Abstracts

Rigorous Analysis of 3-D Planar Circuit Discontinuities Using the Space-Spectral Domain Approach (SSDA)

K. Wu, M. Yu and R. Vahldieck. "Rigorous Analysis of 3-D Planar Circuit Discontinuities Using the Space-Spectral Domain Approach (SSDA)." 1992 Transactions on Microwave Theory and Techniques 40.7 (Jul. 1992 [T-MTT] (Special Issue on Process-Oriented Microwave CAD and Modeling)): 1475-1483.

A new method, the Space-Spectral Domain Approach (SSDA), has been developed to determine scattering parameters for arbitrarily shaped multilayered planar MIC /MMIC discontinuities. Although the basic framework of the SSDA has been introduced previously, only resonant frequencies of planar circuit discontinuities could be calculated. The SSDA as presented in this paper is not only significantly extended, but it also introduces the new concept of self-consistent hybrid boundary conditions to replace the modal source concept in the feed line. Furthermore, a general error function is derived to provide a direct assessment of the discretization accuracy. The convergence behavior of this new method is investigated, and current standing-wave profiles along microstrip throughlines with matched, open and short-circuited conditions are given. Finally, S-parameters for several microstrip discontinuities with abrupt and smooth transition are illustrated to demonstrate the flexibility of this new approach.

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