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应用可控源音频大地电磁法的土壤电阻率测量

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摘要：

采用准确测量土壤电阻率设计的地网可使设计误差达到最小，对电力系统的可靠运行具有重要意义。可控源音频大地电磁法(controlled source audio-frequency magneto- telluric，CSAMT)是一种成功应用于煤、油、气等资源探测的物探技术。基于CSAMT法及Schlumberger法基本原理建立了测量土壤电阻率的模型，在均匀半空间条件下，利用接地分析软件CDEGS实现了土壤电阻率的仿真测量。结果表明，CSAMT法所测土壤电阻率在很宽一段频率范围内基本保持不变，且与真实土壤电阻率的误差很小，表明所测土壤为均匀土壤；而Schlumberger法所测结果与真实值误差较大，且在频率较高时所得结果完全不可信，证实了CSAMT法测量土壤电阻率的高准确性。

关键词：

Analysis on Soil Resistivity Measurement Based on Controlled Source Audio-frequency Magneto-telluric

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Abstract:

Grounding grid that is designed based on accurately measured soil resistivity can make the design error minimum, and it is significant to reliable operation of power system. Controlled source audio-frequency magneto-telluric (CSAMT) is a geophysical technology that has been successfully applied to explore the resources such as coal, petroleum and natural gas. Based on basic priciple of CSAMT method and Schlumberger measurement method a soil resistivity measurement model is built. Under the condition of homogeneous half-space, by use of famout grounding analyzing software CDEGS the simulative measurement of soil resistivity is implemented. Measured results show that when the measured soil resistance basiclly remains constant in a wide frequency range and is close to actual soil resistivity, it indicates that the measured soil is uniform; however the error of results measured by Schlumberger method is larger than actual soil resistivity, in addition, the measured results by Schlumberger method under higher frequencies are not receivable at all, and this fact confirms that CSAMT method is an accurate method for the measurement of soil resistivity.

Keywords:

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