Abstracts

Variational Methods for Nonstandard Eigenvalue Problems in Waveguide and Resonator Analysis

I.V. Lindell. "Variational Methods for Nonstandard Eigenvalue Problems in Waveguide and Resonator Analysis." 1982 Transactions on Microwave Theory and Techniques 30.8 (Aug. 1982 [T-MTT]): 1194-1204.

The nonstandard (general) eigenvalue problem is defined in operator form by L (Lambda) f = 0 and B (Lambda) f = 0, where L and B are linear operators, and for a standard problem L is a linear function of the parameter Lambda and B does not depend on Lambda. It is shown by examples, that nonstandard problems arise in electromagnetic problems, and a unified variational principle is formulated from which stationary functional for the nonstandard eigenvalues can be constructed. The examples include cutoff problem of a waveguide with surface reactance, propagation problem of an azimuthally magnetized ferrite-filled waveguide, the cutoff problem of a corrugated waveguide and the problem of a material insert in a resonator. It is demonstrated with these simple but nontrivial examples that the present method leads to a good engineering accuracy with very elementary test functions.

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