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Nota di contenuto	Front cover; Nonlinear Fiber Optics Fourth Edition; Copyright; Contents; Preface; Chapter 1 - Introduction; Historical Perspective; Fiber Characteristics; Material and Fabrication; Fiber Losses; Chromatic Dispersion; Polarization-Mode Dispersion; Fiber Nonlinearities; Nonlinear Refraction; Stimulated Inelastic Scattering; Importance of Nonlinear Effects; Overview; Problems; References; Chapter 2 - Pulse Propagation in Fibers; Maxwell's Equations; Fiber Modes; Eigenvalue Equation; Single-Mode Condition; Characteristics of the Fundamental Mode; Pulse-Propagation Equation Nonlinear Pulse Propagation Higher-Order Nonlinear Effects; Numerical Methods; Split-Step Fourier Method; Finite-Difference Methods; Problems; References; Chapter 3 - Group-Velocity Dispersion; Different Propagation Regimes; Dispersion-Induced Pulse Broadening; Gaussian Pulses; Chirped Gaussian Pulses; Hyperbolic Secant Pulses; Super-Gaussian Pulses; Experimental Results; Third-Order Dispersion; Evolution of Chirped Gaussian Pulses; Broadening Factor; Arbitrary-Shape Pulses; Ultrashort-Pulse Measurements; Dispersion Management; GVD-Induced Limitations; Dispersion Compensation Compensation of Third-Order Dispersion Problems; References; Chapter 4 - Self-Phase Modulation; SPM-Induced Spectral Changes; Nonlinear Phase Shift; SPM-Induced Spectral Changes; Changes in Pulse Spectra;

SPM-Induced Spectral Changes; Effect of Pulse Shape and Initial Chirp; SPM-Induced Spectral Changes; Effect of Partial Coherence; Effect of Group-Velocity Dispersion; Pulse Evolution; Effect of Group-Velocity Dispersion; Broadening Factor; Effect of Group-Velocity Dispersion; OpticalWave Breaking; Experimental Results; Effect of Third-Order Dispersion; SPM Effects in Fiber Amplifiers
Effect of Group-Velocity DispersionSemianalytic Techniques; Moment Method; Variational Method; Specific Analytic Solutions; Higher-Order Nonlinear Effects; Self-Steepening; Higher-Order Nonlinear Effects; Effect of GVD on Optical Shocks; Higher-Order Nonlinear Effects; Intrapulse Raman Scattering; Higher-Order Nonlinear Effects; Problems; References; Chapter 5 - Optical Solitons; Modulation Instability; Linear Stability Analysis; Gain Spectrum; Modulation Instability; Experimental Results; Modulation Instability; Ultrashort Pulse Generation; Modulation Instability; Impact on Lightwave Systems
Fiber SolitonsInverse Scattering Method; Fiber Solitons; Fundamental Soliton; Higher-Order Solitons; Experimental Confirmation; Soliton Stability; Other Types of Solitons; Dark Solitons; Dispersion-Managed Solitons; Bistable Solitons; Perturbation of Solitons; Perturbation Methods; Fiber Losses; Soliton Amplification; Soliton Interaction; Higher-Order Effects; Moment Equations for Pulse Parameters; Third-Order Dispersion; Self-Steepening; Intrapulse Raman Scattering; Propagation of Femtosecond Pulses; Problems; References; Chapter 6 - Polarization Effects; Nonlinear Birefringence
Origin of Nonlinear Birefringence

Sommario/riassunto

Since the 3rd edition appeared, a fast evolution of the field has occurred. The fourth edition of this classic work provides an up-to-date account of the nonlinear phenomena occurring inside optical fibers. The contents include such important topics as self- and cross-phase modulation, stimulated Raman and Brillouin scattering, four-wave mixing, modulation instability, and optical solitons. Many new figures have been added to help illustrate the concepts discussed in the book. New to this edition are chapters on highly nonlinear fibers and the novel nonlinear effects that have been observed in these fibers since 2000. Such a chapter should be of interest to people in the field of new wavelengths generation, which has potential application in medical diagnosis and treatments, spectroscopy, new wavelength lasers and light sources, etc.
