

ISSN 0258 - 8013

CODEN ZDGXER

中国电机工程学报

半月刊

第 41 卷 增 刊

Proceedings of the CSEE

SEMIMONTHLY

Vol.41 Supplement

第四十一卷 增刊 | 2021 年八月

Proceedings of the CSEE Vol.41 Supplement August 2021



增刊
2021
2021-08-31 出版

ISSN 0258-8013



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 增刊

2021 年 8 月 31 日

目 次

· 电力系统 ·

- 基于动态分析的综合能源系统管道选型和管存管理 翟江, 周孝信, 李亚楼, 李芳, 杨小煜 (1)
考虑量化储热的多区域电-热综合能源系统优化调度
..... 栗海润, 穆云飞, 贾宏杰, 余晓丹, 张嘉睿, 唐志鹏 (16)
碳中和背景下能源低碳化技术综述及对新型电力系统发展的启示
..... 黄雨涵, 丁涛, 李雨婷, 李立, 迟方德, 王康, 王秀丽, 王锡凡 (28)
风电次/超同步振荡激发汽轮机组轴系扭振风险的在线评估与预警技术
..... 刘朋印, 谢小荣, 马宁宁, 唐健 (52)
基于寻优算法的永磁风机并网逆变器故障穿越控制参数分步辨识
..... 秦继朔, 贾科, 孔繁哲, 杨彬, 武文强, 毕天姝 (59)
控制链路延时对 LCC-HVDC 系统小信号稳定性的影响及机理分析
..... 杨硕, 郭春义, 张加卿, 徐李清, 赵成勇 (70)
低压直流系统 VSC 交互影响与稳定性分析: 主从控制与下垂控制
..... 邓卫, 裴玮, 吴琦, 庄莹, 孔力 (80)
直流电压动态时间尺度下大规模直驱风电场振荡稳定性及参数稳定域分析 王一珺, 王海风 (92)
面向高比例新能源外送的送端混合级联型特高压直流输电方案 刘杉, 李修一 (108)
MIMO-PLC 直接序列扩频系统编码方法研究 曹旺斌, 康辉, 谢志远, 梁晓林, 胡正伟 (121)
金属回流双极直流系统中的极模变换及其在故障分析中的应用
..... 周念成, 董宇, 廖建权, 王强钢 (130)
考虑源-荷功率随机波动特性的双馈风力发电机一次频率平滑调节方法
..... 崔森, 颜湘武, 王雅婷, 李锐博, 李铁成 (143)
适用于 MMC 直流电网的源网配合式电容型直流断路器
..... 陈晓龙, 韩小文, 李永丽, 李斌, 李博通 (155)
考虑 LCU 的水电机组有功联合控制对频率稳定的影响
..... 李莹, 王官宏, 艾东平, 魏巍, 李甘, 吴杰 (167)
双碳目标下源-网-荷多层次评价体系研究 李响, 牛赛 (178)
基于用电偏好的可平移负荷参与需求响应最优激励合同与激励策略
..... 李伟, 韩瑞迪, 孙晨家, 傅鹏, 张杰, 王冲 (185)
计及风电消纳的电动汽车负荷优化配置研究 朱磊, 黄河, 高松, 贺瑜环, 卞玉 (194)
传统一个半断路器主接线的 3-正则图化改造方法及基于 4/5-正则图主接线的实现方法 刘志学 (204)

· 发电 ·

- 火电机组供电碳减排高维运行特征提取及其最优基准值确定 胡阳, 杨泽, 房方, 任健 (210)
凝汽器设置局部强化传热“急冷区”的数值模拟研究 刘天文, 孙奉仲, 徐冰 (221)
背压对抽凝机组热耗率的修正计算
..... 张彦鹏, 郑威, 祝令凯, 李思, 李苏生, 商攀峰, 刘军, 劳金旭 (229)
装配隔热板的单罐储热罐性能模拟及㶲分析 尹正宇, 韩奎华, 高明, 齐建荟 (236)
水平管内超临界 CO₂ 冷却传热特性数值分析 尹少军, 闫晨帅, 徐进良, 刘欢 (247)
基于阵列涡流检测法的管道内部减薄检测仿真与试验研究
..... 李轶名, 李巍, 王焱祥, 李毅龙, 蒋桂平, 宋凯 (254)

· 电工电机 ·

- 国际单位制变革与电磁测量发展互促共赢 李世松, 赵伟, 黄松岭, 白静芬, WANG Qing (261)
交流输电线路暂态时对邻近埋地油气管道的电磁干扰研究
..... 黄万里, 周尚虎, 孙常明, 莫冰玉, 韩梦龙, 康钧, 等 (275)
服役工况下车用超级电容器模组寿命预估方法研究 张婉婷, 韦莉, 闫孟迪, 白欣桐 (286)
基于二维有限元法的感应电机 T 型等效电路参数的分析与计算
..... 燕婧文, 狄冲, 鲍晓华, 朱庆龙 (294)
变极永磁电机研究综述与展望 杨公德, 李捷, 周扬忠, 林明耀 (303)
基于改进等效面电流法的永磁电机气隙磁场解析计算 陈春涛, 吴新振, 郑晓钦, 赵胜华 (315)
低频直线感应电机次级结构的设计与分析 吴思玥, 卢琴芬 (324)
电动汽车用模块化永磁游标电机的设计与分析 赵飞, 杨矿, 王毅 (332)
一种基于双矢量恒定开关频率的三电平 ANPC 型全桥逆变器模型预测控制方法
..... 罗龙, 李耀华, 李子欣, 赵聪 (343)
基于功率因数自适应的城轨辅助逆变器 DPWM 控制策略
..... 许明夏, 李长安, 王志强, 葛艳华, 李国锋, 王宁会 (356)
一种内转子不均匀 Halbach 阵列的磁性齿轮 井立兵, 王涛, 潘永林, 曲荣海 (366)

· 高电压技术 ·

- 一种适用于介质阻挡放电负载的紧凑型脉冲供电电源
..... 江天鸿, 唐雄民, 方文睿, 陈伟正, 邹翀 (374)
直流输电导线负极性电晕放电离子风流动特性研究 李安琪, 张新春, 王金祝, 范伟丽 (383)
特高压交流线路大吨位瓷绝缘子运行状态评估方法研究
..... 卢明, 高超, 邹乔戈, 刘泽辉, 李黎, 刘阳 (392)

· 教育与教学 ·

- 以创新为导向、先实验后理论的电工技术基础课程教学实践
..... 从浩熹, 胡雪锋, 徐衍会, 李庆民, 赵海宇 (401)
期刊基本参数: CN11-2107/TM * 1964 * S * A4 * 352 * zh * P * ¥80.00 * 4000 * 35 * 2020-9 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 Supplement

Aug. 31, 2021

CONTENTS

·Power Systems·

- Pipeline Selection and Line-pack Management of Integrated Energy System Based on Dynamic Analysis ZHAI Jiang, ZHOU Xiaoxin, LI Yalou, LI Fang, YANG Xiaoyu (1)
- Optimal Scheduling of Multi-regional Integrated Power and Heating System Considering Quantified Thermal Storage LI Hairun, MU Yunfei, JIA Hongjie, YU Xiaodan, ZHANG Jiarui, TANG Zhipeng (16)
- Decarbonization Technologies and Inspirations for the Development of Novel Power Systems in the Context of Carbon Neutrality HUANG Yuhan, DING Tao, LI Yuting, LI Li, CHI Fangde, WANG Kang, WANG Xiuli, WANG Xifan (28)
- Online Assessment and Early Warning of Torsional Vibration Risk for Turbine Generators Stimulated by Sub-/Super-synchronous Oscillations Associated with Wind Power LIU Pengyin, XIE Xiaorong, MA Ningning, TANG Jian (52)
- Stepwise Parameter Identification of Fault Ride-through Control Parameters of PMSG Grid-connected Inverter Based on Optimization Algorithm QIN Jishuo, JIA Ke, KONG Fanzhe, YANG Bin, WU Wenqiang, BI Tianshu (59)
- Impact of Time-Delay on Small Signal Stability of LCC-HVDC System and Its Mechanism Analysis YANG Shuo, GUO Chunyi, ZHANG Jiaqing, XU Liqing, ZHAO Chengyong (70)
- VSC Interaction and Stability Analysis of Low-voltage DC System: Master-slave Control VS Droop Control DENG Wei, PEI Wei, WU Qi, ZHUANG Ying, KONG Li (80)
- Analysis of Oscillation Stability and Stability Region of Parameters in Large-scale Direct-drive Wind Farms Under DC Voltage Dynamic Time Scale WANG Yijun, WANG Haifeng (92)
- Scheme of Sending End Hybrid Cascaded UHVDC for Delivery of High-proportion Renewable Energy LIU Shan, LI Xiuyi (108)
- Research on Coding Method of MIMO-PLC Direct Sequence Spread Spectrum System CAO Wangbin, KANG Hui, XIE Zhiyuan, LIANG Xiaolin, HU Zhengwei (121)
- Pole-mode Transformation of Bipolar DC Systems With Metallic Return and Its Application in Fault Analysis ZHOU Niancheng, DONG Yu, LIAO Jianquan, WANG Qianggang (130)
- A Smooth Adjustment Method for Primary Frequency of Doubly-fed Wind Generators Considering Random Fluctuation CUI Sen, YAN Xiangwu, WANG Yating, LI Ruibo, LI Tiecheng (143)
- Source-network Coordination Type DC Circuit Breaker Based on Pre-charged Capacitors for MMC DC Grid CHEN Xiaolong, HAN Xiaowen, LI Yongli, LI Bin, LI Botong (155)
- Influence of Combined Active Power Control of Hydro Turbine on Frequency Stability Consider the Effect of LCU LI Ying, WANG Guanhong, AI Dongping, WEI Wei, LI Gan, WU Jie (167)
- Study on Multi-layer Evaluation System of Source-grid-load Under Carbon-neutral Goal LI Xiang, NIU Sai (178)
- An Optimal Incentive Contract and Strategy of Shiftable Loads Participation in Demand Response Based on User Electricity Preference LI Wei, HAN Ruidi, SUN ChenJia, FU Peng, ZHANG Jie, WANG Chong (185)
- Research on Optimal Load Allocation of Electric Vehicle Considering Wind Power Consumption ZHU Lei, HUANG He, GAO Song, HE Yuhuan, BIAN Yu (194)
- Method of Reforming Traditional Breaker-and-half Connection Into 3-Regular Graph Connection and Method of Realizing 4/5-Regular Graph Connection LIU Zhixue (204)

·Power Generation·

- High Dimensional Operation Feature Extraction and Optimal Reference Value Determination of Carbon Emission Reduction for

Power Supply of Thermal Power Units	HU Yang, YANG Ze, FANG Fang, REN Jian	(210)
Numerical Study of Locally Enhancing Heat Transfer “Quench Area” in Condenser	LIU Tianwen, SUN Fengzhong, XU Bing	(221)
Correction Calculation of Heat Rate of Extraction Condensing Steam Turbine by Modified Back Pressure	ZHANG Yanpeng, ZHENG Wei, ZHU Lingkai, LI Si, LI Susheng, SHANG Panfeng, LIU Jun, LAO Jinxu	(229)
Simulations and Exergy Analysis on Performance of Single Thermocline Energy Storage Tank With the Thermal Insulation Panel	YIN Zhengyu, HAN Kuihua, GAO Ming, QI Jianhui	(236)
Numerical Analysis on Heat Transfer Characteristics of Supercritical CO ₂ Cooled in a Horizontal Tube	YIN Shaojun, YAN Chenshuai, XU Jinliang, LIU Huan	(247)
Simulation and Experimental Research on Pipeline Internal Thinning Detection Based on Eddy Current Array Testing	LI Yiming, LI Wei, WANG Yanxiang, LI Yilong, JIANG Guiping, SONG Kai	(254)

·Electrotechnology & Electric Machinery·

Electrical Measurements and Revision of International System of Units: A Win-win Outcome	LI Shisong, ZHAO Wei, HUANG Songling, BAI Jingfen, WANG Qing	(261)
Research on Electromagnetic Interference of AC Transmission Line to Adjacent Buried Pipeline under Transient States	HUANG Wanli, ZHOU Shanghu, SUN Changming, MO Bingyu, HAN Menglong, KANG Jun, et al	(275)
Research on Life Prediction Method of Vehicle Supercapacitors Module Under Service Conditions	ZHANG Wanting, WEI Li, YAN Mengdi, BAI Xintong	(286)
Analysis and Calculation of T-type Equivalent Circuit Parameters of Induction Machines Based on Two Dimensional Finite Element Method	YAN Jingwen, DI Chong, BAO Xiaohua, ZHU Qinglong	(294)
Overview and Prospect of Pole-changing Permanent Magnet Machines	YANG Gongde, LI Jie, ZHOU Yangzhong, LIN Mingyao	(303)
Analytical Calculation of Air-gap magnetic Field of Permanent-magnet Motor Based on Improved Equivalent Surface Current Method	CHEN Chuntao, WU Xinzen, ZHENG Xiaoqin, ZHAO Shenghua	(315)
Design and Analysis of Secondary Structure of Low-frequency Linear Induction Motor	WU Siyue, LU Qinfen	(324)
Design and Analysis of a Modular Permanent Magnet Vernier Machine for Electric Vehicle Application	ZHAO Fei, YANG Kuang, WANG Yi	(332)
A Model Predictive Control Method of Three-level ANPC Type Full-Bridge Inverter Based on Dual Vector Constant Switching Frequency	LUO Long, LI Yaohua, LI Zixin, ZHAO Cong	(343)
DPWM Control Strategy of Auxiliary Inverter for Urban Rail Transit Based on Adaptive Power Factor	XU Mingxia, LI Changan, WANG Zhiqiang, GE Yanhua, LI Guofeng, WANG Ninghui	(356)
A Magnetic Gear With Unequal Halbach Arrays on the Inner Rotor	JING Libing, WANG Tao, PAN Yonglin, QU Ronghai	(366)

·High Voltage Engineering·

A Compact Pulse Power Supply Suitable for Dielectric Barrier Discharge Load	JIANG Tianhong, TANG Xiongmin, FANG Wenrui, CHEN Weizheng, ZOU Chong	(374)
Study on the Flow Characteristics of Ionic Wind on the Negative Corona Discharge in the DC Transmission Conductors	LI Anqi, ZHANG Xinchun, WANG Jinzhu, FAN Weili	(383)
Research on Operation State Evaluation Method of Large Tonnage Porcelain Insulator for UHV AC Transmission Line	LU Ming, GAO Chao, ZOU Qiaoge, LIU Zehui, LI Li, LIU Yang	(392)

·Education and Teaching·

Innovation-oriented Curriculum Teaching Practice on Fundamental Theory of Electrical Engineering Course With Experiment First and Then Theory	CONG Haoxi, HU Xuefeng, XU Yanhui, LI Qingmin, ZHAO Haiyu	(401)
---	---	-------