Abstracts

Application of a Simple and Efficient Source Excitation Technique of the FDTD Analysis of Waveguide and Microstrip Circuits

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A simple, efficient, and unified source excitation scheme for the finite-difference time-domain (FDTD) analysis of both waveguides and microstrip circuits is developed and validated. In this scheme, by moving the source plane several cells inside the terminal plane and adding the excitation wave as an extra term in the FDTD equation, the interaction between the excitation and reflected waves are totally separated in time domain. Hence, for both waveguide and microstrip discontinuities, absorbing boundary conditions can be applied on the terminal plane directly. In particular, for microstrip circuits, our scheme does not induce any source distortions when a simplified field distribution is used as the excitation. Consequently, the terminal plane can be moved very close to the discontinuity and thus significant computational savings are achieved. In addition, for microstrip systems, the validity and efficiency of the Mei's simplified field distribution are evaluated and confirmed for the first time.

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