Abstracts

Derivation of equivalent circuits of microwave structures using numerical techniques

R. Levy. "Derivation of equivalent circuits of microwave structures using numerical techniques." 1999 Transactions on Microwave Theory and Techniques 47.9 (Sep. 1999, Part I [T-MTT]): 1688-1695.

The use of electromagnetic (EM) field simulation to derive new circuit models for microwave component elements, such as discontinuities or T-junctions, or to verify and/or update existing circuit models in the literature is described. Such models may then be used to generate accurate microwave component designs using conventional synthesis. The technique for derivation of equivalent-circuit models is illustrated by examples of a stepped transmission line and an iris-coupled junction between a rectangular waveguide and an overmoded circular waveguide supporting both the TE/sub 11/ and TM/sub 11/ modes. The method may be orders of magnitude faster than those based on direct EM field analysis combined with optimization, and also gives physical insight. In addition, this paper gives simple formulas for the derivation of the impedance and admittance matrices of lossless networks avoiding inversion of complex matrices.

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