Abstracts

One-Way Equation Absorbing Boundary Conditions for 3-D TLM Analysis of Planar and Quasi-Planar Structures

Absorbing boundary conditions based on one-way wave equations (formulated by Higdon for FD-TD analysis) have been investigated and implemented for the 3-D Symmetrical Condensed Node TLM analysis of dispersive microwave and millimeter-wave structures. Very low reflections over a wide frequency band have been obtained by concatenating two and three first-order boundary operators. Numerical stability of the absorbing boundary conditions with different discretizations of the boundary operators (derivatives) has been studied. It has been found that numerically stable algorithms can be obtained with proper discretizations. These excellent stable absorbing boundary conditions can considerably reduce the computational domain, thus making possible the 3-D TLM analysis of planar and quasi-planar structures with moderate computer resources. The scattering parameters computed using these boundary conditions for microstrip via holes and shorting pins compare well with the available data.

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