Abstracts

Finite Element Analysis of Resonant Cavities and Waveguides Using a Vector Potential Formulation

B.E. MacNeal, L.A. Larkin and J.R. Brauer. "Finite Element Analysis of Resonant Cavities and Waveguides Using a Vector Potential Formulation." 1991 MTT-S International Microwave Symposium Digest 91.3 (1991 Vol. III [MWSYM]): 1107-1110.

A general, finite element formulation of resonant field behavior is presented. The formulation uses the magnetic vector potential /spl rarr over A/ and time-integrated electric scalar potential Psi as solutions variables. Two types of physical modes are found. "Microwave" modes with nonzero /spl rarr over A/ and Psi components represent ordinary, high-frequency resonant behavior in the presence of inhomogeneous, anisotropic dielectrics. Because the time-integral of the scalar potential is used, "electrostatic" modes are found at zero frequency with only Psi components. Unphysical "spurious" modes are eliminated using a modal transformation method- in a way that does not affect physical solutions. The capability is demonstrated with two examples.

❑ Return to main document.