# Abstracts

## Multiresolution analysis similar to the FDTD method: derivation and application

*M. Fujii and W.J.R. Hoefer. "Multiresolution analysis similar to the FDTD method: derivation and application." 1998 Transactions on Microwave Theory and Techniques 46.12 (Dec. 1998, Part II [T-MTT] (1998 Symposium Issue)): 2463-2475.*

A three-dimensional (3-D) multiresolution analysis procedure similar to the finite-difference time-domain (FDTD) method is derived using a complete set of three-dimensional orthonormal bases of Haar scaling and wavelet functions. The expansion of the electric and the magnetic fields in these basis functions leads to the time iterative difference approximation of Maxwell's equations that is similar to the FDTD method. This technique effectively models realistic microwave passive components by virtue of its multiresolution property; the computational time is reduced approximately by half compared to the FDTD method. The proposed technique is validated by analyzing several 3-D rectangular resonators with inhomogeneous dielectric loading. It is also applied to the analyses of microwave passive devices with open boundaries such as microstrip low-pass filters and spiral inductors to extract their S-parameters and field distributions. The results of the proposed technique agree well with those of the traditional FDTD method.

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