Abstracts

A PEEC with a new capacitance model for circuit simulation of interconnects and packaging structures

Yi Cao, Zheng-Fan Li, Ji-Feng Mao and Jun-Fa Mao. "A PEEC with a new capacitance model for circuit simulation of interconnects and packaging structures." 2000 Transactions on Microwave Theory and Techniques 48.2 (Feb. 2000 [T-MTT] (Mini-Special Issue on Research Reported at the 1999 Radio Frequency Integrated Circuits (RFIC) Symposium)): 281-287.

In this paper, a modified partial-element equivalent-circuit (PEEC) model, i.e., (L/sub p/, A/spl I.oarr/, R, /spl epsiv/f)PEEC, is introduced. In such a model, no equivalent circuit, but a set of state equations for the variables representing the function of circuit, are given to model a three-dimensional structure. Unlike the original (L/sub p/, P, R, /spl epsiv/f) PEEC model, the definition of vector potential A/spl I.oarr/ with integral form and the Lorentz gauge are used in expanding the basic integral equation instead of the definition of the scalar potential /spl phi/ with integral form. This can directly lead to the state equations, and the capacitance extraction can be replaced by the calculation of the divergence of A/spl I.oarr/, which is analytical. For analysis of most interconnect and packaging problems, generally containing complex dielectric structures, the new model can save a large part of computing time. The validity of the new model is verified by the analysis in time and frequency domain with several examples of typical interconnect and packaging structures, and the results with this new method agree well with those of other papers.

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