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Nota di contenuto	FUNDAMENTALS OF OPTICAL FIBER SENSORS; CONTENTS; PREFACE; 1 INTRODUCTION; 1.1 Historical Review and Perspective; 1.2 Classifications of Optical Fiber Sensors; 1.3 Overview of the Chapters; References; 2 FUNDAMENTALS OF OPTICAL FIBERS; 2.1 Introduction to Optical Fibers; 2.1.1 Basic Structure and Fabrication of Optical Fiber; 2.1.2 Basic Characteristics; 2.1.3 Classifications of Optical Fibers; 2.2 Electromagnetic Theory of Step-Index Optical Fibers; 2.2.1 Maxwell Equations in Cylindrical Coordinates; 2.2.2 Boundary Conditions and Eigenvalue Equations 2.2.3 Weakly Guiding Approximation, Hybrid Modes, and Linear Polarized Modes2.2.4 Field Distribution and Polarization Characteristics; 2.2.5 Multimode Fiber and Cladding Modes; 2.2.6 Propagation of Optical Pulses in Optical Fibers; 2.3 Basic Theory of the Gradient-Index Optical Fiber; 2.3.1 Ray Equation in Inhomogeneous Media; 2.3.2 Ray Optics of GRIN Fiber; 2.3.3 Wave Optics of GRIN Fiber; 2.3.4 Basic Characteristics of Gradient Index Lens; 2.4 Special Optical

Fibers; 2.4.1 Rare-Earth-Doped Fibers and Double-Cladding Fibers; 2.4.2 Polarization Maintaining Fibers 3.5.1 Fiber Polarizers 3.5.2 Fiber Polarization Controller; 3.5.3 Fiber Depolarizer and Polarization Scrambler; 3.5.4 Fiber Optical Isolator and Circulator; Problems; References; 4 FIBER GRATINGS AND RELATED DEVICES; 4.1 Introduction to Fiber Gratings; 4.1.1 Basic Structure and Principle; 4.1.2 Photosensitivity of Optical Fibers; 4.1.3 Fabrication and Classifications of Fiber Gratings; 4.2 Theory of Fiber Grating; 4.2.1 Theory of Uniform FBG; 4.2.2 Theory of Long-Period Fiber Grating; 4.2.3 Basic Theory of Nonuniform Fiber Gratings; 4.2.4 Inverse Engineering Design 4.2.5 Apodization of Fiber Grating

Sommario/riassunto

This book describes the latest development in optical fiber devices, and their applications to sensor technology. Optical fiber sensors, an important application of the optical fiber, have experienced fast development, and attracted wide attentions in basic science as well as in practical applications. Sensing is often likened to human sense organs. Optical fiber can not only transport information acquired by sensors at high speed and large volume, but also can play the roles of sensing element itself. Compared with electric and other types of sensors, fiber sensor technology has unique merits
