Abstracts

Error in the Finite Element Discretization of the Scalar Helmholtz Equation Over Electrically Large Regions

A.F. Peterson and R.J. Baca. "Error in the Finite Element Discretization of the Scalar Helmholtz Equation Over Electrically Large Regions." 1991 Microwave and Guided Wave Letters 1.8 (Aug. 1991 [MGWL]): 219-222.

Discretization error arising from a finite element solution of the scalar Helmholtz equation for open-region geometries is studied for the simple case of scattering from dielectric slabs. In electrically-large homogeneous regions, the primary source of error is found to be phase error that increases progressively in a direction away from the boundary where the excitation is coupled into the computational domain. The error can be reduced by using smaller cell sizes, employing higher order polynomial basis functions, or using a modified "scattered field" formulation that couples the excitation into the equation in a different manner.

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