Abstracts

A Weak Form of the Conjugate Gradient FFT Method for Two-Dimensional TE Scattering Problems

P. Zwamborn and P.M. van den Berg. "A Weak Form of the Conjugate Gradient FFT Method for Two-Dimensional TE Scattering Problems." 1991 Transactions on Microwave Theory and Techniques 39.6 (Jun. 1991 [T-MTT]): 953-960.

The problem of two-dimensional scattering of a transversal electric (TE) polarized wave by a dielectric object can be formulated in terms of a hypersingular integral equation, in which a grad-div operator acts on a vector potential. The vector potential is a spatial convolution of the free-space Green's function and the contrast source over the domain of interest. A weak form of the integral equation for the unknown electric flux density is obtained by testing it with rooftop functions. As the next step, the vector potential is expanded in a sequence of the rooftop functions and the grad-div operator is integrated analytically over the dielectric object domain only. This method shows excellent numerical performance.

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