Abstracts

Systematic development of transmission-line models for interconnects with frequency-dependent losses

K.M. Coperich, J. Morsey, V.I. Okhmatovski, A.C. Cangellaris and A.E. Ruehli. "Systematic development of transmission-line models for interconnects with frequency-dependent losses." 2001 Transactions on Microwave Theory and Techniques 49.10 (Oct. 2001, Part I [T-MTT] (Mini-Special Issue on Electrical Performance of Electronic Packaging (EPEP))): 1677-1685.

This paper presents a new method for the extraction of the frequency-dependent, per-unit-length (p.u.l.) resistance, and inductance parameters of multiconductor interconnects. The proposed extraction methodology is based on a new formulation of the magneto-quasi-static problem that allows lossy ground planes of finite thickness to be modeled rigorously. The formulation is such that the p.u.l. impedance matrix for the multiconductor interconnect is extracted directly at a prescribed frequency. Once the matrix has been calculated over the bandwidth of interest, rational function representations of its elements are generated through a robust matrix curve-fitting process. Such a formulation enables subsequent transient analysis of interconnects through a variety of approaches. Direct incorporation of the rational function model into a general-purpose circuit simulator and a standalone multiconductor-transmission-line simulator is demonstrated.

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