Abstracts

Global time-domain full-wave analysis of microwave circuits involving highly nonlinear phenomena and EMC effects

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The global time-domain analysis of microwave circuits involving highly nonlinear phenomena such as injection locking and intermodulation, along with parasitic effects and electromagnetic compatibility (EMC) issues is presented in this paper. Employing the concept of equivalent sources, the device-wave interaction is characterized and incorporated into the finite-difference time-domain method. The investigation of nonlinear phenomena is accomplished by utilizing a large-signal device circuit model. Measured results are also provided for comparisons with simulated results. The applicability of this equivalent-source algorithm for investigating EMC effects is also demonstrated. A correspondence between simulated and measured EMC phenomenon indicates the usefulness of this algorithm in providing an effective tool for real world radio-frequency front-end circuit designs.

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