Abstracts

Variational Propagation Constant Expressions for Lossy Inhomogeneous Anisotropic Waveguides

Y. Liu and K.J. Webb. "Variational Propagation Constant Expressions for Lossy Inhomogeneous Anisotropic Waveguides." 1995 Transactions on Microwave Theory and Techniques 43.8 (Aug. 1995 [T-MTT]): 1765-1772.

Based on reciprocal relationships for the adjoint operator, we derive a variational formulation for the propagation constant satisfying the divergence-free condition in lossy inhomogeneous anisotropic waveguides whose media tensors have all nine components. In addition, with some advantages over previous representations, two variational formulations have been derived for waveguides with the transverse part of the media tensors decoupled from the longitudinal part. However, to obtain a variational formulation for a general lossy reciprocal problem the waveguide must be bidirectional. Each of the variational expressions results in a standard generalized eigenvalue equation with the propagation constant appearing explicitly as the desired eigenvalue. The stationarity of the formulations is shown. It is also shown that for a general lossy nonreciprocal problem the variational functional exists only if the original and adjoint waveguide are mutually bi-directional.

❑ Return to main document.