A Universal Finite-Element Analysis Of The Bipolar Ionized Field

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Summary

A novel iterative method for the analysis of the bipolar ionized field in HVDC (high-voltage direct-current) transmission lines without resort to Deutsch's assumption is described. The finite-element technique is used to solve Poisson's equation where the constancy of the conductor's surface field at the corona inception value is directly implemented in the finite-element formulation. The proposed method has been tested on laboratory and full-scale models. The calculated V -I characteristics agreed well with those calculated and measured before. The dependency of the corona current as well as its monopolar and bipolar components on the conductors' height is discussed. The simplicity in the computer programming in addition to the low number of iterations required to achieve convergence characterize the proposed method of analysis