Abstracts

Fundamental gridding-related dispersion effects in multiresolution time-domain schemes (Dec. 2001 [T-MTT])

C.D. Sarris and L.P.B. Katehi. "Fundamental gridding-related dispersion effects in multiresolution time-domain schemes (Dec. 2001 [T-MTT])." 2001 Transactions on Microwave Theory and Techniques 49.12 (Dec. 2001 [T-MTT] (Special Issue on 2001 International Microwave Symposium)): 2248-2257.

The effect of electric and magnetic node arrangement on the dispersion characteristics of the multiresolution time-domain (MRTD) technique is investigated. It is first noted that, by adopting multiresolution analysis principles, the dispersion behavior of an arbitrary order MRTD scheme can be extracted from the analysis of the corresponding S-MRTD scheme, which is based on scaling functions only. The introduction of one wavelet level is expected to bring about a refinement in the resolution of S-MRTD by a factor of two. However, this contradicts several dispersion analyses of MRTD schemes that have been recently presented in the literature. This conflict between theoretical predictions and numerical observations is resolved through the proof that the introduction of wavelets does not result in the expected enhancement of resolution of an S-MRTD scheme, unless a certain arrangement of electric and magnetic field nodes is implemented.

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