Abstracts

Full-wave analysis of packaged microwave circuits with active and nonlinear devices: an FDTD approach

Chien-Nan Kuo, B. Houshmand and T. Itoh. "Full-wave analysis of packaged microwave circuits with active and nonlinear devices: an FDTD approach." 1997 Transactions on Microwave Theory and Techniques 45.5 (May 1997, Part II [T-MTT]): 819-826.

This paper presents a comprehensive full-wave analysis of packaged nonlinear active microwave circuits by applying the extended finite-difference time-domain (FDTD) method. Based on the approach of using equivalent sources, the device-wave interaction is characterized and incorporated into the FDTD time-marching scheme. As a consequence, analysis of linear and nonlinear properties, including harmonic generation and intermodulation, can be accomplished by employing a large-signal device circuit model. The implementation is first validated by comparing results of FDTD and HP MDS simulation of the circuit without the packaging structure. The analysis then goes beyond the capability of the circuit simulator to include the packaging effect. This analysis is useful in circuit design involving electromagnetic compatibility/electromagnetic interference (EMC/EMI) problems.

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