Abstracts

Prediction of Laser Wavelength for Minimum Total Dispersion in Single-Mode Step-Index Fibers

P.S.M. Pires, D.A. Rogers, E.J. Bochove and R.F. Souza. "Prediction of Laser Wavelength for Minimum Total Dispersion in Single-Mode Step-Index Fibers." 1982 Transactions on Microwave Theory and Techniques 30.2 (Feb. 1982 [T-MTT]): 131-140.

Pulse dispersion in single-mode optical fibers with step-index profiles has been analyzed in the past using asymptotic methods. One of these methods is based on the approximate characteristic equation for the dominant mode of propagation in these structures, obtained using the "weakly guided" condition. Other methods use approximations for certain parameters of this equation. Utilizing numerical methods of differentiation and interpolation, we have developed a method for the analysis of pulse dispersion in these fibers that is based on solutions of the exact characteristic equation. Exact formulas for the parameters necessary for this study have been established and developed to the point where the steps that would follow, involving extensive analytical effort, are replaced by computational procedures. We make comparisons between our method and those that, although based on asymptotic expressions, present the best theoretical characteristics. The differences found are discussed. This method permits greater precision in prediction of the ideal laser wavelength for use with a given single-mode optical fiber.

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