Abstracts

Three-Dimensional Finite, Boundary, and Hybrid Element Solutions of the Maxwell Equations for Lossy Dielectric Media

K.D. Paulsen, D.R. Lynch and J.W. Strohbehn. "Three-Dimensional Finite, Boundary, and Hybrid Element Solutions of the Maxwell Equations for Lossy Dielectric Media." 1988 Transactions on Microwave Theory and Techniques 36.4 (Apr. 1988 [T-MTT]): 682-693.

Finite, boundary, and hybrid element approaches are presented as numerical methods for computing electromagnetic (EM) fields inside lossy dielectric objects. These techniques are implemented as computer algorithms for solving the Maxwell equations in heterogeneous media in three dimensions. Algorithm verification takes the form of comparisons of test cases with analytic solutions. Computed results for each technique are in good agreement with exact solutions, especially in the light of the coarse computational grid resolutions used. Implementation was in Fortran on a moderate-sized computer (MicroVax II). The basic problem formulation is quite general however, it has direct application in hyperthermia as a cancer therapy where the EM fields produced inside the patient by external sources are of interest. An example of the application of these numerical methods in a three-dimensional clinical setting is shown.

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