Abstracts

Approximate Scalar Finite-Element Analysis of Anisotropic Optical Waveguides with Off-Diagonal Elements in a Permittivity Tensor

M. Koshiba, K. Hayata and M. Suzuki. "Approximate Scalar Finite-Element Analysis of Anisotropic Optical Waveguides with Off-Diagonal Elements in a Permittivity Tensor." 1984 Transactions on Microwave Theory and Techniques 32.6 (Jun. 1984 [T-MTT]): 587-593.

An approximate scalar finite-element program for the analysis of anisotropic optical waveguides having a permittivity tensor with nonzero off-diagonal elements is described. In this approach, the nonphysical spurious solutions which are included in the solutions of the earlier vectorial finite-element method in an axial-components formulation do not appear. Numerical examples On an anisotropic dielectric rectangular waveguide composed of a uniaxial medium are given. Our results for the waveguide whose optic axis lies in the plane (xy-plane) normal to the direction (z-axis) of propagation agree well with the results of the vectorial wave analysis using the variational method. We also demonstrate the application of this approach by analyzing the anisotropic dielectric rectangular waveguide whose optic axis lies in the xz- or yz-plane.

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