Abstracts

Analysis of inhomogeneously filled waveguides using a bi-orthonormal-basis method

E. Silvestre, M.A. Abian, B. Gimeno, A. Ferrando, M.V. Andres and V.E. Boria. "Analysis of inhomogeneously filled waveguides using a bi-orthonormal-basis method." 2000 Transactions on Microwave Theory and Techniques 48.4 (Apr. 2000, Part I [T-MTT]): 589-596.

A general theoretical formulation to analyze inhomogeneously filled waveguides with lossy dielectrics is presented in this paper. The wave equations for the tranverse-field components are written in terms of a nonself-adjoint linear operator and its adjoint. The eigenvectors of this pair of linear operators define a biorthonormal-basis, allowing for a matrix representation of the wave equations in the basis of an auxiliary waveguide. Thus, the problem of solving a system of differential equations is transformed into a linear matrix eigenvalue problem. This formulation is applied to rectangular waveguides loaded with an arbitrary number of dielectric slabs centered at arbitrary points. The comparison with theoretical results available in the literature gives good agreement.

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