

高电压技术

可控避雷器的静态电位分布计算方法

陈秀娟¹, 陈维江², 沈海滨¹, 贺子鸣¹, 陈立栋¹, 车文俊³, 宋继军³

1. 中国电力科学研究院, 2. 国家电网公司, 3. 廊坊电科院东芝避雷器有限公司

摘要: 可控避雷器的晶闸管开关中晶闸管的等效电容CT随端电压UT的变化而变化, 在计算可控避雷器静态电位分布时, 须考虑该特点。将“场路结合法”与CT随UT的变化规律相结合, 提出了可控避雷器静态电位分布计算方法, 即先建立受控元件、固定元件和晶闸管均压电阻的电场数值计算模型, 求出等效杂散电容网络; 再通过试验检测和曲线拟合, 求出晶闸管CT和UT之间的函数关系; 然后建立可控避雷器等效电路模型, 将CT和UT之间的函数代入电路模型中, 通过反复迭代, 求得各电极电位U_{Fi}与避雷器端电压U_s之间的函数; 最后将U_{Fi}与U_s之间的函数代入电场数值计算模型中, 求出可控避雷器静态电位分布随U_s的变化规律。经试验验证, 该计算方法用于求解可控避雷器静态电位分布是有效的。

关键词: 可控避雷器 晶闸管阀 等效电容 场路结合法 电位分布

Calculation Method for Voltage Distribution of Controlled Metal Oxide Arresters

CHEN Xiujuan¹, CHEN Weijiang², SHEN Haibin¹, HE Ziming¹, CHEN Lidong¹, CHE Wenjun³, SONG Jijun³

1. China Electric Power Research Institute
2. State Grid Corporation of China
3. Langfang EPRI Toshiba Lightning Arrester Company

Abstract: Equivalent capacitances of thyristors of thyristor switch in the controlled metal oxide arrester (CMOA), CT, changes with voltage, UT. When the voltage distribution of CMOA is calculated, such characteristic should be fully considered. Combining field-circuit combination method and variation rule of CT with UT, a calculation program was put forward. Firstly, electromagnetic-field numerical calculation models of controlled component, fixed component and resistance of thyristor were established and an equivalent capacitance network was set up. Then the relation between CT and UT, was solved by test and curve fitting. Secondly, an equivalent circuit of CMOA was founded, the relation between CT and UT was substituted to the circuit, then the function between the electrode voltage, U_{Fi}, and the CMOA voltage, U_s could be calculated by iterations. Finally, the function between U_{Fi} and U_s was substituted to the electromagnetic-field numerical calculation model, the variation rule of voltage distribution with U_s was solved. The calculation program was verified by tests. Results indicated that it is effective to calculate the voltage distribution of CMOA.

Keywords: controlled metal oxide arrester (CMOA) thyristor switch equivalent capacitance field-circuit combination method potential distribution

收稿日期 2009-12-08 修回日期 2010-02-23 网络版发布日期 2010-09-20

DOI:

基金项目:

国家自然科学基金项目(50737003)。

通讯作者: 陈秀娟

作者简介:

作者Email: xjchen@epri.sgcc.com.cn

扩展功能

本文信息

- ▶ Supporting info
- ▶ PDF(221KB)
- ▶ [HTML全文]
- ▶ 参考文献[PDF]
- ▶ 参考文献

服务与反馈

- ▶ 把本文推荐给朋友
- ▶ 加入我的书架
- ▶ 加入引用管理器
- ▶ 引用本文
- ▶ Email Alert
- ▶ 文章反馈
- ▶ 浏览反馈信息

本文关键词相关文章

- ▶ 可控避雷器
- ▶ 晶闸管阀
- ▶ 等效电容
- ▶ 场路结合法
- ▶ 电位分布

本文作者相关文章

- ▶ 陈秀娟
- ▶ 陈维江
- ▶ 沈海滨
- ▶ 贺子鸣
- ▶ 陈立栋
- ▶ 车文俊
- ▶ 宋继军

PubMed

- ▶ Article by Chen,X.J
- ▶ Article by Chen,W.J
- ▶ Article by Chen,H.B
- ▶ Article by He,Z.M
- ▶ Article by Chen,L.D
- ▶ Article by Che,W.J
- ▶ Article by Song,J.J

本刊中的类似文章

1. 韩社教 李平舟 路彦峰 张西元. 1000kV立柱式氧化锌避雷器三维电位分布计算及均压环设计[J]. 中国电机工程学报, 2007,27(27): 50-55
 2. 车文俊 千叶智基 张晓星 宋继军 菅雅弘. 1 000 kV瓷外套金属氧化物避雷器的电位分布研究[J]. 中国电机工程学报, 2009,29(22): 53-57
 3. 郭焕 温家良 汤广福 郑健超. 高压直流输电晶闸管阀关断的电压应力分析[J]. 中国电机工程学报, 2010,30(12): 1-6
-