Abstracts

Application of a Variation-Iteration Method to Inhomogeneously Loaded Waveguides

A.S. Vander Vorst and R.J.M. Govaerts. "Application of a Variation-Iteration Method to Inhomogeneously Loaded Waveguides." 1970 Transactions on Microwave Theory and Techniques 18.8 (Aug. 1970 [T-MTT]): 468-475.

An approximate technique for eigenvalue equations, the variation-iteration method, is commonly used in theoretical physics. Through an adequate numerical treatment it reduces to the inverse iteration method. It is shown here that this technique is most promising. Starting from an initial trial function, iterates are calculated, in which the components relative to the unwanted true eigenfunctions are eliminated. Both an upper and a lower bound of the unknown eigenvalues are calculated. This leads to an approbate eigenvalue within a specified accuracy with respect to the exact (unknown) eigenvalue. An extrapolation technique further accelerates the convergence. The computation time is shorter than when using the Rayleigh-Ritz procedure. The method is applied here to the dielectric-slab loaded waveguide, because the exact solution is available to check the validity of the method. The influence of the geometry, the dielectric constant, and the frequency is evaluated.

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