Abstracts

Application of Generalized Characteristic Vectors to Problems of Propagation in Clad Inhomogeneous Dielectric Waveguides

E. Bahar and B.S. Agrawal. "Application of Generalized Characteristic Vectors to Problems of Propagation in Clad Inhomogeneous Dielectric Waveguides." 1979 Transactions on Microwave Theory and Techniques 27.4 (Apr. 1979 [T-MTT]): 345-352.

A transformation matrix that uses generalized characteristic vectors is used to convert Maxwell's equations into a set of loosely coupled equations for the wave amplitudes. This transformation is suitable for permittivity profiles with turning points. In earlier full-wave solutions to these equations, several special functions that account for the local features of the permittivity profile, especially near the turning points, were used to obtain appropriate expansions of the fields. The transverse field components, the propagation coefficients, as well as the phase and group velocities, are computed for both horizontally polarized (TE) and vertically polarized (TM) modes of the dielectric waveguides using the full-wave approach. These solutions are compared with analytic solutions for waveguides with special permittivity profiles. They are also compared with recently published results based on a perturbational approach.

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