

Analysis Of Monopolar Ionized Field As Influenced By Ion Diffusion

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Summary

The authors present an analysis of the monopolar ionized field in conductor-to-plane configurations without resort to Deutsch's assumption. An iterative finite-element technique is used to solve Poisson's equation. Satisfying the current continuity condition and updating the space-charge density are based on the application of Kirchoff's current-balance law at each node of the finite-element grid, taking the ion diffusion into account. The proposed method of solution has been applied to laboratory and full-scale models of a monopolar transmission line. The calculated V-I characteristics and the current-density and electric field profiles at the ground plane agreed well with those measured experimentally in comparison with previous calculations. Fast convergence and simplicity in programming characterize the proposed method

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