

Full Vectorial Finite Element Formalism for Lossy Anisotropic Waveguides

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An efficient computer-aided solution procedure based on the finite-element method is developed for solving general waveguiding structures containing lossy anisotropic materials. In this procedure, a formulation in terms of the transverse magnetic field component is adopted and the eigenvalue of the final matrix equation corresponds to the propagation constant itself. Thus one can avoid the unnecessary iterations which arise when using complex frequencies. To demonstrate the strength of the present method, numerical results are shown for a rectangular waveguide filled with lossy anisotropic dielectric with off-diagonal elements in a permittivity tensor.

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