Abstracts

On the Dispersion Errors Related to (FD)²TD Type Schemes

J.L. Young, A. Kittichartphayak, Y.M. Kwok and D. Sullivan. "On the Dispersion Errors Related to (FD)²TD Type Schemes." 1995 Transactions on Microwave Theory and Techniques 43.8 (Aug. 1995 [T-MTT]): 1902-1910.

The dispersion errors associated with various frequency-dependent FDTD methods are considered herein. Particularly, we provide a rigorous error analysis of both direct integration and recursive type schemes for two media models: The one-pole Debye and the two-pole Lorentz. The error equations are cast in terms of a dispersion relation that shows explicitly the errors associated with numerically induced dispersion and dissipation. From the dispersion relation, plots are provided that typify the errors of each method. In general, all methods have about the same propagation characteristics; the differences, however, are seen in the attenuation plots. To validate the claims herein, data obtained from FDTD scattering simulations (both 1-D and 3-D geometries) are also given.

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