水平分层土壤结构对感应雷过电压的影响 【上架时间： 2023-03-30】

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作者	：	作者	：胡逸
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详细信息

【标题】水平分层土壤结构对感应雷过电压的影响

【Title】Effect of Horizontally Layered Soil Structure on Induced Lightning Overvoltage

【摘要】研究水平分层土壤结构对感应雷过电压的影响，可为配电线路的防雷设计提供参考。通过建立2维时域有限差分（2-D FDTD）算法模型，并结合改进Agrawal耦合模型计算配电线路的感应雷过电压。利用该算法研究配电线路在不同水平分层土壤结构下感应雷过电压的变化。结果表明：当上层土壤电导率小于下层电导率时，随着上层土壤厚度的增加，感应雷过电压的峰值也逐渐增大。当上层土壤电导率大于下层电导率时，当上层土壤厚度大于10 m时，感应雷过电压幅值几乎由上层土壤决定。研究结论可为线路的防雷设计提供一定的参考依据。

【Abstract】Studying the effect of horizontally layered soil structure on induced lightning overvoltage can provide a reference for lightning protection design of distribution lines. By establishing a 2-D finite-difference time-domain (2-D FDTD) algorithm model, combined with the improved Agrawal coupling model, the induced lightning overvoltage of distribution lines is calculated. The algorithm is used to study the variation of induced lightning overvoltage in distribution lines under different levels of layered soil structure. The results show that: when the conductivity of the upper layer is lower than that of the lower layer, the peak value of the induced lightning overvoltage increases gradually with the increase of the thickness of the upper layer of soil. When the conductivity of the upper layer of soil is greater than that of the lower layer, and when the thickness of the upper layer of soil is greater than 10 m, the amplitude of induced lightning overvoltage is almost determined by the upper layer of soil. The research conclusions can provide a certain reference for the lightning protection design of the line.

【关键词】感应雷过电压；配电线路；2维时域有限差分算法；Agrawal耦合模型；水平分层土壤

【Keywords】induced lightning overvoltage；distribution lines；2-D finite-difference time-domain method；Agrawal coupling model；horizontally stratified ground

【作者】
胡逸：1云南电网有限责任公司电力科学研究院 2重庆大学电气工程学院

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