG Wind Farm Based on Optimal Control	191
Pa06-05	A Systematic Framework Presenting Impact of Dataset Completeness on Data Driven Approaches: A Transmission Line Fault Classification Study	197
Pa06-06	Study on Autotransformer's Low Voltage Side Over-current Protection with Circulating Current	204
Pa07-01	Protection Scheme for Collector Lines Based on the Current Amplitude Ratio with Spectrum Index	209
Pa07-02	Fast Security Analysis for Urban Power System Based on Full Voltage Level Security Region	215
Pa07-03	Optimal Planning of Electric-Heat Coupled Integrated Energy System with N-1 Constraints	221
Pa07-04	Research on Short-Term Load Forecasting Method of Power System Based on Seq2Seq-Attention Model	227
Pa07-05	Observer Based Fault-tolerant Control for DC Microgrids with Sensor Fault	233
Pa07-06	A Protection Method based on Phase Voltage Variation Characteristics for Generator Stator Ground Fault	238
Pa08-01	Protection Method of Small Current Grounding System Based on Phase Current Variation	243
Pa08-02	Dynamic Load Shedding Strategy Using Distributional Deep Reinforcement Learning in Power System Emergency Control	248
Pa08-03	Economic Analysis of Thermal Power Plants Considering Hidden Costs in Deep Peak Shaving	254
Pa08-04	Cool Storage Technology Selection Based on the Operation Simulation of Electric-thermal Integrated Energy System	261
Pa08-05	Decentralized Economic Dispatch of Integrated Electricity-gas energy System Considering P2G and Line Pack	267
Pa08-06	Non-cooperative-game-based Multi-agent Collaborative Planning Method for Distributed Generations	273
Pa09-01	Cost-Benefit Evaluation for Battery Energy Storage Considering Degradation and Data Clustering in Performance-Based Frequency Regulation Service	279
Pa09-02	A Demand Side Industrial Aluminum Load Control Scheme based on Output Regulator Theory for Wind Power Smoothing	286
Pa09-03	Fault Location Technology of Transmission Line and Asynchronous Phasor Measurement from pmus	292
Pa09-04	Lightning Probability Warning of Transmission Line Based on Bayesian Network	298
Pa09-05	Research on the Influencing Factors Affecting Carbon Emissions in Fujian Province	304
Pa09-06	The Influence of Urban Rail Transit's Stray Current on Power Grid and Its Synchronous Monitoring	308
Pa10-01	Remote Harmonic Mitigation within Offshore Wind Power Plants by Embedded Active Filters in Grid-Side Converters	313
Pa10-02	A Simulation-Constraint Graph Reinforcement Learning Method for Line Flow Control	319
Pa10-03	Cooperative Optimal Operation of Multi-Area Integrated Electricity and Natural Gas System	325

	Based on Bargaining Game Model	
Pa10-04	Analysis on Transient Overvoltage Mechanism of Large-scale Renewable Energy Integration System	332
Pa10-05	Monitoring Method of Injection-type Generator Stator-to-earth Insulation State in Neutral Point Combined Grounding Mode	337
Pa10-06	Construction of the Evaluation Index System of the Regional Integrated Energy System Compatible with the Hierarchical Structure of the Energy Internet	342
Pa11-01	Evaluation of Frequency Regulation Performance of Energy Storage Power Plants Based on Correlation Analysis and Combined Weighting Method	349
Pa11-02	Design and Control of Battery Energy Storage System Based on Cascaded Multilevel Converter with Reduced Low-Frequency Battery Current Ripple	355
Pa11-03	Modal Frequency and Damping Evaluation of Grid-Connected vsocs in Sub-Synchronous Range Based on Motion Equation Method	361
Pa11-04	Hierarchical Game Trading Model for Multiple vpps Considering the Interaction with Distribution System	368
Pa11-05	Optimal Sizing of Variable-speed Seawater Pumped Storage Based on Maximum Efficiency Tracking	374
Pa11-06	Impact Suppression Method for PV Power Generation Grid-reconnection Based on DC Voltage Control	380
Pa12-01	An Improved Control Method for Suppressing Capacitor Voltage Fluctuation of Medium -Voltage Motor Drives Based on Cascaded H-Bridge	386
Pa12-02	State of Health Equalization Strategy for Retired Battery Based Energy Storage System	392
Pa12-03	Research on Construction and Dispatching of Virtual Power Plant Based on Reserve Energy Storage of Communication Base Station	398
Pa12-04	Capacity Limitation Service for Multi-Energy Virtual Power Plants Based on Multi-Parametric Programming	404
Pa12-05	The Design Method of AC-DC Microgrid Based on Smart Energy Station	410
Pa12-06	Robust Adaptive Frequency Modulation Strategy for Variable Speed Pumped Storage in Generator Mode	415
Pa13-01	Stability Analysis of Cascaded H-Bridge Power Electric Transformer-Boost Converter Cascade System	421
Pa13-02	Adaptive Robust Unit Commitment in Coordinated Electricity and Natural Gas System	427
Pa13-03	Coordination of Industrial Load Management and Micro-Turbines for Improving Renewable Energy Utilization Efficiency	433
Pa13-04	Life Cycle Economic Analysis of Integrated Energy Station Combined with a Aractical Project	439
Pa13-05	Practices and Suggestions on the Construction of Port Shore Power in the Context of "Protection of the Yangtze River"	443
Pa13-06	Frequency Control Strategy of Energy Storage System Based on SOC under Distributed Photovoltaic Intensive Access	447
Pa14-01	Collaborative Optimization Dispatch for Multi-microgrids System with Combined Cooling, Heating and Power	452
Pa14-02	Service Restoration Based on Interruption Loss for Resilient Distribution System Considering Distributed Generations	458
Pa14-03	Research on Low-Frequency Offshore Wind Power Transmission and Frequency Conversion Technology	464

Pa14-04	Transient Stability Analysis of Power System with Integration of dfigs Based on Complementary Cluster Center of Inertia-Relative Motion	469
Pa14-05	Energy Scheduling and Decision Learning of Combined Cooling, Heating and Power Microgrid Based on Deep Deterministic Policy Gradient	476
Pa14-06	Dispatching Methods and Strategies for Controllable Charging Pile Clusters To Participate in Grid Ancillary Services	482
Pa15-01	Robust Dispatch of Integrated Electric-Heat Systems Considering Weather-Parameter-Driven Residential Thermal Demands	487
Pa15-02	A New Integrated Heat Storage and Heat Load Control Method to Erase the Wind Power Curtailment	493
Pa15-03	A Convolution Neural Network Method for Power System Oscillation Type Identification	499
Pa15-04	Reliability Evaluation of Distribution System with Multi-energy Integration Considering Comprehensive Demand Response	505
Pa15-05	Coordinated Operation of An Islanded Multi-energy Microgrid with Demand Response	512
Pa15-06	Optimal Operation Strategy of Port Integrated Energy System Considering Demand Response	518
Pa16-01	Distributed Generation Capacity Planning Method of AC/DC Hybrid Distribution Network Based on Different Functions of Energy Storage	524
Pa16-02	A Fuzzy Control Strategy for Grid Connected DFIG System Based on Dissipated Energy Coefficient	530
Pa16-03	Efficient Operation of Electricity Market Considering the Flexible Load Based on Improved PSO Algorithm	537
Pa16-04	Integrated Energy Coordinated Control System of Industrial Park and Its Application	541
Pa16-05	Simulation Research of MMC Based Multi-Terminal AC/DC Converter	547
Pa16-06	Optimizing and Controlling Building Electric Energy Using catboost under the Energy Internet of Things	553
Pa17-01	Design and Research of Substation Measurement System Based on Internet of Things Technology	559
Pa17-02	An Improved Short-Term Load Forecasting Method Considering Thermal Inertia Effect	564
Pa17-03	Research on Digital Design and Control Technology of Secondary Circuit in Substation	569
Pa17-04	Composite Error Model Analysis of Digital Metering System in Smart Substations	575
Pa17-05	A Comprehensive Survey on Transformer Fault Diagnosis and Operating Condition Prediction	579
Pa17-06	A Data-driven Method of Users-transformer Relationship Identification in the Secondary Power Distribution System	585
Pa18-01	Vehicle Position Measurement and Misalignment-Effect-Eliminated Metal Object Detection for Wireless EV Charging System: A Dual-Purpose Design of Sensing Coils	591
Pa18-02	Research on the Optimization Method of Capacity Configuration of DC Microgrid	597
Pa18-03	Robust Frequency Lock Loop based Power Control and Harmonic Compensation Method for Bidirectional AC/DC Converter	601
Pa18-04	Thermal Behavior Analysis of Wireless Electric Vehicle Charging System under Various Misalignment Conditions	607
Pa18-05	A Multi-Port and Reconfigurable Hybrid AC/DC Microgrid Architecture with Hierarchical Power Control for Nearly/Net Zero Energy Buildings	613
Pa18-06	Analysis of S-S Resonance Compensation Circuit of Electric Vehicle Wireless Power Transfer System	619
Pa19-01	Sliding Mode MPPT Control Based on Fuzzy Exponential Approach Rate for PV Cells	623

Pa19-02	Dual-Port Machine Imitation Control for AC-DC Interlinking Converters in Hybrid Microgrids	627
Pa19-03	Coupled Optimization of Topology Reconfiguration and Voltage Source Converter Control for Enlarging Load Margin of AC/DC Distribution Network	633
Pa19-04	A Current Spike Reduction Method for Totem-pole Bridgeless PFC at Zero-crossing	638
Pa19-05	Analysis and Simulation of Energy Router Suitable for Metro Power Supply Network	643
Pa19-06	A Novel Model Predictive Control Approach for Voltage Regulation and Efficiency Optimization of Wireless Power Transfer Systems	648
Pa20-01	The Interoperability Test of Off-Board Charger for Electric Vehicle	654
Pa20-02	Coordinated Charging Strategy for Electric Vehicle Charging Station Based on Demand Prediction	659
Pa20-03	Start-up Strategy for DR-MMC Paralleled Hybrid HVDC Integrated with Offshore Wind Power	665
Pa20-04	Coordinated Frequency Control Strategy for Electric Vehicles and Air Conditioners Based on Hierarchical Control Scheme	670
Pa20-05	Bidding Strategy for FTR Auction Market Based on Deep Reinforcement Learning	676
Pa20-06	Research on Energy Station System Design Based on Substation Function Expansion	682
Pa21-01	LSTM Recurrent Neural Network based Interactive Behaviour Learning of Microgrid under Incomplete Information	688
Pa21-02	Automatic Adjustment Method of Power Flow Calculation Convergence for Large-scale Power Grid Based on Knowledge Experience and Deep Reinforcement Learning	694
Pa21-03	Measurement of the Resistive Component of Grounding Impedance by Square Wave Excitation	700
Pa21-04	A Bi-directional Maximum Matching Method Based on Thesaurus for Power Outage Address Matching	705
Pa21-05	Explainable AI in Deep Reinforcement Learning Models: A SHAP Method Applied in Power System Emergency Control	711
Pa21-06	Analysis on New Techniques of Secondary and Auxiliary Control System in Intelligent Substation	717
Pa22-01	Generation of Large-scale Convergent Power Flow Samples Through a Data-driven Approach	722
Pa22-02	Peer-Peer Electricity Transaction and Integrated Regulation of VPP based on Blockchain	727
Pa22-03	A Novel Smart Grid Simulation Framework Based on Software Defined System and Cloud Computing	733
Pa22-04	The Edge Computing Aided Security Information Transformation via Relay	739
Pa22-05	Multinodal Forecasting of Industrial Power Load Using Participation Factor and Ensemble Learning	745
Pa22-06	Resource Scheduling Strategy of Edge Computing Based on Bloom Filter Classification for on-site Sensing Tasks	751
Pa23-01	Application of Optical Wireless Communications for the 5G enforced Smart Grids	756
Pa23-02	Vulnerability Analysis of Cyber-physical System Based on Improved Structural Entropy	761
Pa23-03	Extreme Risk Assessment in Power System Considering Cyber Attacks	766
Pa23-04	Countermeasure Analysis of Power System Network based on Markov Game Theory	771
Pa23-05	Cyber Security Risk Identification in Power Internet of Things System	777
Pa23-06	A Synchronous Iterative Method of Power Flow in Inter-Connected Power Grids Considering Privacy Preservation: A CPS Perspective	782
Pa24-01	A Soft-Robotic Gripper for Ultra High-Voltage Transmission Line Operations	788
Pa24-02	Optimized AC Fault Ride-through Strategy for Back-to-back VSC-HVDC System	794
Pa24-03	Research on Inverter Side AC Fault Ride-through Strategy for Hybrid Cascaded Multi-terminal	800

HVDC System

Pa24-04	Decomposition Characteristics of SF ₆ /N ₂ under Partial Discharge of Different Degrees	806
Pa24-05	Research on UHV DC Fault Form and Its Influence	810
Pa24-06	Research on Soil Resistivity Modeling Method of DC Grounding Electrode	816
Pa25-01	Coordinating Operation and Control Strategy for the Integrated Wind-Storage VSC-MTDC System	822
Pa25-02	Dimension Reduction Based Short-Term Voltage Security Preventive Control	828
Pa25-03	Calculation of Wide-Area Earth Surface Potential of HVDC Grounding Electrodes	834
Pa25-04	Comparison Analysis of Modulation Strategies for Modular Multilevel Converter	839
Pa25-05	Analysis of Operating Voltage Characteristics of UHV Transformer Medium-Voltage Side Reactive Power Compensation	846
Pa25-06	Thermoelectric Coupling Characteristics of 1100kv GIS/GIL Basin Insulators under AC and DC Voltage	852
Pa26-01	Electric Field Joint Checking Method for Isolated Power Supply Transformer of 535kv DC Circuit Breaker Considering Air Conductivity	857
Pa26-02	Study on Wind Induced Vibration Response of High-voltage Disconnecter Switch by Wind Tunnel Test	863
Pa26-03	The Influence of Shan-Wu HVDC System on the Operation Characteristics of Hubei Power Grid	868
Pa26-04	Preparation and Mechanical Properties of Modified Epoxy Composites Through Plasma Fluorination of Filler	874
Pa26-05	Research on Reactive Power Control Strategy of MMC HVDC Converter	880
Pa26-06	The Multiple Solution Problem of Static Power Flow in AC/DC Hybrid System	885
Pa27-01	Multi-Source Partial Discharge Signal Separation and recognition Method Based on manifold Learning in Oil-pressboard Insulation System	890
Pa27-02	Optimal Placement of Dynamic VAR Compensation for Lessening Commutation Failure Risk in Multi-infeed AC/DC System	896
Pa27-03	Analysis Method of Factors Affecting the Settlement of Large Power Users	902
Pa27-04	Distributed Generation Placement Considering Carbon Trading in the Context of Energy Internet	908
Pa27-05	Radiation Influence Model of Electric Vehicle Charging Station	914
Pa27-06	The Development of Smart Low-Voltage Distribution Network in Shenzhen	918
Pa28-01	Competitiveness Analysis of Resources Comprehensive Utilization Self-generation Power Plants under New Situations	923
Pa28-02	Day-ahead Bidding Strategy for the Smart-building Virtual Power Plant Participating in Energy and Frequency Regulation Market	929
Pa28-03	Research on Application Path of Power Big Data Realization under the Background of Energy Internet	933
Pa28-04	Bidding Strategies for Thermal Power Units Considering the Randomness of Renewable Energy Sources in a Unified Power Market	939
Pa28-05	Integrated Energy Service for "5G" in China: Market Prediction and Case Study	944
Pa28-06	Research on Differential Distribution Price of Incremental Distribution Network	950
Pa29-01	Identifying the System-related Conditions and Consequences of Power-to-X Solutions for a High Renewables Penetration in Denmark	955
Pa29-02	Research on Economic Evaluation for Typical Integrated Energy Services	961
Pa29-03	Analysis of Multi-Time-Scale Business Models for the Development of Virtual Power Plants	965

Pa29-04	A Calculation Method of Network Charge Based on the Shortest Path of Typical Topology	971
Pa29-05	Procurement Market for Reactive Power Reserve Considering Coupling of Energy with Reactive Power	977
Pa29-06	Defining Three Distribution System Scenarios for Microgrid Applications	982
Pa30-01	Impact of Energy Storage on Security-constrained Unit Commitment of Power System with Wind Power Integration	988
Pa30-02	Design of Real-time Message Synchronization cross Smart Grid Dispatching System	994
Pa30-03	Demonstration Project and State Estimation Application in PMU-Based Distribution Network	1000
Pa30-04	Design and Performance Test of Power Compensated Energy Storage Flywheel on Drilling Platform	1005
Pa30-05	Design of Dry-type Transformer Online Monitoring and Fault Diagnosis System	1010
Pa30-06	Analysis on the Optimized Current Control for Delta-Connected Cascaded STATCOM	1014
Pa31-01	Coordinated Generation and Transmission Expansion Planning with High Proportion of Renewable Energy	1019
Pa31-02	Optimal Configuration for Power Electronic Transformer Ports Considering the Optimization of Transfer Paths	1025
Pa31-03	Design Key Points and Multi-Field Simulations for Half Bridge Module of Converter Valve Based on sic IGBT	1031
Pa31-04	Power Safety Warning Method Based on GM-FHMM Load Decomposition Algorithm	1037
Pa31-05	Compressed Sampling and Reconstruction Method of Transient Power Quality Signal	1043
Pa31-06	Research on Optimal Configuration of Emergency Reserve for Fluctuation Risk of Renewable Energy Output	1049
Pa32-01	Spatial Correlation Based Short-term Wind Speed Forecasting	1054
Pa32-02	Dynamic Reactive Power Compensation in Multi-Infeed HVDC Power Grid Considering Transient Stability	1059
Pa32-03	Damage Differences of Carbon Fiber Reinforced Polymer under Different Lightning Current Components	1065
Pa32-04	Ultraviolet Absorption Spectroscopy Measurement of Gas Mixture of SF ₆ Decomposition Components SO ₂ and CS ₂	1069
Pa32-05	Influence of Micro-water on Decomposition Characteristics of C ₄ F ₇ N/CO ₂ Mixed Gas	1074
Pa32-06	A Strategy for Mode Transition of Energy Storage Converter	1079
Pa33-01	A Hybrid Forecasting Model for Wind Energy based on the Complementary Ensemble Empirical Mode Decomposition and Whale Optimized Back Propagation Neural Network	1084
Pa33-02	Research on Interchangeability of Intelligent Electronic Device Based on Plug and Play in Intelligent Substations	1090
Pa33-03	Analysis on Market Potential of Generation-side Contract Electricity Transfer Transaction	1095
Pa33-04	Correlation Analysis of Aging Indicators for Distribution Network XLPE Cables	1101
Pa33-05	A Data-Driven Approach for Fast Reliability Calculation under a Given Investment Strategy	1106
Pa33-06	Modeling of Dynamic Behavior for Suspension Insulator String under Wind and Rain Loadings	1111
Pa34-01	Improved Magnetic Force Computation Method Using Parameterized Multi-layer Mesh Techniques	1117
Pa34-02	Efficient Transient Magnetic Field Computation Using Adaptive Dual-order Finite-element Method	1121
Pa34-03	Analysis about Potential Distribution of the Ur 780kv Metal-oxide Surge Arrester for 1000kv Substation	1125

Pa34-04	Study on the Characteristics of Reactor Core Vibration Acoustic Signal under Different Excitation	1131
Pa34-05	Implementation of Equivalent Circuit Model of Solid Oxide Fuel Cells for Multi-physics Transients Simulation Using Simulink/simpower Systems	1137
Pa34-06	Electromagnetic Transient Model of Multi-infeed DC System Based on Accurate Modeling of Converter Valve	1143
Pa35-01	Optimization of Lightning Warning Effectiveness Assessment Method for Atmospheric Electric Field	1149
Pa35-02	Lightning Strike Ablation Characteristics of Overhead Transmission Lines	1154
Pa35-03	Study on the Induction Coupling Response Characteristics of Parallel Cables	1158
Pa35-04	Locating Lightning Arrester Counters in UAV Inspection Video of Overhead Transmission Lines	1161
Pa35-05	Research on the Correlation Between the Moisture Content and Insulation Performance of XLPE Cables	1166
Pa35-06	Research on the Step Response Testing Technology of DC Measuring Device in VSC-HVDC	1170
Po01-01	Analysis of Harmonic Spatial Distribution along AC Power Lines of Meshed Power Systems	1176
Po01-02	Multilevel Dispatch and Control for Grid Interconnected Wind-CAES Hybrid Systems	1182
Po01-03	Mechanical & Thermal Stress Analysis under Actual Condition and Test Design of 550kv High Coupled Split Reactor	1187
Po01-04	A Robust Two-stage Dispatching Model with Wind Power Correlation and Multiple Uncertainties	1193
Po01-05	A DC Power Flow Controller for Multi-Terminal DC Grids	1199
Po01-06	A Novel Uncertainty Characterization Method for Source and Load in Renewable Power Grid	1204
Po01-07	Research on Clustering Algorithm of Load Decomposition Considering Harmonic Characteristics in Power Safety Monitoring	1210
Po01-08	Indicator State Recognition Based on HSV Feature Transformation	1216
Po01-09	Optimized Model of an Inset-Permanent Magnet Machine with Low-Cost Ferrite Magnet to Acquire Improve Electro-mechanical Performances	1220
Po01-10	Solving 3D Low-frequency Electromagnetic Field Problems Based on freefem++	1225
Po01-11	Research on Internet of Things Convergence and Access Architecture of Intelligent Equipment	1230
Po01-12	Digital Twin for Power System Steady-state Modelling, Simulation, and Analysis	1233
Po01-13	Stability Analysis of Power Fluctuation Suppression Converter in Radar Power System	1239
Po01-14	Effect of GIC's Frequency Variation on Transformer Bias	1245
Po01-15	Seamless Transfer Control Strategy of Multi-Energy Complementary Microgrid	1251
Po01-16	Networking Scheme of Electric Energy Router for Dispersive End Consumers in Remote Distribution Networks	1257
Po01-17	Small Signal Modeling Method for VSC-MTDC System with Wind Farms	1263
Po01-18	Spatial-Temporal Distribution Prediction of Charging Load for Electric Vehicles Based on Dynamic Traffic Information	1269
Po01-19	Research on Reactive Power Coordinated Control Strategy of Doubly-Fed Wind Farm Considering STATCOM	1275
Po01-20	Simulation and Analysis of Community Energy Consumption Based on Multi-agent Modeling	1280
Po01-21	Smart Grid Dispatching Strategy Considering the Difference of Electric Vehicle Demand	1285
Po01-22	Optimal Dispatch of Power Electronic Transformer Embedded AC/DC Hybrid Distribution System	1291
Po01-23	A New Reactive Power Optimization Method for Distribution Network with High Participation of Renewable Distributed Generation	1298

Po01-24	Accuracy Evaluation Method for Electromechanical Transient Model of Dynamic Reactive Power Compensation Device Applied to Renewable Power Station	1303
Po01-25	Steady-State Security Region-based Chance-Constrained Optimization for Integrated Energy Systems	1307
Po01-26	Joint Dispatching Strategy of Distributed Generation and Electric Vehicle Based on Virtual Power Plant	1313
Po01-27	Real-time Rapid Simulation Model for Faults Near the DC Drop Point Based on Dynamic Phasor Theory	1319
Po01-28	A quantitative Modeling Method of Occupant Behavior of Office Building Based on Human Dynamics	1325
Po01-29	Transmission and Distribution Networks Coordinated Volt/var Control Method and Its Application in Jibei Grid	1331
Po01-30	Study on Modeling and Thermal Behavior of Spiral Wound Aluminum Electrolytic Capacitor	1337
Po01-31	Coordinated Operation of Multi-Line Power Transmission for Hydrodominated Power Grid	1343
Po01-32	Probabilistic Optimal Power-Water Flow Analysis of Integrated Electricity-Water System Considering Uncertainties and Correlations	1349
Po01-33	Design of Micro Dynamic Simulation System for Power System with Wind Power and VSC-HVDC	1355
Po01-34	A Novel Binary Social Learning Particle Swarm Optimizer for Power System Unit Commitment	1361
Po01-35	Decentralized Optimal Gas-Power Flow Calculation via Modified Generalized Benders Decomposition	1366
Po01-36	Study on Power Flow Linearization Based on Error Correction of Voltage Profiles	1371
Po01-37	Analysis of Grid Interfaced Proton Exchange Membrane Fuel Cell Characteristics	1376
Po01-38	A Short-term Electric Load Forecasting Method Based on Improved VMD-LSSVR Considering Comprehensive Energy Correlation	1382
Po01-39	Generation Method of Power System Test Examples Based on Complex Network Theory	1389
Po01-40	Piecewise Linear Ramp based Preventive Dispatch for Intra-Interval Power Insufficiency	1395
Po01-41	Robust Optimal Dispatch of Power Grid Considering Wind/PV Power Uncertainties	1401
Po01-42	Research on Load Modeling Considering Distributed Photovoltaic Generation	1407
Po01-43	Analysis on the Influence of Multi Source Load Connection on Distribution Network Operation	1413
Po01-44	An Optimal Configuration Method of APF Applied to Distributed Grid of Distributed poverty Alleviation Photovoltaic Power Supply with High Penetration Rate	1417
Po01-45	Multi-Energy System Planning for Low-Carbon Park Considering Supply and Demand Interaction	1423
Po01-46	A Piecewise Function Based Equivalent Aggregation of Photovoltaic Array Considering Partial Shading Situation	1428
Po01-47	Modeling Principle and Parameter Identification of Double Fed Wind Turbine for Electromechanical Transient Simulation of Power System	1433
Po01-48	Adjustable Robust Economic Dispatch: Case Study on its Application and Evaluation in Power System	1439
Po01-49	Simplified CCHP-HP System Design Method Based on Yearly Operation Analysis	1444
Po01-50	A Bi-level Robust Planning Method of Active Distribution Networks with Uncertain Renewable Energy Sources	1449
Po02-01	Credibility-based Risk Assessment of Load Loss in Active Distribution Network	1455
Po02-02	Research on Identification Approach of Coherent Groups of Generators Based on Elbow	1461

Judgment

Po02-03	An N-1 Short-Time Security Constrained Dispatch for Hybrid AC/DC Power Systems: Chance Constrained Approach	1467
Po02-04	An Interval Programming based OPF Model Considering N-1 Security Criterion for Hybrid AC/DC Power Systems	1473
Po02-05	Heat Pumps Optimal Scheduling Based on Equivalent State Space Thermal Model	1479
Po02-06	Research on Real-time Simulation of Wide Area Out-of-step System in CSG	1485
Po02-07	Research on Control Strategy of Energy Storage System as Black Start Power Supply	1490
Po02-08	Frequency Regulation and Optimization of Microgrid System with Multi PV-VSG Using Advanced Droop Controller	1495
Po02-09	A Method of Remote Experiment for Complex Energy System: An Example for Process Control Experiment of Thermal Power Plants	1501
Po02-10	Optimal Trading Strategy of Coordinating Electricity Purchase in Monthly Electricity Market and Day-ahead Market Based on cvar	1507
Po02-11	Dynamic Modeling of Natural Gas Pipeline Using Electric Circuit Equivalents	1512
Po02-12	Key Technology Research of Integrated Energy System	1517
Po02-13	Research on Temperature Distribution Calculation of UHV Shunt Capacitor Unit	1523
Po02-14	Robust Data-driven Linearization for Distribution Three-phase Power Flow	1527
Po02-15	Multi-objective Optimal Scheduling of Power Systems Based on Complementary Characteristics of Heterogeneous Energy Sources	1533
Po02-16	The Impact of High-Speed Heavy Electric Railway Load on Wind Farms	1539
Po02-17	A Multi-energy Virtual Power Plant Model Based on Distributed Energy Resource Aggregation	1543
Po02-18	Review on Modeling Methods of Large-Scale Wind Power Connected UHVDC Systems	1549
Po02-19	Security and Stability Problems Faced by the Transformation of Full Clean Energy in the Power Grid at the Transmission End and Countermeasures	1554
Po02-20	Comprehensive Evaluation Indices and Method for Power Supply Planning with Complex Power Structure	1559
Po02-21	Research on Low voltage ride through Control Technology Based on Dynamic Voltage Restorer	1565
Po02-22	Integration of Mobile Energy Resources and Demand Response to Strengthen the Survivability of Isolated Distribution Systems	1571
Po02-23	Robust Economic Optimal Dispatch Method of Wind Power System considering AC Power Flow Constraints	1578
Po02-24	Fine Planning Method of Power Grid Based on Principal Component Analysis and Index Correlation Degree	1585
Po02-25	The Key Issue of Control Strategy for Large-scale Wind Power Grid Integration	1589
Po02-26	Effects of Iron Core Materials on a Single-phase Power Transformer during Out-of-Phase Synchronisation in microgrid	1593
Po02-27	Optimal Scheduling for Integrated Energy System Considering Shiftable Loads and Thermal Energy Storage of Building	1599
Po02-28	Medium-long Term Load Forecasting of Power System Based on Interval Taylor Model Algorithm	1604
Po02-29	A Random Matrix Theory Based Systematic Condition Assessment Method for Integrated High-power PEMFC System	1608
Po02-30	Review on Transient Power Angle Stability of System with Doubly-fed Induction Generator Based on Virtual Synchronous Generator	1614

Po02-31	Integrated Multi-Stage Coordination Planning of Transmission Network and Thermal generation units' Flexibility Reformation	1620
Po02-32	Dynamic Estimation Algorithm for Modulation Frequency under Off-nominal Frequency and Oscillations	1626
Po02-33	Optimized Tie-line Planning of Distribution Networks with Explicit Reliability Constraints	1632
Po02-34	A Robust Model Predictive Control for Multi-microgrids Frequency Control	1637
Po02-35	Integrated Energy System Planning & Operation Evaluation Based on Multiple Economic Indexes	1642
Po02-36	Robust Economic Dispatching of High Renewable Energy Penetrated System with Concentrating Solar Power Providing Reserve Capacity	1647
Po02-37	Study on Main Factors of Dynamic Stability for Regional Interconnected Power System	1653
Po02-38	An Active Power Control Strategy for Multi-source System Considering Section Safety Constraints	1659
Po02-39	The Design of Substation Structure	1665
Po02-40	Multi-Objective Optimization of Distributed Energy Systems under Uncertainty	1670
Po02-41	Nonparametric Modeling Method for Correlation Analysis of Performance Indexes Against the Load Loss Caused by Power System Cascading Failures	1675
Po02-42	Economical Optimal Configuration of Electric-heat Hybrid Energy Storage System Based on Improving Wind Power Consumption	1680
Po02-43	Protection in Active Distribution Network Against Short Circuit Fault and Broken line Fault	1685
Po02-44	Distributed Generation Optimal Placing Approach Considering Low-voltage Control in Low-voltage Distribution Network	1691
Po02-45	The Early Warning of Icing Flashover Fault of Transmission Line Based on Support Vector Machine and Partial Mutual Information Method	1697
Po02-46	Research on SVG Correlation Control Strategy Based on Voltage Slope Detection	1703
Po02-47	Identification of Key Lines of Power Grid under Typhoon Disaster Based on Situation Awareness	1707
Po02-48	Event-Driven Fast Frequency Response for Large Active Power Disturbances	1712
Po02-49	Multi-energy Energy Hub Configuration Method Containing New Energy Consumption	1717
Po02-50	Frequency Regulation Strategy of Wind Farm Considering Complex Wind Speed	1723
Po03-01	Active Dispatch Method of Wind Farm with dfigs Considering Reactive Power Regulation Capability	1729
Po03-02	Identification of Key Transmission Section in Energy Internet	1734
Po03-03	Capacity Optimization Configuration Method of CSP-PV Power Generation System Considering Regulation Demand	1739
Po03-04	Energy Savings from the Mutual Operation of Two Interconnected Energy Stations a Case Study	1745
Po03-05	A General Coordination Scheme for Zero-sequence Current Differential Protection on Series-compensated Multi-circuit Line	1750
Po03-06	Shutdown Risk Assessment of Small-Size Hydropower Station under Typhoon Disaster	1756
Po03-07	Research on Planning Method of Park-level Integrated Energy System Considering Multi-objective Collaboration	1762
Po03-08	Capacity Optimization and Economic Evaluation of Battery Energy Storage System for Qinghai Province based on Time Series Simulation Technology	1768
Po03-09	A Method of Fault Diagnosis for Secondary System Based on Multi-source Fault Information	1774

Po03-10	Hierarchical Coordinated Voltage Correction Scheme for Active Distribution Network	1779
Po03-11	Prediction Method Based on Random Forest Regression for Sympathetic Inrush Peak	1784
Po03-12	Design and Test of Lithium Battery Storage Power Station in Regional Grid	1791
Po03-13	Optimal Connecting Nodes Planning Based on the Risk Assessment of Power Systems	1796
Po03-14	Detection of Abnormal Status of PV Modules At PV Stations with Complex Installation Conditions	1801
Po03-15	Research on Outdoor Demonstration Test Technology of Photovoltaic Module	1807
Po03-16	Impact Analysis of Renewable Energy Accommodation Considering Heat Pump in Peak Shaving	1813
Po03-17	A Protection Method for DC Distribution Network Based on High and Low Frequency Current Amplitude Ratio	1817
Po03-18	Evaluating Transmission Network Flexibility considering Uncertainties	1822
Po03-19	Fault Identification and Protection Technology Based on Multi-Source Information	1828
Po03-20	Research on Fast Frequency Response Technology and Device Development of Photovoltaic Power Station	1833
Po03-21	Optimization of Maintenance Interval based on Equal Deterioration Rate Theory	1840
Po03-22	Overview of Power Grid Loss Prediction and Early Warning under Typhoon Disaster	1845
Po03-23	Research on Waste-to-Energy Plant as Black Start-Up Power Source for Megacity Power Grid	1850
Po03-24	Research on Comprehensive Evaluation for New Energy Big Data Service Project based on Prospect Theory and TOPSIS	1856
Po03-25	Optimization on Combined Cooling, Heat and Power Microgrid System with Power-to-gas Devices	1862
Po03-26	Precise Fault Location Method of Traveling Wave in Distribution Grid Based on Multiple Measuring Point	1867
Po03-27	Research on the Impact of Crystal Oscillator Frequency Deviation on PMU Measurement under System Oscillation	1873
Po03-28	Research on the Damage Experiment Model Design and Metal Magnetic Memory Testing of Wind Turbine Tower in Service	1879
Po03-29	The Shutdown Risk Assessment of Wind Farms under Typhoon Disaster	1885
Po03-30	Evaluation and Optimization of Electric Vehicle Load Acceptance Capacity of Distribution Network	1890
Po03-31	Frequency Stability Control Strategy of the Receiving Power Grid Based on Multiple Resources	1896
Po03-32	Coordinated Frequency Support and Multi-Band Oscillation Damping of Power System with Grid-Connected Wind Farms	1902
Po03-33	Decentralized Combined Heat and Power Dispatch Using the Communication-Censored ADMM	1907
Po03-34	Study on Stability of Low-voltage Multi-terminal DC System under Electric Vehicle Integration	1913
Po03-35	Identification of Weak Links in Distribution Network Based on Random Matrix Theory	1919
Po03-36	Intra-day Rolling Dispatch Considering Large-scale Wind Power Participation in Primary Frequency Regulation and Unit Fast Start-up Capability	1923
Po03-37	Toughness Analysis and Enhancement Strategy Research of Distribution Network in Extreme Environment	1929
Po03-38	Dynamic State Estimation for Power System Based on M-UKF Algorithm	1935
Po03-39	Threats and Countermeasures of Doubly-Fed Induction Generator High-Voltage Trip-Off under Short Circuit Fault	1941
Po03-40	Research and Application on Renewable Energy Assessment Method of Absorptive Capacity	1947

Considering Adaptability of Power Grid

Po03-41	Harmonic Resonance Analyzing for Wind Farm Based on Eigenvalue Decomposition	1954
Po03-42	Study on the Power Frequency Distribution Characteristics for Half-Wavelength Transmission Lines Based on the Frequency-length Factor	1960
Po03-43	Analysis and Simulation of Functional Properties of Large Power Grid	1965
Po03-44	Delay Analysis and Improvement of Intraday Generation Schedule of an Actual Power Grid	1971
Po03-45	Economic Dispatch Strategy of Multi-energy System Considering N-1 Security Constraints	1976
Po03-46	Conditional value-at-credibility Model for Wind Power Integrated Stochastic Optimal Power Flow under Risk Aversion	1981
Po03-47	Research on Optimal Configuration of Synchronous Condenser for Transient Voltage Stability of Weak Sending-end Power System	1986
Po03-48	A Novel Scenario Reduction Method for Static Voltage Stability	1992
Po03-49	A nested Genetic Algorithm for Generation Planning in Electricity Market	1998
Po04-01	Optimization of Power Source Adapting to Renewable Energy Collected by Flexible DC	2004
Po04-02	Photovoltaic Panel Fault Diagnosis Method for Grid-connected Households Based on Least-square Fitting Power Loss	2010
Po04-03	Two-Stage Stochastic Dynamic Unit Commitment and Its Analytical Solution with Large Scale Wind Power Integration	2016
Po04-04	Comparison of Voltage Stability Assessment Using Different Machine Learning Algorithms	2023
Po04-05	An On-line Setting Self-adaptive Distance Protection Scheme for 110kv Transmission Line	2027
Po04-06	Grey Prediction PI Control of Direct Drive Permanent Magnet Synchronous Wind Turbine	2032
Po04-07	Relay Protection Service Support Platform to Meet Multiple Business Needs	2036
Po04-08	Bi-level Collaborative Expansion Planning for Power Grid and Plants Considering Operational Flexibility	2042
Po04-09	Investment Optimization Model for Distribution Networks Projects with Risk and Efficiency Constraints	2047
Po04-10	Research on Coordination Between Single Phase-to-Ground Fault Protection Equipment and Distribution Terminal Unit	2053
Po04-11	Evaluation Method for Single-phase Fault Processing Technology of Distribution Network Based on Safety Protection	2058
Po04-12	A Bi-level Optimal Configuration of Combined Cooling, Heating, and Power System Considering Demand Side Management	2064
Po04-13	Location of Multi-harmonic Source Based on FAJD Method	2071
Po04-14	Optimal Allocation of Distributed Generations Considering Demand Response and Multi-agent Benefits	2077
Po04-15	Optimal Planning of AC/DC Hybrid System Integrated with Distributed Renewable Energy Considering Economy and Safety	2083
Po04-16	Operation and Switching Strategy Optimization of Integrated Energy System	2090
Po04-17	Design of Fault Line Selection Method for Distribution Network Based on Correlation of Characteristic Quantities	2097
Po04-18	Measurement Technology of Ground Parameters Based on Tap Adjustment of Grounding Transformer Winding for Distribution Networks	2102
Po04-19	Performance Testing and Analysis of Multi-vendor IEDs under PRP Configuration	2108
Po04-20	Quantified Flexibility of Energy Storage System to Improve Distributed Generator Penetration in Active Distribution Network	2114

Po04-21	Research and Application on the Relay Protection Setting Comparison System Based on Fuzzy Matching	2119
Po04-22	Urban Distribution Systems Planning Considering Integrated Load Forecasting	2124
Po04-23	Inter-harmonic detection based on Blind Source Separation Algorithm	2130
Po04-24	Optimal Planning of Distribution Network Based on K-means Clustering	2135
Po04-25	Analysis and Assessment of Power System Source-Network-Load-Storage Intrinsic Safety Risk	2140
Po04-26	An Intelligent Fault Diagnosis Technology for Distributed Photovoltaic System Based on Ensemble Voting Fusion Model	2146
Po04-27	Research on Multi Units Coordinated Phase Advance Based on Filled Function Particle Swarm Optimization Algorithm	2151
Po04-28	A Network Partition-based Method for Voltage Control in Distribution Networks with Distributed PV	2156
Po04-29	Joint Optimized Dispatch of Pumped Storage-Wind-Thermal Considering the Flexible Space of Pumped Storage and Deep Regulation of Thermal Power	2162
Po04-30	An Analytical Calculation Model for Power Supply Capability of Distribution Systems Considering Load Transfer of Network	2168
Po04-31	Evaluation Model and Method on Life-cycle Comprehensive Low-carbon Benefits of Large-scale Energy Storage System From the Distribution Network Planning Perspective	2174
Po04-32	Research on Life-cycle Comprehensive Low-carbon Benefits of Wind Power Generation from Distribution Planning Perspective	2180
Po04-33	Identification of Voltage Sag Sources Based on Wavelet Transform Sample Entropy and Extreme Learning Machine	2186
Po04-34	A Novel Traveling Wave Fault Location Algorithm for Distribution Network Based on Binary Tree Model and Multiple Time Information	2191
Po04-35	Research on Active Distribution Network Structure Planning for Multi Distributed Generation Access	2197
Po04-36	Traveling Wave Time Difference Based Multi-terminal Transmission Network Fault Location	2203
Po04-37	A Novel Protection Method of Wind Farm Collector Line Based on Clustering Algorithm	2208
Po04-38	A Study on Operation of Heat Pump Cluster Based on Particle Swarm Optimization	2214
Po04-39	Short-Term Voltage Stability Constrained Two-Stage Dynamic Optimal Reactive Power Flow	2219
Po04-40	Knowledge Mapping Analysis on the Research of Work without Power Interruption in China	2224
Po04-41	Experimental Study on Thermal Aging Characters of Silicone Oil in Cable Terminal	2230
Po04-42	A Bi-Level Model for DG and ESS Integrated Planning in Distribution System	2234
Po04-43	Power Optimization Method for Interactive Operation of Integrated Energy Distribution System and Superior Power Grid	2239
Po04-44	Distribution Network Planning Considering Uncertainty of Incremental Distribution Network Access	2244
Po04-45	Periodic Narrow-Band Noise Denoising of Partial Discharge Signal Through Time-Frequency Analysis	2248
Po04-46	Denoising of Partial Discharge Signal by Common Factor Method and Wavelet Thresholding	2252
Po04-47	Deep Learning Driven Rolling Evaluation and Optimization Method of Distribution Network Asset Utilization Efficiency	2256
Po04-48	Research on Collaborative Optimization Decision Method of Source-Grid-Load-Storage	2261
Po04-49	Optimization for Short-Term Operation of Hybrid Hydro-PV Power System Based on NSGA-II	2267
Po04-50	Evaluation Model and Realization of Battery Energy Storage Power Station with Operational	2272

Compound Value Mining

Po05-01	Flexibility Assessment Considering the Network Dispatch Ability of Flexible Capacity	2278
Po05-02	A Recent Overview of Power-to-Gas Projects	2282
Po05-03	Power Grid Fault Diagnosis Based on Immune RBF Neural Network	2287
Po05-04	A Decentralized Robust planning Approach for Smart Buildings Considering Bilateral Transactions with Fair Market Clearing Strategy	2292
Po05-05	Short-term wind Power Prediction Based on IPSO-GSA Optimized Neural Network	2298
Po05-06	Research on the Influence of Photovoltaic Low Voltage Ride Through Characteristics on the Operation Characteristics of Receiving-end Grid	2304
Po05-07	Microgrid Fault Detection Method Based on Sequential Overlapping Differential Transform	2308
Po05-08	A New Control Strategy of Active Participation in Frequency Regulation of Photovoltaic System	2314
Po05-09	Analysis of Renewable Energy Consumption Ability of Distribution Network	2319
Po05-10	Research on the AC and DC Hybrid Power System Simulation Based on RTDS	2324
Po05-11	Research on Automatic Line Selection Method for Single-phase Ground Fault in Active Distribution Network	2330
Po05-12	Single-phase Grounding Fault Line Selection Method of Active Distribution Network Based on Swept Frequency Injection Signal	2335
Po05-13	Dual Laser Cantilever Enhanced Photoacoustic Spectroscopy Detection System for SF ₆ Decomposition Components	2340
Po05-14	The Research on Infrared Spectrum of C ₄ F ₇ N by Combined Experimental and Theoretical Study	2344
Po05-15	A New Backup Protection for Transmission Lines Based on Substation-area Current Information	2347
Po05-16	Condition Cleaning Maintenance Technology of Carbon Brush Slip Ring in Pumped Storage Power Units	2353
Po05-17	Improved Sequential Monte Carlo Method Approach to Substation Connection Reliability Assessment	2357
Po05-18	Generalized Equal Area Criterion for Transient Stability Analysis	2363
Po05-19	Research on the Technology Requirement of Distributed Renewable Energy AC/DC Output System and Network Voltage Coordinated Control	2369
Po05-20	Rub-impact Behavior Study of a Flywheel Rotor by Considering the Friction Coefficients Effect	2373
Po05-21	Interactive Trading and Profit Sharing among Multiple Micro-energy Grids	2379
Po05-22	Trading Model of Virtual Power Plant Considering Shapley Contribution Based Revenue Distribution	2385
Po05-23	Economic Assessment of Power Link between Europe and China	2391
Po05-24	The Optimal Operation and Revenue Allocation Method of Virtual Power Plant Considering Carbon Trading	2396
Po05-25	Development of Activated Liquid for Degraded Lead-Acid Batteries in Substations	2403
Po05-26	An Optimal Congestion Scheduling Model of Intraday Market for Promoting the Consumption of Renewable Energy Sources	2407
Po05-27	Dynamic Monitoring of Voltage Difference Fault in Energy Storage System Based on Adaptive Threshold Algorithm	2413
Po05-28	The Research on Temperature Control Load Modeling and Aggregate Simulation	2419
Po05-29	Review of Power Emergency Repair Strategy after Typhoon Disaster	2425
Po05-30	Research on Application of Demand Response in Power System of Smart Park	2429
Po05-31	Research on Turn-on Delay Time t_{don} of the Multichip IGBT Module after Partial Chip Failure	2435

Po05-32	A Distributed Coordination Scheme for Periodic Loads for Demand Side Management	2439
Po05-33	Nonintrusive Load Monitoring and Analysis Based on Power Disturbance Data	2445
Po05-34	Study on the Whole Life Cycle Energy Management Method of Energy Storage System with Risk Correction Control	2450
Po05-35	LSTM-Based Rapid Identification of Dominant Low Frequency Oscillation Modal Features in Power System	2455
Po05-36	Research on Key Technologies of User Side Integrated Demand Response for Multi-Energy Coordination	2461
Po05-37	Research on Active Current Suppression Control Strategy of Photovoltaic Generation System	2465
Po05-38	Optimized Configuration of Integrated Energy System Considering the Access and Operation of Renewable Energy	2470
Po05-39	Optimal Dispatch of A Multi-Energy Residential Microgrid with Flexible Multi-Energy Loads	2477
Po05-40	Multi-objective Optimal Dispatch of Microgrid Combined Cooling, heating, Power and Gas	2483
Po05-41	A Fast Calculation Method Supporting Price Arbitrage for Energy Storage	2490
Po05-42	Multi-energy Supply Microgrids To Enhance the Resilience of the Electric/Gas/Heat Utility Grid Systems under Natural Disasters	2495
Po05-43	Research on the Optimal Operation of Integrated Energy Station Considering Auxiliary Equipment	2501
Po05-44	A Novel Equalizer Based on Switched-Inductor and LC Converter for Lithium-Ion Battery Strings	2507
Po05-45	Dynamic Evaluation of Controllable Ability of Building Energy System	2512
Po05-46	Short-term Load Forecasting of Long-short Term Memory Neural Network Based on Genetic Algorithm	2518
Po05-47	Research on Nodal Energy Price of Multi-energy Flow System Considering Heat Network Loss	2523
Po05-48	N-1 Security-constrained Integration of Distributed Generators in Active Distribution Grids with Energy Storage Support	2528
Po05-49	Multi-time Scale Collaborative Optimal Dispatching Strategy for Island Micro-grid with Multi-Distributed Power Generation	2534
Po05-50	A New Transmission Pricing Method of Large Scale Wind Power to Promote Wind Consumption	2540
Po06-01	Optimal Dispatch of Integrated Energy System in a Small High-tech Industrial Park	2546
Po06-02	Research on Wind Power Capacity Evaluation Based on Risk Theory and Unit Commitment under Multi-Scenarios	2551
Po06-03	Symlets Wavelet Transform based Power Management of Hybrid Energy Storage System	2556
Po06-04	A Dynamic Convexification Approach for Optimal Power-Gas Flow	2562
Po06-05	Overview the Approaches for Maximum Power Point of Photovoltaic Arrays in partially Shaded Environment*	2568
Po06-06	Distributed Aggregation Control of Smart Buildings for Frequency Regulation Services	2572
Po06-07	Research of Doubly Fed Induction Machine's Optimal Reactive Power Limit Considering Junction Point's Voltage Fluctuation	2577
Po06-08	Integrated Planning of Urban Electricity and Gas Distribution Systems Considering Demand Response	2583
Po06-09	Frequency Support of a Wind Power Plant for Over-Frequency Disturbances	2589
Po06-10	LSTM Based Quantile Regression Method for Holiday Load Forecasting	2593
Po06-11	Two-level Capacity Optimization Strategy for Generations in Multi-energy Gathering Center Considering the Flexibility	2599
Po06-12	Review and Prospect of Flexible Loads for Participating in Frequency Regulation	2605

Po06-13	Modular Multilevel Converter with Partial Energy Storage System for Frequency Support	2609
Po06-14	Integrated Operational Security of Multi-energy Systems: Concepts, Features and Mechanism	2615
Po06-15	Interval Linear Energy Flow Model of Electricity and Natural Gas Coupling System Considering the Uncertainty of Wind Power	2621
Po06-16	Multi-objective Temporal Coordination of A Multi-Energy Microgrid with Demand Response	2627
Po06-17	Performance Test Method of Condenser based on Virtual Power Dispatching Technology	2633
Po06-18	Capacity Value and Economic Evaluation of Electric Vehicle Parking Lots in Smart Distribution Grids	2639
Po06-19	Energy Management of Integrated Energy System Based on Stackelberg Game and Deep Reinforcement Learning	2645
Po06-20	Non-Intrusive Load Monitoring based on feature extraction of change-point and xgboost classifier	2652
Po06-21	Black start process simulation of isolated power grid based on PSASP	2657
Po06-22	A Multi-energy Flow Calculation Method Considering Multiple Energy Coupling Operation Modes	2661
Po06-23	A Survey of Value-added Services for Electricity Transaction in China	2667
Po06-24	Joint Optimal Deep Peak Regulation of Renewable-rich Power System with Responsive Load, Heating Storage Enabled CHP and Flexible Thermal Plants	2673
Po06-25	An Improved Droop Control Strategy of Distributed Energy Storage Systems in Microgrids	2679
Po06-26	Research on Capacity Optimization of Offshore Wind Power Flow Combined Power Generation System Based on Homer	2684
Po06-27	Study of Doubly Fed Induction Generator Wind Turbines for Primary Frequency Control	2690
Po06-28	Day-head Peak-shaving Model for Coordinated Wind-photovoltaic-pumped-storage-hydropower Generation Systems	2696
Po06-29	The Research and Engineering Practice on the Protection and Control Method of the DG System	2701
Po06-30	Sequence Optimization of Auxiliary Load in Black Start of Isolated Power Grid	2707
Po06-31	Research on Three-dimensional Comparison and Selection Strategy of Sequential Control Transformation	2711
Po06-32	Technical Structure and Operation Principle of Mechanical Elastic Energy Storage System	2717
Po06-33	A Capacitor-Isolated Balancing Circuit for Battery Modules Applied in Grid-Tied Battery Energy Storage System	2722
Po06-34	Research on Distribution Network Reconfiguration Based on Deep Q-learning Network	2728
Po06-35	Investigation of a High Speed Permanent Magnet Synchronous Machine for Magnetic Suspended Flywheel Energy Storage System	2733
Po06-36	Research on Application of Energy Storage System to Three Defense Lines of Frequency	2738
Po06-37	Prediction of Solar Photovoltaic Power Generation Based on MLP and LSTM Neural Networks	2744
Po06-38	Lean Operation and Maintenance Evaluation Technology of Power Grid Equipment Based on Improved Big Data Cleaning Method	2749
Po06-39	Optimal Energy Management Strategy Considering Forecast Uncertainty Based on LSTM-Quantile Regression	2753
Po06-40	Data-Driven Wind Farm Volt/VAR Control Based on Deep Reinforcement Learning	2758
Po06-41	A Two-Step Multi-objective Optimization Framework for Microgrid Scheduling Problem Based on Cloud-edge Computing	2764
Po06-42	DC-side Voltage Control Strategy of Dynamic Voltage Regulator Based on Nine-switch	2769

	Conversion Circuit	
Po06-43	A State-of-Art Review on Energy Internet and Internet of Energy Advancements	2775
Po06-44	Current and Voltage Measurement Method Based on Magnetic and Electric Field Sensors for Smart Grid Applications	2783
Po06-45	Security Risk Assessment of Power System Based on Latin Hypercube Sampling and Daily Peak Load Forecasting	2787
Po06-46	Denoising of a Multi-station Point Cloud and 3D Modeling Accuracy for Substation Equipment Based on Statistical Outlier Removal	2793
Po06-47	Design and Application of Intelligent Sensing Terminal for Distribution Transformer	2798
Po06-48	Design and Implementation of Lightweight Man-machine Terminal Screen Interactive Client	2802
Po06-49	Monitoring and Application of Low-Voltage Distribution Network Leakage Protector Based on Internet of Things	2806
Po06-50	A Quantitative Analysis Method for the Influence of Three-phase Unevenness on Line Loss Based on K-Means Clustering	2811
Po07-01	Intelligent Line Losses Management System for Secondary Power Distribution Network Based on SSM Framework	2815
Po07-02	Human-machine Hybrid Intelligent Evaluation System for Power Grid based on Data-driven	2821
Po07-03	Data Driven-based Operational Risk Control System for Whole Process Risk Prevention	2827
Po07-04	Multi-Objective Optimization of Electric Vehicle Scheduling Based on Behavior Prediction	2832
Po07-05	Study on the Influence of Radio Anechoic Chamber Filter Circuit on the Smart Meter Error in Radio Frequency Immunity Test	2837
Po07-06	Research on the Development and Current Status of DC Power Distribution	2842
Po07-07	An Electric Vehicle Charging Load Forecast Model Based on Probability Distribution	2847
Po07-08	Safety Assessment of Charging Stations Connected to the Power Grid Considering Distribution Network Constraints	2852
Po07-09	A Review of Energy Storage System Study	2858
Po07-10	Fault Current Controller and Its Control Technology of DC Microgrid Based on Negative Pressure Source	2864
Po07-11	A Multi-objective Optimization Charging Strategy for Lithium Ion Battery Based on Lithium-plating Inhibited Model	2868
Po07-12	Profit Evaluation for Virtual Power Plant in Power Load Response: from the Perspective of Power Grid	2874
Po07-13	Assessment of Design Parameters Affecting Trigenation AA-CAES System Performance	2879
Po07-14	Power Flow Analysis of the Economic Dispatch Considering the Flexible EV Charging	2885
Po07-15	A Multi-functional Converter Electrical Tests System Scheme and Research in Its Digital Simulation	2889
Po07-16	The Interoperability Test Study of Abnormal Charging State for DC Charger	2895
Po07-17	Research on safety evaluation System of optical storage charging station based on Fuzzy Theory	2900
Po07-18	Modeling and Optimization Design of a New Type of Electric Energy Actuator Based on Dielectric Barrier Discharge	2904
Po07-19	Analysis of Intelligent Linkage Technology for Smart Energy Station Monitoring System	2909
Po07-20	Comparison of Grounding Modes of MMC-Based Flexible DC Distribution Network	2914

Po07-21	Finite Element Simulation Analysis of Three-phase Bridge Arm Reactor of Modular Multilevel Converter	2920
Po07-22	Service Restoration Strategy of Active Distribution Network Based on Power Router	2925
Po07-23	Design and Implementation of an Efficient Single Stage Three Phase AC-DC Buck Converter for Hybrid Vehicle Charging	2930
Po07-24	Overload Risk Evaluation of dns with High Proportion evs Based on Adaptive Net-based Fuzzy Inference System	2936
Po07-25	Reinforcement Learning Based Optimal Operation Strategy for Electric Taxis	2942
Po07-26	Digital Twin in Energy Internet and Its Potential Applications	2948
Po07-27	Research on Intelligent Sampling Inspection Platform for Distribution Network Materials	2954
Po07-28	Research on Large-scale Multi-objective Optimization Algorithm with Irregular Frontier for Operation Dispatching of New Generation Energy System Integration	2959
Po07-29	Workload Analysis and Microservice Placement of Energy Management Application Based on Power Internet of Things	2966
Po07-30	Multiple Classifiers based Information Fusion for Power Transformer Fault Diagnosis	2971
Po07-31	Ultra-Short-Term Bus Load Forecasting Method Based on Multi-source Data and Hybrid Neural Network	2976
Po07-32	A Robust Line Parameter Identification Method Based on LSTM and Modified SCADA Data	2981
Po07-33	Research on Power Grid Fault Diagnosis Method Based on PMU Data and Convolutional Neural Network	2987
Po07-34	Short-term Forecast of Multi-load of Electrical Heating and Cooling in Regional Integrated Energy System Based on Deep LSTM RNN	2994
Po07-35	Two Optical Image Fusion Model of Transmission Line Based on DCGAN	2999
Po07-36	Virtual Power Plant Trading Strategy Based on Blockchain to Satisfy Clean Energy Partiality	3004
Po07-37	Judgment of Transformation Rate for Electric Energy Meter Based on BP Neural Network and Adaboost Algorithm	3011
Po07-38	Electric Energy Data Storage and Privacy Protection in Edge Computing Mode	3018
Po07-39	Research on Multi-source Heterogeneous Data Cleaning Technology based on Integrating Neural Network with Fuzzy Rules for Renewable Energy Accommodation	3024
Po07-40	Automatic Generation of Power Grid Dispatching and Control Scheme Based on Heterogeneous Information Network	3028
Po07-41	Detection of Abnormal Data of Gateway Energy Meter Based on User Dynamic Behavior Mining	3033
Po07-42	A Review of AI and AI Intelligence Assessment	3039
Po07-43	Distribution System Anomaly Detection Based on anogan Embedded with Cross-Stitch Units	3045
Po07-44	Research on Mining of Transmission Grid Assets of Heterogeneous System Based on Digital Twin	3051
Po07-45	Frequent Itemsets Mining of SCADA Data Based on FP-Growth Algorithm	3057
Po07-46	Refined Characterization of Internet of Things Applications in Power Systems	3062
Po07-47	Automatic Detection and Mapping of Solar Photovoltaic Arrays with Deep Convolutional Neural Networks in High Resolution Satellite Images	3068
Po07-48	Data Model Design of Dispatching, Operation and Maintenance of Power Information System Based on CIM	3073
Po07-49	Motif Difference Field: An Effective Image-based Time Series Classification and Applications in Machine Malfunction Detection	3079

Po07-50	Consortium Blockchain-based Decentralized Energy Trading Mechanism for Virtual Power Plant	3084
Po08-01	A Methodology for high-efficient Federated-learning with Consortium Blockchain	3090
Po08-02	Energy System Time Series Data Quality Maintenance System Based on Data Mining Technology	3096
Po08-03	A Hybrid Edge-Cloud Computing Method for Short-Term Electric Load Forecasting Based on Smart Metering Terminal	3101
Po08-04	Deep Reinforcement Learning based Wind Farm Cluster Reactive Power Optimization Considering Network Switching	3106
Po08-05	Analysis of Large-scale Automatic Verification Data for Smart Meters in Non-reference Temperature	3111
Po08-06	Multi-node Cooperative Sensing Model of FBG Sensor Network in Smart Grid	3116
Po08-07	Research of Overheat Defect Detection on the Infrared Thermal Image of Current Transformer	3120
Po08-08	A Security Defense Model for Ubiquitous Electric Internet of Things Based on Game Theory	3125
Po08-09	A Review on Cyber Security of Digital Electro-hydraulic Control System of Steam Turbine	3129
Po08-10	Optimal Defense Strategy Based on the Load Nodes' Importance against Dummy Data Attacks in Smart Grids	3134
Po08-11	Correlation Analysis of Reactor Internal and External Vibration Based on Sum Squared Residual	3139
Po08-12	Decoupling Analysis of Electromagnetic Loop Network Based on Optimal Comprehensive weighting Evaluation model	3143
Po08-13	Experimental Analysis of Factors Affecting Photon Number of Ultraviolet Charge Detection in Power Equipment	3150
Po08-14	Summary of key technologies for reliability evaluation of the HVDC protection systems	3156
Po08-15	Discussion on Reactive Power Coordination Control Technology of VSC/LCC HVDC Parallel Hybrid System	3162
Po08-16	Multi-energy power planning for the Sending-end of Hybrid Multi-terminal HVDC System	3166
Po08-17	Characteristics of Lightning Faults of 220 kv and Above Overhead Transmission Lines in Zhejiang Province in last 15 Years	3171
Po08-18	Study on Phase-leading Operation Characteristics of UHVDC Sending-end Synchronous Condensers	3175
Po08-19	Reliability Evaluation for a Grid Connected Offshore Wind Farm	3181
Po08-20	Line Protection Scheme for Multiple-Receiving Ends HVDC System	3187
Po08-21	Topological Analysis and Parameter Calculation of Transfer Breakers in Multi-Terminal HVDC System	3191
Po08-22	Line Protection Scheme for Multiple-receiving Ends HVDC System	3197
Po08-23	Research and Application of Series Compensation Protection Automatic Testing Technology	3201
Po08-24	Effect of Synchronous Compensator in Leading-Phase Operation on Transient and Steady State of the Hunan Network	3206
Po08-25	Research and Characteristic Analysis of Flame Retardant Test Methods for Solid Insulation Materials of Converter Transformer	3210
Po08-26	Relevant Zone and Mode Type Identification Based on Electrical Distance for Low Frequency Oscillation	3215
Po08-27	Strategy of Voltage Stress Suppression and Dynamic Simulation Experiments of MMC Sub-Module on Hybrid Cascaded Multi-Terminal UHVDC Transmission System	3221

Po08-28	Calculation and Analysis of 220kv Cross-River Cable Carrying Capacity Considering Complex Environments, Part I --- Analysis of Thermal Problems for the Entry Section of Overhead Transmission Line to Underground Cable	3227
Po08-29	Optimal Configuration Method of Dynamic Reactive Power Compensation Device Considering Reducing Commutation Failure Risk of Multi-infeed DC System	3233
Po08-30	Research on Correlation Analysis of Vibration Signals at Multiple Measuring Points and Black Box Model of Flexible-DC Transformer	3238
Po08-31	Fast Prediction of Cascading Commutation Failure in Multi-infeed HVDC System by Integrating Data-driven Method and Model-driven Method	3243
Po08-32	Fault Identification of High-voltage Cable Sheath Grounding System Based on Ground Current Analysis	3248
Po08-33	Reliability Assessment of HVDC Receiving-end System Considering Wind Power Output Uncertainty	3252
Po08-34	Grey-Fuzzy PI Optimal Control of MMC-HVDC System	3258
Po08-35	Research on Fault Intelligent Identification and Control System of Large AC/DC Hybrid Grid	3263
Po08-36	Analysis on Protection Function of VSC-HVDC Projects	3269
Po08-37	A Frequency Control Method Based on a Coordinated Active and Reactive Power Optimization Adjustment for Weak HVDC Sending-end Power Grid	3275
Po08-38	Calculation and Analysis of 220kv Cross-River Cable Carrying Capacity Considering Complex Environments, Part II --- Thermal Analysis of Cable in the Utility Tunnel with Ventilation	3282
Po08-39	Development and Application of Leakage Current Monitoring Device of MOV in UHV/EHV Series Capacitors	3287
Po08-40	Analysis on On-site Artificial Grounding Fault Test of MMC-HVDC Grid	3292
Po08-41	Design of UHV Long-distance GIL Fault Location System Based on Ultrasonic Method	3296
Po08-42	A Miniaturized Planar Spiral Antenna for PD Detection in GIS	3302
Po08-43	The Protection Scheme for the Novel Flexible Short Circuit Current Suppression Technology	3307
Po08-44	Impulse Current Measurement Device Based on Uniform Spiral Magnetic Induction Module	3312
Po08-45	Development of Operation Support Platform for Chongqing-Hubei Flexible HVDC Transmission Project	3319
Po08-46	Development and Characteristic Test of a 500kv Wideband Highvoltage Divider	3324
Po08-47	Analysis of DC Magnetic Bias Influences on Transformers	3329
Po08-48	Research on Coordinated Control Strategy Considering stability risk of DC Sending and Receiving End Power Grids	3333
Po08-49	A Transmission Line Selection Method for Parameter Measurement Based on its Impacts on Power Flow Sensitivity and Static Voltage Stability	3339
Po08-50	Feasibility Analysis of Single-end Equivalent Modeling to LCC-HVDC Transmission System	3345
Po09-01	A Fault Detection Method for MMC-HVDC Grid Based on Transient Energy of DC Inductor and Submodule Capacitors	3350
Po09-02	Aging Performance Evaluation of Composite Insulators for EHV Transmission Lines	3356
Po09-03	Method of Multi-Sample Maximum Correlation Wavelet High Energy Scale on Location Time Difference Calculation of Partial Discharge Source	3361
Po09-04	Simplified Risk Assessment of DC Bias for Ultra-High-Voltage Direct-Current Transmission	3367
Po09-05	Research on Circuit Parameter Configuration of DC Superimposed Impulse Voltage Test on UHV DC Cable	3372
Po09-06	A Double-ended Contactless Current Traveling Waves Scheme for Fault Location in Overhead	3378

Transmission Lines

Po09-07	Mechanism Analysis of the Circuit Breaker Body's Three-phase Inconsistent Protection Malfunction and Prevention Measures	3384
Po09-08	Research Review of Flexible Load Aggregation Methods in Distribution Networks	3388
Po09-09	Microgrid Dynamic Economic dispatching Considering Wind -Solar Complementary Characteristics	3394
Po09-10	An Event Detection Approach Based on Improved CUSUM Algorithm and Kalman Filter	3400
Po09-11	Comparison of Insulated Tubular Busbars with Different Insulated Structure	3404
Po09-12	Research on Image Deblurring Method of Transmission line for Unmanned Aerial Vehicle Inspection based on Scale Cyclic Network	3409
Po09-13	Digital and Intelligent Emergency management Preplan of Urban Power Grid	3415
Po09-14	Optimal Capacity Allocation of Integrated Agricultural Energy Network with Enhanced Geothermal System Considering Seasonal Differences	3422
Po09-15	A Novel Detection Method of Power System Sub-synchronous Oscillation Based on Sample Entropy	3429
Po09-16	Intelligent Control of Medium and Low Voltage Distribution Network based on Power Big Data Interconnection	3434
Po09-17	Comprehensive Sustainability Assessment of China's Electric Energy System Based on Emergy Analysis	3439
Po09-18	Research on the Mode of Energy Distribution Network for Smart Low-carbon City	3445
Po09-19	Vulnerability Assessment Method of Electrical Cyber-Physical Interdependent Network Considering Node Heterogeneity	3451
Po09-20	Delivery Route Optimization for Electric Logistics Vehicles based on Full Information Acquisition	3457
Po09-21	From Distributed Energy Resources to Virtual Power Plants: A Cyber-Physical System Solution for Integrating Demand-side in Smart Grid	3463
Po09-22	The "Source-Network-Load" Interactive System and Application under the Energy Internet	3468
Po09-23	Research on Key Issues of Energy Internet Planning: A Review	3474
Po09-24	Research on Power Spot Market Comprehensive Index System and Evaluation Method	3479
Po09-25	Customized High Reliability Power Supply Service Strategy for Smart Factories	3485
Po09-26	Market Design and Optimal Dispatch of Energy Storage Systems in North China Grid	3490
Po09-27	Design of Green Certificate Trading Mechanism Based on Double Auction	3496
Po09-28	A Provincial Grid Investment Distribution Method based on the Evaluation of Distribution Network Investment Benefit and Grid Development Demand	3502
Po09-29	Influence of Peak Shaving and Frequency Regulations Earnings on the forecasting model of Electric Vehicle Charging Demand	3506
Po09-30	Research and Demonstration of Planning and Decision-making Tools Based on Power Grid Full-Cost Chain	3512
Po09-31	Profit Loss Risk Modeling and Avoidance Decision of Power Selling Companies for Medium and Long-Term Electricity Market	3517
Po09-32	Risk Measurement Model of Investment Strategy for Incremental Distribution Planning Considering Multiple Scenarios	3522
Po09-33	Analysis and Prospect of New Energy Utilization Technology for Ships	3529
Po09-34	Cost-Based Approach for Time of Use Pricing Decision	3535
Po09-35	Application of Emerging Information Technologies in Modern Energy Strategy Planning	3540
Po09-36	Research on Simulation Modeling of C2C Business Model for Multiple Regional Integrated	3546

Energy System

Po09-37	International Hydrogen Energy Policy Summary and Chinese Policy Analysis	3552
Po09-38	Service Pattern for Premium Power Supply Based on Combination of Leasing and Property Transfer	3558
Po09-39	Real Time Electricity Price Mechanism Considering Carbon Cost	3564
Po09-40	A Combinatorial Optimization Method of Time-Period and Electricity Price to Promote New Energy Consumption	3570
Po09-41	Evaluation of Information Value for Solar Power Plants in Market Environment	3574
Po09-42	Optimal Purchasing Strategy for Inter-provincial Renewable Energy Dealers under RPS Considering Electricity Purchasing Risk	3581
Po09-43	Generation Plan Liberalization Scheme: A Method Based on Multi-objective and MPEC	3587
Po09-44	Research on South Korean Electricity Market and Its Enlightenment to the Construction of Chinese Electricity Market	3591
Po09-45	Applying Multi-period Newsvendor Model to Load Serving Entity's Procurement Problem with DR/Batteries	3597
Po09-46	Business Model of Energy Big Data Service Based on Business Canvas Theory	3603
Po09-47	A Differential Game Approach to Distributed Energy Trading for Energy Internet	3608
Po09-48	Business Model Innovation of China's New Energy Vehicle Industry Based on Social Network Analysis: Demonstration City Cases	3614
Po09-49	Transformer Capacity Selection Method for Transformers in Heavy Overload Area	3620
Po09-50	Cloud Terminal for Bulk Power Grid Dispatching System	3625
Po10-01	Research on the Influence of Stray Current on Grounding Grid and Corresponding Protection	3631
Po10-02	Research on Distribution Network Topology and Energy Management Considering Energy Router Port Interconnection	3636
Po10-03	Study on the Thermal Decomposition Characteristics of $C_5F_{10}O/N_2$ Gas Mixture	3641
Po10-04	Effect of O_2 on the AC Breakdown Characteristics of $C_5F_{10}O/CO_2$	3645
Po10-05	Design Parameters and Application of a 160kv Mechanical HVDC Circuit Breaker	3649
Po10-06	Principle and Design Parameters of a ± 160 kv Resistive DC Superconducting Current Limiter	3654
Po10-07	Research on Voltage Command Optimization Strategy of Chain-Circuit STATCOM	3659
Po10-08	Demand-side Energy Management Method for Building Clusters Based on Reinforcement Learning	3664
Po10-09	Calculation Simulation and Experimental Verification of Current Rating Capacity for XLPE Insulated	3670
Po10-10	Research on the Requirements for the Break Time of DC-RCD under Different Voltage Levels and Grounding Modes in LVDC System	3675
Po10-11	Numerical Simulation of Mechanical Stress & Thermal Stress Test of 550kv High Coupled Split Reactor	3681
Po10-12	Research on Breaking Power Flow Algorithm of Offshore Platform Power Grid Based on Parameter Sensitivity	3687
Po10-13	Modified LSTM with Memory Layer for Power Grid Signal Classification	3693
Po10-14	Simulation Study of Multi-platform Interconnection System Based on Electricity-gas Interaction	3698
Po10-15	Fault-tolerant Control of Twelve-phase PMSM Based on Motor Model Reconstruction in FESS	3703
Po10-16	An Overall Control of Doubly fed Variable Speed Pumped Storage Unit in Pumping Mode	3709
Po10-17	Research on Wind-Photovoltaic Output Power Aggregation Method Considering Correlation	3715

Po10-18	Power IOT Attack Samples Generation and Detection Using Generative Adversarial Networks	3721
Po10-19	Sampled Value Slow-release Verification Method in the Design of Power System Specific Processor	3725
Po10-20	Dominant Parameter Identification for Virtual Load Model Based on Incremental Learning	3728
Po10-21	Two-level Correction Method of Load Parameters Based on an Aggregation-identification Structure	3733
Po10-22	Intraday Operation Optimization Strategy of Multi-Energy Power System Based on Characteristic Parameter Identification	3739
Po10-23	Unbalance Response Analysis on the High Speed Flywheel Motor Supported by Active Magnetic Bearings	3745
Po10-24	Electricity User Consumption Feature Selection and Behavior Portraying	3749
Po10-25	Coordinated Control for Power Balance Based on Per-Unit Voltage for Multivoltage-Level DC Microgrid	3755
Po10-26	Research on the Transient Characteristic for Typical Wind - Thermal - Bundled System	3761
Po10-27	Design of Panoramic Grid Map Incorporating Multi-source Information	3766
Po10-28	Coordinate Dispatch of Combined Heat and Power System Based on Approximate Dynamic Programming	3772
Po10-29	A Corrective Control Method for Combined Heat and Power Integrated Energy System Considering the Heat Network	3779
Po10-30	Post-arc Transient Characteristics for DC Vacuum Circuit Breaker with Diode Connected in Series	3785
Po10-31	Distributed Optimal Operation of AC/DC Hybrid Distribution Network Considering Wind Power Uncertainty	3791
Po10-32	A Petri-net-based Framework for Microgrid Process Mining	3797
Po10-33	Dynamic Reactive Power Configuration of High Penetration Renewable Energy Grid Based on Transient Stability Probability Assessment	3801
Po10-34	Review on Technology of Seawater Variable Speed Pumped Storage Generator Unit	3806
Po10-35	Real-time Monitoring of Smart Grid Terminals based on Multi-dimensional Information Fusion	3812
Po10-36	Anomaly Detection for PLC Based on Magnetic Side Channel	3817
Po10-37	A Microgrid Controller Security Monitoring Model Based on Message Flow	3822
Po10-38	Development Path of Future Power Grid with High Proportion of Renewable Energy in the Context of Electricity Spot Market	3827
Po10-39	Research on Coordinated Utilization of Regional Integrated Energy	3832
Po10-40	Development and Application of Planning Software for Cascaded Hydro-Photovoltaic-Pumped Storage Hybrid Power Stations	3838
Po10-41	Threat Assessment for Power Industrial Control System Based on Descriptive Vulnerability Text	3844
Po10-42	Transparent Access Architecture for Intelligent Dispatching and Control System	3850
Po10-43	Experimental Study on Power Frequency Discharge of SF ₆ Mixture in Non-Uniform Electric Field	3855
Po10-44	Self-adaption Faster-than-real-time Temperature Prediction Technology of Pumped Storage Power Unit in Start-up State	3859
Po10-45	Method for Calculating Text Similarity of Cross-Weighted Products Applied To Power Grid Model Search	3863
Po10-46	The Modified Thermal Circuit Model for Three-phase Unbalanced Operation of Distribution	3868

Transformers

Po10-47	Research on Insulation Problems of the Polymer Insulated Busbar with Tape Winding Insulation	3873
Po10-48	Research on Application of Current Splitting Device in Nonlinear Measurement	3877
Po10-49	Study on the Economic Operation of the Main Transformers	3883
Po10-50	Positive-Net-Damping Stability Criterion in Subsynchronous Oscillation	3888
Po11-01	Loss Reduction Strategy for Low Voltage Three-phase Unbalance Distribution Network Considering Load Phase Adjustment	3894
Po11-02	Design of Multi-Channel Integrated Platform for Electric Power Marketing Based on Microsoft Service Architecture	3900
Po11-03	Quantitative Detection of SO ₂ , H ₂ S and CS ₂ Based on Ultraviolet Absorption Spectrometry and Least Squares Algorithm	3905
Po11-04	An Optimal Strategy to Generate Optimal Electricity Plans via Big Data Technology	3911
Po11-05	Motor-Generator Pair for Improving the Transient Stability of Grid-Connected Renewable Energy	3915
Po11-06	Research of the High Voltage Vacuum Circuit Breaker Motor Actuator Rotor	3919
Po11-07	Research on Transient Hybrid Simulation of UHV AC/DC Power Transmission System	3925
Po11-08	Study on Reliability Evaluation Technology for Isolation Switch Operation in GIS	3930
Po11-09	Design of an Multi-sensor Ultrasonic Detection System for SF ₆ Gas Leak in Power System	3935
Po11-10	Sensitive Load Identification Method Based on Voltage Sag Monitoring Data	3940
Po11-11	Effect of Fluorinated Nano-composite Coating on the Flashover Characteristics of Epoxy Insulators	3945
Po11-12	Fault Mechanism Analysis and Ride-through Strategy of Adjustable Speed Drive to Voltage Sag	3951
Po11-13	Research on Partial Discharge Detection Technology for Power Transformers	3956
Po11-14	Short-Term Day-To-Day Maximum Load Forecasting Based on Data Mining and Deep Learning	3960
Po11-15	The Influence of Distributed Photovoltaic on the Voltage Profile in Distribution Network	3966
Po11-16	Analysis of Electric Vehicle Load Storage Resource Potential Based on R-ANN Activity Behavior Model	3972
Po11-17	Experimental Investigation of a Power Management Chip Applied in Wireless Sensor Devices	3977
Po11-18	A Novel Similarity-Comparison-Based Directional Protection Scheme for Multi-Terminal HVDC Grid	3981
Po11-19	Short-term Photovoltaic Power Forecasting Model Based on Improved BP Neural Network Method	3987
Po11-20	Research on the Impact of Integrated Wind Farm on Static Voltage Stability of Power System	3993
Po11-21	Application of Improved Coyote Optimization Algorithm in Optimal Configuration of Photovoltaic Intelligent Edge Terminal	3998
Po11-22	Wind Farm Predictive Coordination Control Strategy	4004
Po11-23	Price Demand Response Model Based on Consumer Psychology	4009
Po11-24	Analysis and Correction Methods for Network Time-delay Error of IEEE 1588 Synchronization Clock	4015
Po11-25	A Method for High-voltage Distribution Network Structure Planning Based on the Optimal Division of Power Supply Units	4021
Po11-26	Fast Inductance Extraction for Sweeping Coil Positions Based on Nonconforming Finite Element Method and Dual Formulations	4027
Po11-27	Cooperative Planning Method of Distribution Network and dgs Considering Operation of Energy Storage Systems	4032

Po11-28	Identification of Abnormal PV Output Power Based on Kernel Density Estimation and Consistency Method	4037
Po11-29	Supraharmonics Detection Algorithm Based on Bimodal Spectral Line Interpolation Algorithm	4043
Po11-30	Fault Diagnosis and Location for Long Submarine Cable Based on Frequency Domain Reflection	4047
Po11-31	Research on Error Properties and Influence Factors of Three-phase Combined Instrument Transformers under Different Operating Conditions	4051
Po11-32	Operation Control Strategy of Soft Open Point Based on Unified Virtual Electric Machinery Technology	4057
Po11-33	Experimental Investigation of Breakdown Characteristics of Rod-Plate-Rod Gap under Impulse Voltage	4064
Po11-34	Failure Probability Analysis of Lightning Strike Transmission Line Based on Data Mining	4070
Po11-35	Research on Bearing Fault Identification of Wind Turbine Based on Deep Belief Network	4076
Po11-36	Prediction of Photovoltaic Power based on Entropy Weight Combination Forecasting Method	4081
Po11-37	Application of Improved Hybrid Particle Swarm Optimization Algorithm in Model Identification of Micro Gas Turbine	4087
Po11-38	Optimal Dispatching of Regional Integrated Energy System Based on SMPC	4092
Po11-39	The Designation and Development of Automatic Power Control System with Energy Storage Resources	4097
Po11-40	Analysis and Improvement of Electrical Lifetime of Generator Circuit Breaker of Pumped Storage Unit	4102
Po11-41	Harmonic Management for Wind Power Plant Using Embedded Filter Control in Wind Turbine	4107
Po11-42	Operation Optimization of Concentrating Solar Power- Wind -Photovoltaic Combined Power Generation System	4112
Po11-43	Short-term Tie Line Power Prediction Based on CNN-LSTM	4118
Po11-44	Bus Reactive Load Prediction Based on Random Forests	4123
Po11-45	Improving Operational Efficiency and Benefits of the Distribution Network with Advanced Distribution Management System	4127
Po11-46	Optimal Planning of Distribution Network Considering Photovoltaic Energy Consumption	4133
Po11-47	The Application of Unified Power Flow Controller in Smepec	4138
Po11-48	State-evaluation & Risk-loss based Maintenance Mode Selection Method for Distribution Equipment	4142
Po11-49	Magnetizing Inrush Current Blocking Method for Shunt Reactor with Auxiliary Winding System	4148
Po11-50	Short term power load forecasting of large buildings based on Multi-view convlstm Neural Network	4154
Po12-01	A Bi-Level Optimal Allocation and Dispatching Method of Active Distribution Network Considering Electric Vehicles	4159
Po12-02	Research on Capacity of Distributed Photovoltaic Connected to Distribution Network Considering Voltage Constraint	4164
Po12-03	Cooperative Fire Extinguishing Technology of Battery Energy Storage Device in Cluster	4169
Po12-04	Application of Flywheel Energy Storage Equipment in Vital Places	4174
Po12-05	Study of Over-Sampling Methods Used in Distribution Transformer Connectivity Verification	4179
Po12-06	Incoming Line Phase Identification of the Meter Box Bus of Low Voltage Distribution Network Using Circuit Terminal Unit	4184
Po12-07	Prevention and Maintenance Technology for Equipment Family Defects Based on Account Data	4191

Map

Po12-08	Dynamic Frame Slotted ALOHA Algorithm based on BP Neural Network	4196
Po12-09	Self-adaption Technology for Abnormal Operation of Pumped Storage Power Station	4200
Po12-10	Research and Design of Robot Application System Security Protection in Electric Power Business Hall based on Artificial Intelligence	4205
Po12-11	Blockchain-Based PKI System and Its Application in Internet of Things	4210
Po12-12	Comprehensive Evaluation Index System and Method for County Power Supply Companies Based on Data Mining	4216
Po12-13	Strategic Study of Safety Monitoring and Control of Low-voltage Power Distributive Devices based on Artificial Intelligence	4222
Po12-14	Online Status Assessment of Distribution Network Transformer Based on Random Matrix Theory	4227
Po12-15	Research on Signature Verification of Two-Tickets Based on Siamese Convolutional Neural Networks	4232
Po12-16	Particle Swarm Optimization Towards Data Collection in the Internet of Things with a Mobile Sink	4238
Po12-17	Study on Data Cleaning Based on Improved K-Means Clustering and Error Analysis	4243
Po12-18	Design and Implementation of Discharge Monitoring System of Parallel Gap Device Based on lora Technology	4249
Po12-19	New Energy Power Performance Evaluation Research Based on ITMD-FM Model	4254
Po12-20	Research on Low-latency Power Communication Technology	4259
Po12-21	Low Voltage Risk Prediction Method of Distribution Station Area Based on Principal Component Analysis and Support Vector Machine	4263
Po12-22	Research on LEACH Routing Algorithm Based on Fuzzy Logic	4269
Po12-23	Edge-Cloud Collaboration Architecture of Virtual Power Plant for Large-scale EV Integration	4273
Po12-24	Exploring Novel Internet-of-things Based on Free Space Optical Communications for Smart Grids	4277
Po12-25	A Risk Situation Estimation Method for Power Information Communication Network	4282
Po12-26	Edge iot Agent Design Compatible with Sensor Equipment of Complex Distribution Terminal and Communication Task Optimization Scheduling	4288
Po12-27	Research on Topology Identification of Distribution Network under the Background of Big Data	4294
Po12-28	Power Prediction Based on Drosophila Optimized Similar Day Method and Random Forest Method	4298
Po12-29	Research on 72-hour Thunderstorm Prediction Method for UHV Transmission Line Based on BPNN	4303
Po12-30	Research of Insulator Fault Identification Method based on Atlas Intelligent Computing Platform	4308
Po12-31	Visual Intelligent Monitoring Technology of Data Center based on SSD Algorithm	4312
Po12-32	Big Data Processing Method for Multi-dimensional Power Supply Reliability of Terminal Users	4317
Po12-33	A Data Repair Method for Missing Voltage Data of Smart Meter Users	4322
Po12-34	Electromagnetic Radiation Analysis of the Potential Transfer Arc During Live Working on the UHV Transmission Line	4326
Po12-35	Thermal Image Skeleton Extraction and Intelligent Recognition of Power Equipment	4331
Po12-36	Security Analysis of Power System Network based on Complex Network	4336
Po12-37	Security Assessment of Intelligent Distribution Transformer Terminal Unit Based on RBF-SVM	4342
Po12-38	Data Interactive Access Gateway for Internal and External Networks in Dual Network Isolation	4347

	Environment	
Po12-39	Secure Access Authentication of Power Terminal Based on Multi-Channel Frequency Intensity	4351
Po12-40	Research on the Development Path of Urban Energy Internet	4357
Po12-41	Comprehensive Evaluation of Urban Energy Transformation Based on ISM and AHP	4363
Po12-42	Research on Optimal Allocation Method of Energy Storage Considering Supply and Demand Flexibility and New Energy Consumption	4368
Po12-43	Failure Analysis of Overhead Conductors Damaged by Preformed Helical Stockbridge Damper	4374
Po12-44	Adaptive Maintenance Technology for Abnormal Operation of Equipment / Working Condition	4378
Po12-45	Interpretation of Immunity Time Testing Method under Voltage Sag for Sensitive Process Rated Less than 1000V	4382
Po12-46	Orientation Recognition of Voltage Sag Source Based on Multi-Dimensional Feature Matrix and Convolution Neural Network	4386
Po12-47	Research on Optimization Method of Distributed Energy Storage Cluster for Power Grid Peak Shaving	4392
Po12-48	Transmission Pricing for Distributed Generation Transactions Based on Cost and Benefit Analysis	4397
Po12-49	A Consensus-based Algorithm for Electric Vehicle Charging System	4403
Po12-50	Implementation of Fractional-order PID Controller Using Industrial DCS with Experimental Validation	4407
	Author Index	4414-4466