Abstracts

Hermitian Finite-Element Method for Inhomogeneous Waveguides

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A finite-element method (FEM) based on Hermitian fifth-degree polynomials has been established in order to determine within a closed waveguide filled with inhomogeneous material to the method based on the Lagrangian approximation, spurious solutions are eliminated when the divergence-free constraint is satisfied the boundary conditions are explicitly enforced. However, the (C/sup 1/) Hermitian approximation allows the direct elimination of the field component in each triangle element. This procedure results reduction of the computer memory needed and in programming efficiency. As the Hermitian FEM uses smooth basis functions, the also increases the quality of the field solution. The method has been applied to mode characterization in waveguides. Several comparisons with Lagrangian FEM demonstrate the advantages of the Hermitian FEM. Some difficulties arising in cases of waveguides with sharp edges are discussed. A solution based on mesh refinement near the sharp edges is proposed.

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