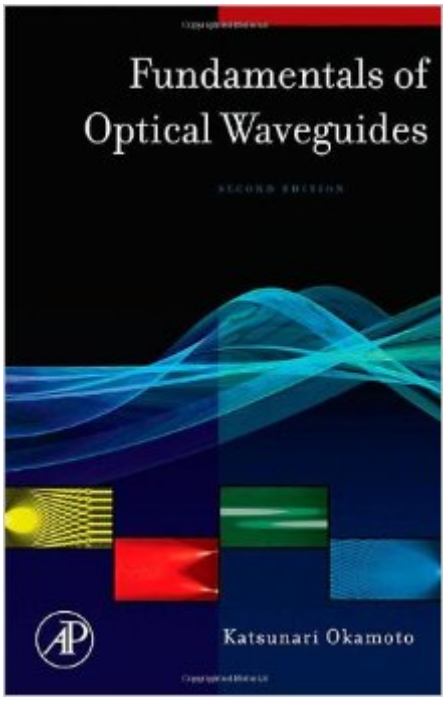
Fundamentals Of Optical Waveguides, Second Edition (Optics And Photonics Series)



Synopsis

Fundamentals of Optical Waveguides is an essential resource for any researcher, professional or student involved in optics and communications engineering. Any reader interested in designing or actively working with optical devices must have a firm grasp of the principles of lightwave propagation. Katsunari Okamoto has presented this difficult technology clearly and concisely with several illustrations and equations. Optical theory encompassed in this reference includes coupled mode theory, nonlinear optical effects, finite element method, beam propagation method, staircase concatenation method, along with several central theorems and formulas. Since the publication of the well-received first edition of this book, planar lightwave circuits and photonic crystal fibers have fully matured. With this second edition the advances of these fibers along with other improvements on existing optical technologies are completely detailed. This comprehensive volume enables readers to fully analyze, design and simulate optical atmospheres. * Exceptional new chapter on Arrayed-Waveguide Grating (AWG)* In depth discussion of Photonic Crystal Fibers (PCFs) * Thorough explanation of Multimode Interference Devices (MMI)* Full coverage of polarization Mode Dispersion (PMD)

Book Information

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Customer Reviews

Fundamental to the science of fiber optics is knowledge about how light behaves in optical

waveguides. Subjects of interest include waveguides made of optical fiber as well as planar waveguides in optical integrated circuits. Issues include the modal distribution of optical energy in the waveguides, nonlinear effects, and the ability of the waveguide to transmit large amounts of data without degradation or errors. Okamoto's book addresses all of these subjects in detail, forming a convenient single-source reference for the practicing scientist, engineer, or graduate student.Okamoto's book is exceptionally well organized, and explains advanced and sometimes difficult concepts easily. The subject material and mathematical detail assume the reader to be well grounded in the basics of fiber optics, and able to work comfortably with differential, vector, and integral calculus. In addition, concepts such as Bessel functions, Maxwell's equations, and the nonlinear Schrodinger equation are used without introduction.Although not formally organized in parts, the subject matter can be broadly divided into three categories. The first category consists of a basic treatment of waveguides in general, including the derivation of the functional forms of the eigenmodes in slab, rectangular, cylindrical, and coupled waveguides. I found the discussion on coupled mode theory particularly useful. Derivation of the eigenmodes is rigorous, with few simplifying assumptions. The equations are generally in Cartesian coordinates, making them useful for general-purpose numerical simulations, which are discussed in detail later in the book.

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