



# 中国电机工程学报

ZHONGGUO DIANJI GONGCHENG XUEBAO

第 40 卷

第 23 期 (总第 658 期)

2020 年 12 月 5 日

## 目 次

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

### · 大电网规划与运行 ·

- 基于多能源网络路由算法的区域能源广域网协同规划 ..... 张露青, 陈爱康, 顾玖, 解大, 顾承红 (7499)  
考虑决策相关随机规划的光热电站容量配置 ..... 史昭娣, 王伟胜, 黄越辉, 侯云鹤, 董凌 (7511)  
考虑短路电流直流分量超标影响的断路器开断能力等效折算方法 ..... 张玉红, 张彦涛, 贺静波, 等 (7522)  
采用架空线等效模型的直流电网故障电流计算方法及实验验证 ..... 俞永杰, 吕煜, 邓伟成, 等 (7530)

### · 智能电网 ·

- 计及交通流量调度的智慧综合能源系统规划 ..... 王珏莹, 胡志坚, 谢仕炜 (7539)  
含脉冲负载的中压直流综合电力系统的无迹卡尔曼动态状态估计方法 ..... 肖润龙, 王刚, 徐晨, 等 (7555)  
考虑蓄电池寿命损耗的最优船舶储能系统调度 ..... 方斯顿, 王鸿东, 张沈习, 尚策 (7566)  
目标物智能跟踪与分割融合算法及其在变电站视频监控中的应用 ..... 陈汐, 韩译锋, 闫云凤, 等 (7578)  
基于 E-Seq2Seq 技术的数据驱动型机组组合智能决策方法 ..... 杨楠, 贾俊杰, 邢超, 刘颂凯, 等 (7587)  
三相不平衡主动配电网随机模糊安全距离研究 ..... 马瑞, 敖维安 (7600)

### · 继电保护、通信及自动化 ·

- 一种面向线路零序过流保护的防励磁涌流所致误动闭锁策略 ..... 张培夫, 金能, 章建玲, 林湘宁, 等 (7609)  
面向多端直流电网的相继速动判据 ..... 郑宇超, 童宁, 林湘宁, 隋权, 汪致洵, 李正天 (7622)  
面向需求响应的电力通信网业务均衡与优化 ..... 曹望璋, 郑兵, 李彬, 孙毅 (7635)

### · 发电 ·

- 汽轮发电机组高位布置技术研究与工程设计 ..... 王树民, 宋畅, 张满平, 陈寅彪, 张翼, 孙锐, 等 (7643)  
空气分级耦合与不耦合多孔壁风工况下煤粉燃烧特性的数值模拟研究 ..... 马红和, 刘仕海, 等 (7652)  
一种基于样本大数据监测汽动给水泵组性能的方法 ..... 朱宝, 顾伟飞, 孙永平, 梅益铭, 赵佳骏 (7659)  
湿法脱硫塔入口烟气调温耦合余热回收工艺系统节能分析比较 ..... 邓庆波, 冉景煜, 杨仲卿, 等 (7667)  
超低排放机组湿式电除尘器颗粒物脱除特性分析 ..... 杜振, 江建平, 张杨, 魏宏鸽, 朱跃 (7675)

### · 电力电子器件及装备的可靠运行与健康管理 ·

- 三相电压型逆变器智能化故障诊断方法综述 ..... 马铭遥, 凌峰, 孙雅蓉, 李飞, 张兴 (7683)  
多芯片并联压接式 IGBT 热-力不均对电流分布的影响分析及建模 ..... 邓真宇, 陈民铀, 赖伟, 等 (7699)  
功率循环试验中开通时间对高压大功率 IGBT 模块失效模式的影响及机理分析 ..... 陈杰, 邓二平, 等 (7710)  
随机载荷下压接型 IGBT 性能稳健性优化设计 ..... 黄志亮, 阳同光, 黎灿兵 (7721)  
高压大容量 MMC 换流阀损耗精确计算 ..... 罗永捷, 宋勇辉, 熊小伏, 张连升, 王强钢, 周念成 (7730)  
大容量电力电子装置母排网络结构矩阵分析方法 ..... 胡斯登, 梁梓鹏, 张志学, 赵争鸣, 何湘宁 (7742)  
融合电流和振动信号的永磁同步风电系统变流器故障诊断方法研究 ..... 施耀华, 冯延晖, 任铭, 邱颖宁 (7750)  
增广时频域反射法在电缆复合故障检测中的应用 ..... 尹振东, 王莉, 陈洪坤, 花旭 (7760)  
变电站系统的地震易损性分析方法 ..... 梁黄彬, 谢强 (7773)

### · 高电压技术 ·

- $\pm 1100\text{kV}$  特高压直流输电工程创新实践 ..... 刘泽洪 (7782)  
基于多重信息分解与时变权重组合的换流变压器振动状态参量综合预测方法 ..... 吴书煜, 汲胜昌, 等 (7792)  
基于气象数据的雾天气条件下高压直流输电线路合成电场计算分析 ..... 申南轩, 张远航, 徐鹏, 卢铁兵 (7805)  
一种改进型电容换流式直流断路器 ..... 许军, 逯江华, 张慧媛, 丁一原 (7816)  
火药辅助分断式开断器设计及其介质恢复特性研究 ..... 周煜韬, 庄劲武, 武瑾, 袁志方, 张超, 鄢玲 (7824)

### · 英文概述见论文电子版

期刊基本参数: CN11-2107/TM \* 1964 \* S \* A4 \* 334 \* zh \* P \* ¥84.00 \* 4000 \* 32\* 2020-12 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.40 No.23 (Ser. 658)

Dec. 5, 2020

**CONTENTS**

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

**• Large Power Grid Planning and Operation •**

- Regional Energy Wide Area Network Planning Based on Routing Algorithm ..... ZHANG Luqing, CHEN Aikang, GU Jiu, XIE Da, Chenghong GU (7499)  
Capacity Optimization of Concentrating Solar Power Plant Based on Decision-dependent Stochastic Programming ..... SHI Zhaodi, WANG Weisheng, HUANG Yuehui, HOU Yunhe, DONG Ling (7511)  
Equivalent Conversion Method for the Breaking Capacity of Breaker Considering Excessive DC Component of the Short-circuit Current ..... ZHANG Yuhong, ZHANG Yantao, HE Jingbo, et al (7522)  
Fault Current Calculation Method in Complex Frequency Domain of MMC-HVDC Grid Using Equivalent Model of Transmission Line ..... YU Yongjie, LYU Yu, DENG Weicheng, et al (7530)

**• Smart Grid •**

- Smart Multi-energy System Planning Considering the Traffic Scheduling ..... WANG Jueying, HU Zhijian, XIE Shiwei (7539)  
An Unscented Kalman Filter Based Dynamic State Estimation for the Medium-voltage DC Integrated Power System With Pulse Load ..... XIAO Runlong, WANG Gang, XU Chen, et al (7555)  
Optimal Management of Shipboard Energy Storage System Considering Battery Lifetime Degradation ..... FANG Sidun, WANG Hongdong, ZHANG Shenxi, SHANG Ce (7566)  
A Unified Algorithm for Object Tracking and Segmentation and its Application on Intelligent Video Surveillance for Transformer Substation ..... CHEN Xi, HAN Yifeng, YAN Yunfeng, et al (7578)  
Data-driven Intelligent Decision-making Method for Unit Commitment Based on E-Seq2Seq Technology ..... YANG Nan, JIA Junjie, XING Chao, LIU Songkai, et al (7587)  
Research on Random Fuzzy Safety Distance of Active Distribution Network Considering Three-phase Unbalance ..... MA Rui, AO Wei'an (7600)

**• Power System Relaying, Communication and Automation •**

- A Line Zero-sequence Over Current Protection Blocking Strategy Against Maloperation Caused by Inrush ..... ZHANG Peifu, JIN Neng, ZHANG Jianling, LIN Xiangning, et al (7609)  
Dead Zone Acceleration Principle for the Multi-terminal DC System ..... ZHENG Yuchao, TONG Ning, LIN Xiangning, SUI Quan, WANG Zhixun, LI Zhengtian (7622)  
Balance and Optimization of Service in Electric Power Communication Network Oriented to Demand Response ..... CAO Wangzhang, QI Bing, LI Bin, SUN Yi (7635)

**• Power Generation •**

- Research and Engineering Design of High Level Layout of Turbine Generator Unit ..... WANG Shumin, SONG Chang, ZHANG Manping, CHEN Yinbiao, ZHANG Yi, SUN Rui, et al (7643)  
Modeling of Pulverized Coal Combustion Under Air Staged Coupled and Un-coupled With Multi-hole Wall Air ..... MA Honghe, LIU Shihai, et al (7652)  
A Method for Monitoring the Performance of Turbine Driven Boiler Feed Water Pump Set Based on Big Sample Data ..... ZHU Bao, GU Weifei, SUN Yongping, MEI Yiming, ZHAO Jiajun (7659)  
Energy Saving Analysis and Comparison of Flue Gas Temperature Regulation Coupling Waste Heat Recovery Process System at the Entrance of Wet Desulfurization Tower ..... DENG Qingbo, RAN Jingyu, YANG Zhongqing, et al (7667)  
Analysis of Particle Removal Characteristics on Wet Electrostatic Precipitator for Ultra-low Emission Coal-fired Power Unit ..... DU Zhen, JIANG Jianping, ZHANG Yang, WEI Hongge, ZHU Yue (7675)

**• Reliable Operation and Health Management of Power Electronic Device and Equipment •**

- Review of Intelligent Fault Diagnosis Methods for Three-phase Voltage-mode Inverters ..... MA Mingyao, LING Feng, SUN Yarong, LI Fei, ZHANG Xing (7683)  
Analysis and Modeling of the Influence of Thermal-force Unevenness of Multi-chip Parallel Press-pack IGBT Devices on Current Distribution ..... DENG Zhenyu, CHEN Minyou, LAI Wei, et al (7699)  
Influence and Mechanism Analysis of Load Pulse Duration on Failure Mode of High Power IGBT Module Under Power Cycling Condition ..... CHEN Jie, DENG Erping, et al (7710)  
Robust Design Optimization for Press-pack IGBT Under Stochastic Loads ..... HUANG Zhiliang, YANG Tongguang, LI Canbing (7721)  
Accurate Loss Calculation Method for Bulk-power MMCs ..... LUO Yongjie, SONG Yonghui, XIONG Xiaofu, ZHANG Liansheng, WANG Qianggang, ZHOU Niancheng (7730)  
Matrix Analysis for Busbar Network in Large-capacity Power Electronic Equipment ..... HU Sideng, LIANG Zipeng, ZHANG Zhixue, ZHAO Zhengming, HE Xiangning (7742)  
Study on Fault Diagnosis Method of Converter in Permanent Magnet Synchronous Wind Power System by Fusion of Current and Vibration Signals ..... SHI Yaohua, FENG Yanhui, REN Ming, QIU Yingning (7750)  
Application of Augmented Time Frequency Domain Reflectometry in Detection of Complex Cable Faults ..... YIN Zhendong, WANG Li, CHEN Hongzhen, HUA Xu (7760)  
Seismic Vulnerability Analysis of Substation System ..... LIANG Huangbin, XIE Qiang (7773)

**• High Voltage Engineering •**

- Findings in Development of ±1100kV UHVDC Transmission ..... LIU Zehong (7782)  
Comprehensive Prediction Method of Converter Transformer Vibration State Parameters Based on Multiple Information Decomposition and Time-varying Weight Combination ..... WU Shuyu, JI Shengchang, et al (7792)  
Calculation and Analysis of Ground-level Total Electric Field of HVDC Lines in Fog Based on Meteorological Data ..... SHEN Nanxuan, ZHANG Yuanhang, XU Peng, LU Tiebing (7805)  
An Improved Capacitor Commutated DC Circuit Breaker ..... XU Jun, LU Jianghua, ZHANG Huiyuan, DING Yiyuan (7816)  
Propellant-assisted Interrupter Design and Its Dielectric Recovery Characteristics ..... ZHOU Yutao, ZHUANG Jinwu, WU Jin, YUAN Zhifang, ZHANG Chao, YAN Ling (7824)

**• For Extended Summaries, Please See the Electronic Journals.**