Review of Techniques for Propagation in Slab and Fiber Waveguides*

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ABSTRACT

Slab and fiber waveguides of homogeneous and inhomogeneous cross section find application for guiding optical signals. The propagation characteristics of such guides can be analyzed by modal methods, ray methods, or a combination of these. This paper reviews various methods, with emphasis on their physical interpretation and on the relation between them. Attention is given to a new asymptotic theory for guided modes in graded index media that is based on the propagation properties of evanescent waves. Also discussed are new techniques for dealing with the excitation of slab and fiber waveguides by incident Gaussian beams.

*Invited paper