Abstracts

Analysis of Coaxial Line Discontinuities by Boundary Relaxation

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Discontinuities in coaxial lines may in general be represented in equivalent networks by lumped capacitances. The calculation of discontinuity capacitance is possible by means of mode-matching techniques for very simple discontinuities; for more complex cases, direct numerical methods are preferable. A new numerical technique is presented for solving the field problem in a region bounded on two sides by infinitely extending coaxial lines. The approach used is to define operators by means of which the potentials at a given cross-sectional plane of the coaxial line are related to potentials at another plane. The problem of a discontinuity region between two infinitely long lines is thereby converted into a finite problem with prescribed boundary operators in place of boundary values. Standard methods may be used to solve the problem in a finite region. Subsequent reformulation of the discontinuity capacitance in terms of stored energy permits calculation of this capacitance from the potential values in only a minimal region. The resulting computer programs are at least an order of magnitude faster than previously published ones.

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