Abstracts

Modeling the Electromagnetic Field in Lossy Dielectrics Using Finite Elements and Vector Absorbing Boundary Conditions

A new functional for the finite element method is described for the distribution of high-frequency electromagnetic fields in arbitrarily shaped, lossy dielectrics in 3D. The method uses a brick-shaped edge element (covariant-projection element) and a second-order, symmetric, vector absorbing boundary condition. Analytic solutions are available for the case of a plane wave incident on a lossy sphere, and these are used to show that the new method is capable of predicting the fields in and around the sphere to an average accuracy of 1-2%, even when the outer, absorbing boundary is no more than a third of a wavelength from the sphere.

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