Abstracts

MRTD: New Time-Domain Schemes Based on Multiresolution Analysis

M. Krumpholz and L.P.B. Katehi. "MRTD: New Time-Domain Schemes Based on Multiresolution Analysis." 1996 Transactions on Microwave Theory and Techniques 44.4 (Apr. 1996 [T-MTT]): 555-571.

The application of multiresolution analysis to Maxwell's equations results in new multiresolution time-domain (MRTD) schemes with unparalleled inherent properties. In particular, the approach allows the development of MRTD schemes which are based on scaling functions only or on a comblnation of scaling functions and wavelets leading to a variable mesh grading. The dispersion of the MRTD schemes compared to the conventional Yee finite-difference time-domain (FDTD) scheme shows an excellent capability to approximate the exact solution with negligible error for sampling rates approaching the Nyquist limit. Simple microwave structures including dielectric materials are analyzed in order to illustrate the application of the MRTD schemes and to demonstrate the advantages over Yee's FDTD scheme with respect to memory requirements and execution time.

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