Abstracts

A Finite-Difference Frequency-Domain Method that Introduces Condensed Nodes and Image Principle

M.M. Afande, K. Wu, M. Giroux and R.G. Bosisio. "A Finite-Difference Frequency-Domain Method that Introduces Condensed Nodes and Image Principle." 1995 Transactions on Microwave Theory and Techniques 43.4 (Apr. 1995, Part I [T-MTT]): 838-846.

A new finite-difference frequency-domain formulation is derived from the integral form of Maxwell's equations. Condensed cubic cell and 3D node are proposed thereby eliminating field discontinuity in the discrete space domain. Deterministic solutions using a reduced 2D condensed node are also presented for standard eigenvalue problems. This method is free from spurious modes by reinforcing electric and magnetic flux conservation among neighboring cells. An image concept is introduced to model field boundaries. Numerical results are presented for the complex propagation constant to demonstrate convergence behavior and accuracy of the proposed approach. Modal field profiles of various guided modes are shown for dielectric waveguides.

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