Abstracts

Computation of Cutoff Wavenumbers for Partially Filled Waveguides of Arbitrary Cross Section Using Surface Integral Formulations and the Method of Moments

S. Shu, P.M. Goggans and A.A. Kishk. "Computation of Cutoff Wavenumbers for Partially Filled Waveguides of Arbitrary Cross Section Using Surface Integral Formulations and the Method of Moments." 1993 Transactions on Microwave Theory and Techniques 41.6 (Jun./Jul. 1993 [T-MTT]): 1111-1118.

A procedure for determining the cutoff wavenumbers of partially dielectric tilled waveguides of arbitrary cross section is presented. A numerical approach based on surface integral formulations and the method of moments is used to obtain a matrix equation. Muller's method is then applied to find the wavenumbers that make the matrix determinant vanish. These are the cutoff wavenumbers. On the conducting walls of the waveguide, perfect electric conductor, perfect magnetic conductor, and imperfect conductor surfaces are considered. The transverse electric and magnetic cases are treated separately. The impedance boundary condition and the symmetry of the waveguide cross section are used to reduce the matrix size in the method of moments. Spurious modes have not been observed using this method. To validate the accuracy of this method, results for circular, partially filled rectangular, and two walled corrugated rectangular waveguides are compared to analytical results. Examples such as T-septate rectangular, coaxial, and dielectric-loaded double-ridged waveguide are also considered. Accurate prediction on the cutoff wavenumbers is achieved.

❑ Return to main document.