2023 Power Electronics and Power System Conference (PEPSC 2023)

Hangzhou, China 24-26 November 2023



IEEE Catalog Number: CFP23HZ9-POD ISBN: 979-8-3503-4130-0

Copyright © 2023 by the Institute of Electrical and Electronics Engineers, Inc. All Rights Reserved

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

*** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.

 IEEE Catalog Number:
 CFP23HZ9-POD

 ISBN (Print-On-Demand):
 979-8-3503-4130-0

 ISBN (Online):
 979-8-3503-4129-4

Additional Copies of This Publication Are Available From:

Curran Associates, Inc 57 Morehouse Lane Red Hook, NY 12571 USA Phone: (845) 758-0400

Fax: (845) 758-2633

E-mail: curran@proceedings.com Web: www.proceedings.com



Table of Contents

Chapter 1: Control, modeling, simulation

Modified Droop Control for Support System Voltage with PID and its Implementation to Multi-VSCs for GFM Inverter
Yicheng Zhou and Ryuichi Yokoyama
Robust Predictive Flux Control Based on Generalized Proportional Integral Observer for PMSM 7 Xiangsong Wang, Shuying Yang, Geng Chen and Zhongjie Zou
Fault Tolerant Control Strategy in Open-winding Drive System With Common Mode Connected DC Buses Based on Instantaneous Power Optimization
Yueting Zhu, Shuying Yang, Zhongjie Zou and Yulei Zhang
Modeling and Analysis of DC Impedance of Bidirectional AC/DC Converter with DC-droop VSM Control Strategy
Qiang She, Jiyong Jin and Ruidong Wang
A Generic Grid-forming Control Structure for Modular Multilevel Converters
Model Predictive Control Strategy for Three-Level Quasi-Z-Source Inverters31 Ji Zhang and Tung-Chin Pan
A Proportional-Phase Lag Compensation Strategy Enhancing Robustness Against Grid Impedance for LCL-type Grid-connected Inverter
Frequency Adaptive ZVS Control for Four-switch Buck-Boost Converter with Minimized Inductor Current
Virtual Inertia Adaptive Control Strategy of Photovoltaic-Storage Systems Using Virtual Synchronous Generator Technique
A New Adaptive Frequency Control Strategy for VSG based on Grid Forming Converter of Renewable Energy
Jiayin Xu, Jiaqing Wang, Kun Li, Xu Gui, Qing Liu, Guifen Jiang and Jiliang Xue
Electric-Methanol Hybrid Energy Storage Control Strategy for Smoothing the Fluctuation of New Energy Generation
Wen Li, Fanpeng Bu, Kang Zhang, Sirui Zhang, Jing Zhang and Chenglong Hou
A Staggered-Phase Off-Oscillation Photovoltaic LMPPT Algorithm for Suppressing the Improper Perturbation
Fan Liu, Sijie Li, Biao Wang, Xi Chen, Hanmei Yang and Ping Yang
An Independent Arm Modulation Strategy of the AM-MMC for Circulating Current Suppression

Zhen Zhang and Yi Wang
A Modulation Method Suitable for AM-MMC with Small Quantities of Submodules
Research on State Switching Control Strategy of AC-DC Hybrid Microgrid Based on Improved Voltage Loop
Lin He, Yue Wu, Lin Wang, Banzhu Wang, Heng Nian, Qiushuo Li and Jianyong Zhao
Chapter 2: Fault analysis and protection
Fault-Tolerant Control Strategy of Open-Winding Permanent Magnet Synchronous Motor With Common DC Bus Under Switch Open-Circuit Fault
Low-frequency Oscillation Analysis of Power System Containing DFIG Wind Farm Based on Wind Speed Interval Prediction and Eigenvalue Trajectory
Analysis of Transient Overvoltage Impacted by PV Grid-connected Control with Series Compensation
Research on Corrosion Diagnosis Method of Substation Grounding Grid Based on Surface Magnetic Induction Intensity
Characteristics and Early Warning Protection of Lightning Activity along China-Laos Railway
Minggang Zhou, Yiran Xie, Xuetao Liu and Yinjie Xu
Active Detection Method For Fault Identification Of LVDC Distribution Network
Research Status of Condition Monitoring Data Cleaning Methods for Power Equipment
Analysis and Detection of Pole-to-pole Short-circuit Fault Characteristics of LVDC Distribution Network Yuanliang Fan, Xinghua Huang, Han Wu, Jinyu Chen, Zewen Li, Guiyu Li and Jianhua Wang
Methodology for the assessment of the behaviour of protection functions in transmission grids with high penetration of renewable sources
A State Model based Failure Prediction of Smart Meters
Fault Warning Method for Power Transformers Based on Neural Network Algorithm Guided by

Multi-Physics Simulation
Chapter 3: New devices and new materials
Study on High Voltage and High Power Converter System
Sine Wave Digital Power Supply based on Single String of Lithium Battery Inverter
A Forward Converter with Separated Resonant Tanks and Mutually Affected Resonance163 Shaofan Zhang and Ting Qian
Transmission Line Structural Health Inspection System
Model Predictive Controlled Two-stage Pulse Load Power Supply for Multi-pulse Loads 176 Gongrui Yang, Chen Ban, Zihan Zhu, Shuhan Yi, Jiacheng Zhao, Ligang Jia, Xi Chen and Ping Yang
Chapter 4: Smart grid and energy
VPP Operation Optimal Strategy based on Improve Light Robust Consideration Fluctuation Demand
Automatic Registration Techniques for Power IoT Terminals
A Novel Layered Energy Management Scheme For DC Photovoltaic-Battery-Hydrogen Microgrids in Island Operation Mode
Regional Power Gap Analysis and Optimal Allocation Strategy
Virtual Inertia Estimation and Response Characteristics Analysis of DFIG Under Overspeed Mode and Synthetic Inertia Control
A Novel Flexible Distributed P2P Energy Management Framework for Energy Community Considering Battery Storages
Research on Energy Data Coupling Mechanism in Energy Internet
Key Technology and Application of Electricity Information Acquisition in the New Power System

Jingtao.	Xи.	Enguo	Zhu.	Zhiving	Zhang	and	Yan	Liu

	esearch and Application of Data Security Control System of Electric Power ERP System233 iaoMei Gao, Ning Jia, Hao Meng, FengChao Yi, HaoXiang Li, HaiRui Li and YunBo Li
Co	esearch on the Optimal Planning Method of Wind-Solar Hydrogen Production Park System onsidering the Optimal Proportion of Wind and Solar Energy
Di	n Efficient Configuration Management Framework of Data Collection System in Power spatching Automation
Sn Ma	Lightweight Blockchain-Based Cooperative Demand Response and Energy Trading Model for nart Grid
Ne Ch	sing Meta-learning Technology To Standardize Transformation Reasoning For New Distribution etwork Planning And Diagnosis
Nε	Power Control Strategy for Electric Vehicles Charging Based on AC/DC Hybrid Distribution etwork
Co	ectric Vehicles Participate in the Economic Optimal Scheduling Method of Virtual Power Plant onsidering Time-of-Use Tariff
Cl	hapter 5: Stability and operation optimization
Ch	fluence Factors and Management Strategy Optimization of Power Grid Engineering Design nange Based on Principal Component Analysis
	rculation Suppression of Parallel Inverter System with Shared DC Bus
Ha	screte Domain Current Control Strategy for LCL Grid-Connected Inverter with Background armonic Suppression Capability
Ar	nalysis and Optimization of System Stability Considering DFIG and PV Connection Methods
Dα	ong Chen, Shenghu Li, Junwei Gong, Zhixiong Xu and Lulu Li
Ο.	otimization Strategy Based on SOP for Flexible Interconnection Path of Low Voltage

A Constrained Optimal Power Flow Algorithm for Grid-connected Power Systems with Small Disturbance Stability Considering PV-VSG
Low-frequency Oscillation Suppression in Gridconnected DFIG Multi-band Supplementary Damping Controller Based on Multi-step Optimization
Analysis and Improvement of New Energy Units Behavior under the Current Moment of Inertia Trading Market Mechanism
Energy Storage Planning Method for Improving Power Supply Capacity and Renewable Energy Consumption in County Distribution Station
A New Strategy For Resonance Suppression in LCC-HVDC System
Research on Distributed Harmonic Mitigation Strategy for HVDC Systems Based on Optimal Configuration of Active Filters
Hybrid Impedance Reshaping Method of Grid-Connected Inverters in Weak Grid
Low-carbon Economy Optimization Operation of Cold-Heat-Electricity Integrated Energy System Based on Digital Twin
A Compensation Scheme of Star Cascade H-bridge STATCOM for Unbalanced Loads355 Guanya Zhang, Hui Wang, Tao Zhang and Jian Zhou
Chapter 6: Test and assessment techniques
Research on Intelligent Testing Technology for One- Key Sequential Control System Based on Digital Simulation Technology
Reliability Analysis of PFTTH Network Based on OPLC Application
Binocular Vision-Based Detection of the Shortest Distance Between Overhead Transmission Lines and Ultra High Vessels
Research on Evaluation System of Secondary Distribution Grid System
A Probabilistic Convolution-Based Model for the Equivalent Reliability of the Distribution

ystem38	35
Cangheng Feng, Jinfeng Wang, Fadong Peng, Wanyu Ye, Zhu Liu and Dehuang Gong	
New Assessment Method of Large-Scale Renewable Generation Integration on Local Power ystem Frequency Response	
Research on Self-Heating Multi-Pulse Test Method of MMC Power Sub-module39 Yai Ma, Lingqi Tan, Ying Li, Huaping Jiang and Xinwei Li)7
Assessment of Rural Energy Supply System Sustainability Based on Energy Cooperatives40 AN Xue, JIN Yanming, FAN Shanshan, YANG Jianing and XV Zhaoyang)2
Experimental Study on the Effect of Humidity on the tanδ of 110kV Oil-immersed Current Cransformer)9
Distribution Grid Reliability Assessment Considering Multiple Scenarios of Distributed Power upplies	5
Vulnerability Assessment Method of Distribution Network Nodes Based on Jaya-AHP-EWM MARCOS	21
Carbon Emission Reduction Potential Assessment of Integrated Energy System Considering Energy Storge Effect	31
Discussion on Measurement and Monitoring of charging piles	38
Author Index44	ŀ3