

1. Record Nr.	UNINA9910130875803321
Autore	Ferreira Mario F. S.
Titolo	Nonlinear effects in optical fibers / / Mario F.S. Ferreira
Pubbl/distr/stampa	Hoboken, New Jersey : , : Wiley, , c2011 [Piscataqay, New Jersey] : , : IEEE Xplore, , [2011]
ISBN	1-283-13879-4 9786613138798 1-118-00338-1 1-118-00337-3 1-118-00339-X
Descrizione fisica	1 online resource (388 p.)
Collana	Wiley-osa series on optical communication ; ; 2
Disciplina	621.36/92 621.3692
Soggetti	Fiber optics Nonlinear optics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Preface -- 1 Introduction -- References. -- 2 Electromagnetic Wave Propagation -- 2.1 Wave Equation for Linear Media -- 2.2 Electromagnetic Waves -- 2.3 Energy Density and Flow -- 2.4 Phase Velocity and Group Velocity -- 2.5 Reflection and Transmission of Waves -- 2.6 The Harmonic Oscillator Model -- 2.7 The Refractive Index -- 2.8 The Limit of Geometrical Optics -- Problems -- References -- 3 Optical Fibers -- 3.1 Geometric Optics Description -- 3.2 Wave Propagation in Fibers -- 3.3 Fiber Attenuation -- 3.4 Modulation and Transfer of Information -- 3.5 Chromatic Dispersion in Single-Mode Fibers -- 3.6 Polarization-Mode Dispersion -- Problems -- References -- 4 The Nonlinear Schrödinger Equation -- 4.1 The Nonlinear Polarization -- 4.2 The Nonlinear Refractive Index -- 4.3 Importance of Nonlinear Effects in Fibers -- 4.4 Derivation of the Nonlinear Schrödinger Equation -- 4.5 Soliton Solutions -- 4.6 Numerical Solution of the NLSE -- Problems -- References -- 5. Nonlinear Phase Modulation -- 5.1 Self-Phase Modulation -- 5.2 Cross-Phase Modulation -- Problems -- References -- 6. Four-Wave

Mixing -- 6.1 Wave Mixing -- 6.2 Mathematical Description -- 6.3
Phase Matching -- 6.4 Impact and Control of FWM -- 6.5 Fiber
Parametric Amplifiers -- 6.6 Parametric Oscillators -- 6.7 Nonlinear
Phase Conjugation with FWM -- 6.8 Squeezing and Photo-Pair Sources
-- Problems -- References -- 7 Intrachannel Nonlinear Effects -- 7.1
Mathematical Description -- 7.2 Intrachannel XPM -- 7.3 Intrachannel
FWM -- 7.4 Control of Intrachannels Nonlinear Effects -- Problems --
References -- 8 Soliton Lightwave Systems -- 8.1 Soliton Properties --
8.2 Perturbation of Solitons -- 8.3 Path-Averaged Solitons -- 8.4
Soliton Transmission Control -- 8.5 Dissipative Solitons -- 8.6
Dispersion-Managed Solitons -- 8.7 WDM Soliton Systems -- Problems
-- References -- 9 Other Applications of Optical Solitons -- 9.1 Soliton
Fiber Lasers -- 9.2 Pulse Compression -- 9.3 Fibers Bragg Gratings --
Problems -- References.
10 Polarization Effects -- 10.1 Coupled Nonlinear
Schrödinger Equations -- 10.2 Nonlinear Phase Shift --
10.3 Solitons in Fibers with Constant Birefringence -- 10.4 Solitons in
Fibers with Randomly Varying Birefringence -- 10.5 PMD-Induced
Soliton Pulse Broadening -- 10.6 Dispersion-Managed Solitons and
PMD -- Problems -- References -- 11 Stimulated Raman Scattering --
11.1 Raman Scattering in the Harmonic Oscillator Model -- 11.2 Raman
Gain -- 11.3 Raman Threshold -- 11.4 Impact of Raman Scattering on
Communication Systems -- 11.5 Raman Amplification -- 11.6 Raman
Fiber Lasers -- Problems -- References -- 12 Stimulated Brillouin
Scattering -- 12.1 Light Scattering at Acoustic Waves -- 12.2 The
Coupled Equations for Stimulated Brillouin Scattering -- 12.3 Brillouin
Gain and Bandwidth -- 12.4 Threshold of Stimulated Brillouin
Scattering -- 12.5 SBS in Active Fibers -- 12.6 Impact of SBS on
Communication Systems -- 12.7 Fiber Brillouin Amplifiers -- 12.8 SBS
Slow Light -- 12.9 Fiber Brillouin Lasers -- Problems -- References --
13 Highly Nonlinear and Microstructured Fibers -- 13.1 The Nonlinear
Parameter in Silica Fibers -- 13.2 Microstructured Fibers -- 13.3 Non-
Silica Fibers -- 13.4 Soliton Self-Frequency Shift -- 13.5 Four-Wave
Mixing -- 13.6 Supercontinuum Generation -- Problems -- References
-- 14 Optical Signal Processing -- 14.1 Nonlinear Sources for WDM
Systems -- 14.2 Optical Regeneration -- 14.3 Optical Pulse Train
Generation. -- 14.4 Wavelength Conversion -- 14.5 All-Optical
Switching -- Problems -- References -- Index.

Sommario/riassunto

"The only book on the market to seamlessly explore the physical and technical aspects of nonlinear effects as well as their impacts and applications, Nonlinear Effects in Optical Fibers provides a comprehensible introduction to the complex nonlinear phenomena occurring within optical fibers. This valuable resource for students, researchers, and developers explores virtually all the latest and most significant research results in the field of nonlinear fiber optics, including: highly nonlinear and photonic fibers; intrachannel nonlinear effects; dissipative and dispersion-managed solitons; and potential applications of nonlinear effects in the area of optical signal processing"--
