Abstracts

Efficient Mode Analysis with Edge Elements and 3-D Adaptive Refinement

Efficient mode analysis of 3-D inhomogeneously loaded cavity resonators of arbitrary shape by the finite edge element method is presented in this paper. Two weak formulations involving field vectors E and H are derived from a Galerkin weighted scheme resulting in a sparse symmetric generalized eigenvalue problem, the solution of which is obtained by a sparse eigenvalue technique. Edge elements with divergence free shape functions guarantee the continuity of the tangential components of the field variables E or H, but not of their normal components, across element interfaces in contrast with node based elements that impose full continuity. The discontinuity of the normal component of D or B, present in the numerical model, is proposed as an error estimator suitable for adaptive mesh refinement of 3-D tetrahedral meshes with edge elements. Application to a dielectrically loaded cavity is given with full documentation and by way of illustration.

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