Abstracts

A Two-Dimensional Transmission Line Matrix Microwave Field Simulator Using New Concepts and Procedures

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A two-dimensional field simutator for microwave circuit modeling is described. It incorporates a number of novel concepts and advanced transmission line matrix (TLM) procedures recently developed at the University of Ottawa. In particular, a discrete Green's function concept based on Johns' time-domain diakoptics has been realized, providing unprecedented processing power through modularization of large structures at the field level, simulation of wide-band matched loads or absorbing walls, modeling of frequency-dispersive boundaries in the time domain, and large-scale numerical preprocessing of passive structures. Nonlinear field modeling concepts have also been implemented in the TLM field simulator. It can analyze two-dimensional circuits of arbitrary geometry containing both linear and nonlinear media. The circuit topology is input graphically. Both time-domain and frequency-domain responses can be computed and displayed. The capabilities and limitations of the simulator are discussed and several microstrip and waveguide components are modeled to demonstrate its important features.

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