Abstracts

A Hybrid Spectral/FDTD Method for the Electromagnetic Analysis of Guided Waves in Periodic Structures

A.C. Cangellaris, M. Gribbons and G. Sohos. "A Hybrid Spectral/FDTD Method for the Electromagnetic Analysis of Guided Waves in Periodic Structures." 1993 Microwave and Guided Wave Letters 3.10 (Oct. 1993 [MGWL]): 375-377.

A hybrid spectral/FDTD (finite-difference time-domain) method is introduced for the analysis of electromagnetic wave propagation in anisotropic, inhomogeneous periodic structures. Discrete Fourier series representations for the field components are used for the spectral calculation of spatial derivatives along the axes of periodicity. Thus, the computational domain is restricted to a single period. Maxwell's system is then solved as an initial value problem on a slightly modified FDTD grid for the prediction of the (eigen)frequencies of the propagating modes for a given value of the propagation constant. Numerical results for two-dimensional periodic structures are in excellent agreement with results obtained using other numerical methods.

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