中国电机工程学报 2011, 31(19) 129-137 DOI: ISSN: 0258-8013 CN: 11-2107/TM

高电压技术

中短波段输电线路无源干扰防护间距求解的关键问题

唐波[1]，文远芳[1]，张小武[2]，赵志斌[3]

1. 华中科技大学电气与电子工程学院
2. 国网电力科学研究院
3. 华北电力大学电气与电子工程学院

摘要：

为更准确地计算输电线路对各类无线台站的无源干扰防护间距，对仿真模型、干扰极大值频率和防护间距计算方法进行研究。仿真模型采用垂直极化平面波进行激励，线路铁塔仿真为面模型，地线仿真为线模型，阐述了线?面模型接点处的基函数及求解方法。结合当前输电线路无源干扰谐振频率发生在整数倍波长回路谐振频率和?/4谐振频率的观点，计算了垂直极化平面波激励下的输电线路感应电流和不同观测点处的无源干扰水平。结果表明平面波激励下的无源干扰最大值出现的频率符合1倍波长回路谐振频率，不符合?/4谐振频率；当频率达短波频段后，整数倍波长回路谐振频率不再适用。提出了输电线路无源干扰防护间距的求解方法，以调幅广播收音台一级台为例，求解了特高压直流输电线路对其的防护间距。

关键词： 特高压直流输电线路 无源干扰 防护间距 谐振频率 线-面模型 感应电流

Key Problems of Solving Reradiation Interference Protecting Distance Between Power Transmission Line and Radio Station at MF and SF

TANG Bo[1], WEN Yuanfang[1], ZHANG Xiaowu[2], ZHAO Zhibin[3]

1. College of Electric and Electronic, Huazhong University of Science and Technology
2. State Grid Electric Power Research Institute
3. College of Electric and Electronic, North China Electric Power University

Abstract:

To improve the accuracy of the calculating assessment of reradiation interference protecting distance between radio station and ultra high voltage (UHV) transmission lines, the simulation model, frequency of the reradiation interference having maximum, and the computation method of protecting distance were researched. The simulation model, in which the steel tower was represented as surface model and ground wire was represented as wire model, was excitated by vertical polarization plane wave. The base function of wire-surface model conjunction and the computation method were discussed. Normally, the frequency of interference having maxima is N-wavelength loop resonance and ?/4 resonance, based on which the induced current on power line and interference values under vertical polarization plane wave were calculated. The results show that the interference maximum occurred on one-wavelength loop resonance, but not on ?/4 resonance. When the frequency was in short-wave band, N-wavelength loop resonance could not be used. As a result, the new calculation method of protecting distance was proposed. Choosing AM broadcast as an example, the interference protecting distance from UHVDC was calculated.

Keywords: ultra high voltage (UHV) DC power line reradiation interference protecting distance resonance-frequency wire-surface model induced current

收稿日期 2010-05-20 修回日期 2011-01-17 网络版发布日期 2011-08-19

DOI:

基金项目:

国家“十一五”科技支撑计划(2006BAA02A09)；国家电网公司科学技术项目(SG0925)。

通讯作者: 唐波

作者简介:

作者Email: tangboemail@sina.com

参考文献：

本刊中的类似文章

1. 马海啸 龚春英 严仰光.电流滞环控制半桥双降压式逆变器输出滤波器设计[J]. 中国电机工程学报, 2007,27(13): 98-103
2. 徐爱群.超磁致伸缩换能器谐振频率自动跟踪方法[J]. 中国电机工程学报, 2009,29(21): 114-118
3. 张淑娥 赵君超 李永倩 熊华.空气湿度微波谐振腔测量方法[J]. 中国电机工程学报, 2008,28(2): 27-32
4. 周雯琪 马皓 何湘宁.基于动态方程的电流源感应耦合电能传输电路的频率分析[J]. 中国电机工程学报, 2008,28(3): 119-124
5. 束洪春 刘可真 朱盛强 张广斌 朱子钊 张敏.±800 kV特高压直流输电线路单端电气量暂态保护[J]. 中国电机工程学报, 2010,30

(31): 108-117
6. 唐波 文远芳 赵志斌 张小武.特高压角钢铁塔无源干扰计算的三维面模型[J]. 中国电机工程学报, 2011,31(4): 104-111