

中国电机工程学报

半月刊

第 41 卷 第 9 期

Proceedings of the CSEE

SEMIMONTHLY

Vol.41 No.9



ISSN 0258-8013



9 770258 801216



中国电机工程学会主办
THE CHINESE SOCIETY FOR ELECTRICAL ENGINEERING



中国电机工程学报

ZHONGGUO DIANJI GONGCHENG XUEBAO

第 41 卷

第 9 期 (总第 668 期)

2021 年 5 月 5 日

目 次

(论文电子版 <http://www.pcsee.org/CN/volumn/home.shtml>)

“电力电子系统多时间尺度建模与控制”专题特约主编寄语	杭丽君 (2965)
· 电力电子系统多时间尺度建模与控制 ·	
电力电子系统建模关键技术综述及展望	
.....杭丽君, 闫东, 胡家兵, 沙德尚, 宁圃奇, 王智强, 张哲宇, 何远彬, 何震, 曾平良 (2966)	
电力电子混杂系统多时间尺度离散状态事件驱动仿真方法	施博辰, 赵争鸣, 朱义诚, 虞竹珺, 鞠佳禾 (2980)
一种通用的 PWM 变流器开关脉冲延时补偿策略	沈泽微, 蒋栋, 陈嘉楠 (2990)
级联 H 桥电力电子变压器高频链端口解耦等效模型	冯谟可, 高晨祥, 丁江萍, 许建中, 赵成勇 (2999)
外环动态影响下变流器广义阻抗判据的适用性分析	杨超然, 宫泽旭, 洪敏, 胡鹏飞, 辛焕海 (3012)
电气化铁路低频等幅振荡机理分析	周毅, 胡海涛, 雷科, 孟昭斐, 何正友 (3024)
用于系统暂态行为分析的双馈风机转子转速控制时间尺度暂态模型	唐王倩云, 张睿, 胡家兵 (3037)
考虑锁相环和换相失败的 LCC-HVDC 闭环动态相量仿真模型	单俊儒, 刘崇茹, 李欢, 魏伟 (3046)
一种面向实时仿真的两电平 VSC 建模方法	林畅, 纪锋, 彭逸轩, 高路, 毛航银, 庞辉, 刘栋 (3056)
· 大电网规划与运行 ·	
惯量安全域: 概念、特点及评估方法	林晓煌, 文云峰, 杨伟峰 (3065)
电力系统机电动态过程中时变幅频内电势激励下的功率特性	杨晖, 袁小明 (3079)
基于反馈线性化滑模控制的直驱风电场经柔直并网系统次同步振荡抑制策略	
.....邵冰冰, 赵书强, 高本锋, 沈俊铃, 刘毅, 易友川 (3090)	
· 智能电网 ·	
计及多电压等级配电网拓扑约束的协调转供优化	周念成, 莫复雪, 肖舒严, 谷飞强, 雷超, 王强钢 (3106)
Tsne 降维可视化分析及飞蛾火焰优化 ELM 算法在电力负荷预测中应用	
.....张淑清, 段晓宁, 张立国, 姜安琦, 姚玉永, 刘勇, 穆勇 (3120)	
架空电力线路对输油气管道的谐波感应研究: 评估方法及影响因素	雍静, 朱子齐, 王晓静 (3130)
基于模型预测控制的离网电氢耦合系统功率调控	孔令国, 于家敏, 蔡国伟, 王士博, 刘闯 (3139)
基于无相位实测数据的系统侧谐波阻抗估计方法改进	徐方维, 王川, 郭凯, 郑鸿儒, 赵劲帅, 杨洪耕 (3149)
配电网供电能力曲线的数学模型与形成机理	肖峻, 梁子钰, 余步鑫 (3158)
· 电力市场 ·	
电力物联网下考虑社会行为的产消者交易模型研究	刘一谷, 高仕斌, 韦晓广, 黄涛, 臧天磊, 陈奎 (3173)
基于热电解耦的电力现货市场机制研究	游大宁, 郝旭东, 张国强, 程定一, 王进 (3187)
综合能源服务商-多用户利益共同体协调运营优化策略研究	
.....潘虹锦, 高红均, 刘畅, 马望, 刘友波, 刘俊勇 (3195)	
· 发电 ·	
回热循环微燃机动态模拟与验证	都静, 赵丽凤, 张士杰, 王波, 路源, 徐震, 肖云汉 (3207)
结构参数对储热罐动态特性的影响	曹丽华, 刘喜峰, 司和勇 (3216)
基于 IGPC 解耦控制的火电机组多目标协同燃烧优化控制策略	冯旭刚, 鲍立昌, 章家岩, 王胜 (3223)
620℃汽轮机用 FB2 转子钢高温时效过程的组织与性能演变	田晓, 秦承鹏, 徐慧, 李太江, 李益民, 杨百勋 (3232)
基于 H ₂ S 生成简化动力学模型的富燃料煤粉燃烧数值模拟研究	
.....马红和, 朱旭东, 李春玉, 周璐, 崔志刚, CHEW Jia Wei (3240)	
芒刺线-板式电除尘器内离子风特性研究	闫东杰, 贡浩, 张子昂, 玉亚 (3250)
核电厂高强度螺栓的氢脆和应力腐蚀问题	张忠伟, 赵彦芬, 赖云亭, 左敦桂, 陈志林, 刘忠 (3259)
· 电工理论与新技术 ·	
便携式固体氧化物燃料电池系统控制研究现状与进展	王雨晴, 童欣, 袁磊 (3273)
基于电化学阻抗谱的锂离子电池内部温度在线估计方法研究	
.....范文杰, 徐广昊, 于泊宁, 张志斌, 雷万钧, 任明, 董明 (3283)	
双面散热 SiC 功率模块的可靠性分析和寿命评估	欧开鸿, 曾正, 王亮, 吴义伯, 柯灏韬 (3293)
· 英文概述见论文电子版 ·	

期刊基本参数: CN11-2107/TM * 1964 * S * A4 * 340 * zh * P * ¥84.00 * 4000 * 31 * 2021-05 版权所有 未经许可不得转载及上网

PROCEEDINGS OF THE CHINESE SOCIETY FOR
ELECTRICAL ENGINEERING
(PROCEEDINGS OF THE CSEE)

Vol.41 No.9 (Ser. 668)

May 5, 2021

CONTENTS

(Electronic Journals <http://www.pcsee.org/EN/volumn/current.shtml>)

Foreword From the Guest Editor in Chief of Special Columns for “Multi-time Scale Modeling and Control of Power Electronic Systems”	HANG Lijun (2965)
• Multi-time Scale Modeling and Control of Power Electronic Systems •	
Review and Prospect of Key Modeling Technologies for Power Electronics System	HANG Lijun, YAN Dong, HU Jiabing, SHA Deshang, NING Puqi, WANG Zhiqiang, ZHANG Zheyu, HE Yuanbin, HE Zhen, ZENG Pingliang (2966)
Discrete-state Event-driven Simulation Approach for Multi-time-scale Power Electronic Hybrid System	SHI Bochen, ZHAO Zhengming, ZHU Yicheng, YU Zhujun, JU Jiahe (2980)
A General Switch Pulse Delay Compensation Strategy for PWM Converter	SHEN Zewei, JIANG Dong, CHEN Jianan (2990)
High Frequency Link Decoupling Equivalent Model of Cascaded H-bridge Type Power Electronic Transformer	FENG Moke, GAO Chenxiang, DING Jiangping, XU Jianzhong, ZHAO Chengyong (2999)
Applicability Analysis of the Generalized-impedance Stability Criterion for Converters Considering the Outer-loop Dynamics	YANG Chaoran, GONG Zexu, HONG Min, HU Pengfei, XIN Huanhai (3012)
Mechanism Analysis of the Sustained Low-frequency Oscillation in the Electric Railway System	ZHOU Yi, HU Haitao, LEI Ke, MENG Zhaofei, HE Zhengyou (3024)
Modelling of DFIG-based WT for Power System Transient Responses Analysis in Rotor Speed Control Timescale	TANG Wangqianyun, ZHANG Rui, HU Jiabing (3037)
Closed-loop Dynamic Phasor Simulation Model of LCC-HVDC Considering Phase-locked Loop and Commutation Failure	SHAN Junru, LIU Chongru, LI Huan, WEI Wei (3046)
A Two-level VSC Modeling Method for Real-time Simulation	LIN Chang, JI Feng, PENG Yixuan, GAO Lu, MAO Hangyin, PANG Hui, LIU Dong (3056)
• Large Power Grid Planning and Operation •	
Inertia Security Region: Concept, Characteristics, and Assessment Method	LIN Xiaohuang, WEN Yunfeng, YANG Weifeng (3065)
Power Characteristics With Excitation of Time-varying Amplitude-frequency Internal Voltages During Electromechanical Dynamic Process in Power Systems	YANG Hui, YUAN Xiaoming (3079)
Sub-synchronous Oscillation Mitigation Strategy of Direct-drive Wind Farms Via VSC-HVDC System Based on Feedback Linearization Sliding Mode Control	SHAO Bingbing, ZHAO Shuqiang, GAO Benfeng, SHEN Junling, LIU Yi, YI Youchuan (3090)
• Smart Grid •	
Coordinated Power Transfer Optimization of Multi-voltage-level Distribution Network Considering Topology Constraints	ZHOU Niancheng, MO Fuxue, XIAO Shuyan, GU Feiqiang, LEI Chao, WANG Qianggang (3106)
Tsne Dimension Reduction Visualization Analysis and Moth Flame Optimized ELM Algorithm Applied in Power Load Forecasting	ZHANG Shuqing, DUAN Xiaoning, ZHANG Liguang, JIANG Anqi, YAO Yuyong, LIU Yong, MU Yong (3120)
Investigating the Overhead Line Caused Harmonic Induction on Pipeline: Evaluation Method and Impact Factors	YONG Jing, ZHU Ziqi, WANG Xiaojing (3130)
Power Regulation of Off-grid Electro-hydrogen Coupled System Based on Model Predictive Control	KONG Lingguo, YU Jiamin, CAI Guowei, WANG Shibo, LIU Chuang (3139)
An Improved Utility Harmonic Impedance Estimation Method Based on Measurement Data without Phase Angle	XU Fangwei, WANG Chuan, GUO Kai, ZHENG Hongru, ZHAO Jinshuai, YANG Honggeng (3149)
Mathematical Model and Formation Mechanism of Total Supply Capability Curve for Distribution Networks	XIAO Jun, LIANG Ziyu, SHE Buxin (3158)
• Electricity Market •	
Research on Trading Model of Prosumers Considering the Social Behaviors in the Power Internet of Things	LIU Yigu, GAO Shibin, WEI Xiaoguang, HUANG Tao, ZANG Tianlei, CHEN Kui (3173)
Research on Electricity Spot Market Mechanism Based on Thermoelectric Decoupling Mode	YOU Daning, HAO Xudong, ZHANG Guoqiang, CHENG Dingyi, WANG Jin (3187)
Research on Coordinated Operation Optimization Strategy of Integrated Energy Service Provider and Multi-users Interest Community	PAN Hongjin, GAO Hongjun, LIU Chang, MA Wang, LIU Youbo, LIU Junyong (3195)
• Power Generation •	
Dynamic Simulation and Verification of a Recuperative Micro Gas Turbine	DU Jing, ZHAO Lifeng, ZHANG Shijie, WANG Bo, LU Yuan, XU Zhen, XIAO Yunhan (3207)
Influence of Structural Parameters of Heat Storage Tank on Its Dynamic Characteristics	CAO Lihua, LIU Xifeng, SI Heyong (3216)
Multi-objective Cooperative Combustion Optimization Control Strategy for Thermal Power Units Based on IGPC Decoupling Control	FENG Xugang, BAO Lichang, ZHANG Jiayan, WANG Sheng (3223)
Microstructure and Mechanical Properties Evolution of FB2 Steel Used for 620℃ Steam-turbine During High Temperature Long-term Aging	TIAN Xiao, QIN Chengpeng, XU Hui, LI Taijiang, LI Yimin, YANG Baixun (3232)
Numerical Simulation of Fuel-rich Combustion of Pulverized Coal With Reduced Kinetic Model of H ₂ S Formation	MA Honghe, ZHU Xudong, LI Chunyu, ZHOU Lu, CUI Zhigang, CHEW Jia Wei (3240)
Experimental Study on the Characteristics of Ionic Wind of Barb Corona Electrodes in ESP	YAN Dongjie, GONG Hao, ZHANG Zi'ang, YU Ya (3250)
Problems of Hydrogen Embrittlement and Stress Corrosion of High Strength Bolts Used in Nuclear Power Plants	ZHANG Zhongwei, ZHAO Yanfen, LAI Yunting, ZHUO Dungui, CHEN Zhilin, LIU Zhong (3259)
• Theory and New Technology of Electrical Engineering •	
Research Status and Advances in Control of Portable Solid Oxide Fuel Cell Systems	WANG Yuqing, TONG Xin, YUAN Lei (3273)
On-line Estimation Method for Internal Temperature of Lithium-ion Battery Based on Electrochemical Impedance Spectroscopy	FAN Wenjie, XU Guanghao, YU Boning, ZHANG Zhibin, LEI Wanjun, REN Ming, DONG Ming (3283)
Reliability Analysis and Lifetime Assessment of Double-sided Cooling SiC Power Module	OU Kaihong, ZENG Zheng, WANG Liang, WU Yibo, KE Haotao (3293)
• For Extended Summaries, Please See the Electronic Journals •	