Abstracts

Fast Wavelet Analysis of 3-D Dielectric Structures Using Sparse Matrix Techniques

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This paper presents an efficient integral formulation based on the theory of orthonormal wavelets for the analysis of open three-dimensional dielectric structures used in microwave and optical applications. In this approach, the fields and currents are represented by a two-dimensional multiresolution expansion in a transverse plane and a sub-domain pulse expansion along the normal direction. The implementation of the method of moments is then combined with the highly efficient Fast Wavelet Algorithm (FWA). It is shown that the resulting moment matrices are very sparsely populated and easily render themselves to the sparse matrix techniques like the Bi-Conjugate Gradient method. Finally, to validate the formulation, a rectangular dielectric resonator is investigated.

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