Abstracts

The Three-Dimensional Algorithm of Solving the Electric Field Integral Equation Using Face-Centered Node Points, Conjugate Gradient Method, and FFT

C.-C. Su. "The Three-Dimensional Algorithm of Solving the Electric Field Integral Equation Using Face-Centered Node Points, Conjugate Gradient Method, and FFT." 1993 Transactions on Microwave Theory and Techniques 41.3 (Mar. 1993 [T-MTT]): 510-515.

It has been known for a long time that the accuracy of solving the scattering by a dielectric body using the electric field integral equation (EFIE) is poor when the permittivity of the scatterer becomes large. Recently, such a trouble has been settled by using a procedure involving face-centered node points. Such a procedure is efficient, since it preserves the convolution property in the EFIE and, hence, the applicability of the fast Fourier transform. In this investigation we generalize this procedure to the three-dimensional and anisotropic case. The generalization is quite straight in both the formulation and the programming. A calculation for a scatterer with a relative permittivity of as high as 100 indicates that the proposed procedure converges quite rapidly, while the conventional approach fails to converge in using the conjugate gradient method.

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