Abstracts

A New Finite-Difference Time-Domain (FDTD) Algorithm for Efficient Field Computation in Resonantor Narrow-Band Structures

R. Mittra and P.H. Harms. "A New Finite-Difference Time-Domain (FDTD) Algorithm for Efficient Field Computation in Resonantor Narrow-Band Structures." 1993 Microwave and Guided Wave Letters 3.9 (Sep. 1993 [MGWL]): 316-318.

The finite-difference time-domain (FDTD) algorithm is a versatile method capable of solving a variety of problems from circuit component characterization to radiation analyses, but it exhibits slowness in convergence when employed for the study of resonant structures, because their transient responses often exhibit a ringing behavior for a long time. This communication describes a new approach, called the FDTD-update algorithm, that can substantially improve the convergence properties of the FDTD method when used to compute the response of resonant type structures a single frequency at a time. The filtering behavior of the algorithm is demonstrated by considering the problem of coupling into a cavity. Application to other problems is illustrated by solving the microstrip patch antenna configuration, for which the update algorithm is shown to enhance the accuracy of the results.

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