Abstracts

Fast Waveguide Mode Computation Using Wavelet-Like Basis Functions

R.L. Wagner, G.P. Otto and W.C. Chew. "Fast Waveguide Mode Computation Using Wavelet-Like Basis Functions." 1993 Microwave and Guided Wave Letters 3.7 (Jul. 1993 [MGWL]): 208-210.

The use of wavelet-like basis functions for solving electromagnetic problems is demonstrated. In particular, the modes of an arbitrarily shaped hollow metallic waveguide using a surface integral equation/method of moments (MOM) formulation are found. A class of wavelet-like basis functions is used to produce a sparse MOM impedance matrix, allowing the use of sparse matrix methods for fast solution of the problem. The same method applies directly to the external scattering problem. For the examples considered, the wavelet domain impedance matrix has about 20% nonzero elements, and the time required to compute its LU factorization is reduced by approximately a factor of 10 compared to the original full matrix.

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