电网建设

覆冰输电导线舞动非线性有限元分析

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摘要： 摘要：以考虑扭转的索单元来模拟输电导线，分别采用空间杆单元和平面梁单元模拟绝缘子串和间隔棒，利用Newmark-β法并结合Newton迭代法计算了单跨单导线、多跨单导线及分裂导线的舞动响应，分析了舞动振幅与风速的关系。研究结果表明：几何非线性有限元方法比线性有限元方法得到的舞动振幅大；多跨单导线舞动振幅大于单跨单导线；分裂导线舞动振幅大于单导线振幅；单跨单导线和多跨单导线均存在某一风速使得舞动振幅达到最大，而分裂导线舞动振幅则是随着风速增大而增大。

关键词：

Nonlinear Finite Element Analysis on Galloping of Ice-Coated Transmission Line

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Abstract: ABSTRACT: Under the presuppositions that transmission line is simulated by cable elements when the torsion of cable elements is taken into account and the insulator strings and conductor spacers are simulated by spatial link elements and planar beam elements separately, by use of Newmark-βmethod integrated with Newton iteration method the galloping responses of single-span-line, multi-span-line and bundled lines are calculated, and the relation between wind speed and galloping amplitude is analyzed. Research result shows that the galloping amplitudes obtained by geometric nonlinear finite element method are larger than that by linear finite element method; the galloping amplitude of multi-span single conductor is larger than that of single-span single conductor; the galloping amplitude of bundled conductor is larger than that of single-conductor; as for single-span single conductor and multi-span single-conductor, there is a certain respective wind speed making the galloping amplitudes reaching maximum, however the galloping amplitude of bundled conductor increases with the increasing of wind speed.

Keywords:

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