Abstracts

Three Dimensional Finite-Difference Time-Domain Slotline Analysis on a Limited Memory Personal Computer

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In order to reduce computer memory and computational time required by three dimensional Finite-Difference Time-Domain (FDTD) microwave passive component analysis, two strategies are developed in this paper. First, the recently reported dispersive boundary condition (DBC) is modified thereby enabling the absorbing boundary to be located near to the main field area; second, an exact source plane field distribution itself produced by the FDTD algorithm is adopted to improve numerical accuracy. This leads to a reduction in computer memory requirements. As an example, a full-wave 3d FDTD analysis of a slotline is performed on a 33MHz PC486. The dispersion characteristic of the slotline is presented up to 1000 GHz this agrees well with that of closed form formula. When compared with previous slotline solutions, frequency range results are extended by an octave and less than 9 percent of the computer memory previously required is demanded by this paper. The unique and highly efficient combination of the two strategies presented here could be applied to other microwave waveguide component analyses.

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