

1. Record Nr.	UNINA9910830451603321
Autore	Ghafouri-Shiraz H
Titolo	Distributed feedback laser diodes and optical tunable filters [[electronic resource] /] / H. Ghafouri-Shiraz
Pubbl/distr/stampa	West Sussex, England ; ; Hoboken, NJ, : J. Wiley, 2003
ISBN	1-280-27040-3 9786610270408 0-470-30003-5 0-470-85622-X 0-470-85623-8
Descrizione fisica	1 online resource (343 p.)
Disciplina	621.36/6 621.38275
Soggetti	Light emitting diodes Solid-state lasers Tunable lasers Light filters
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	Distributed Feedback Laser Diodes and Optical Tunable Filters; Contents; Preface; Acknowledgements; Glossary of Abbreviations; Glossary of Symbols; 1. An Introduction to Optical Communication Systems; 1.1 Introduction; 1.2 Historical Progress; 1.3 Optical Fibre Communication Systems; 1.3.1 Intensity Modulation with a Direct Detection Scheme; 1.3.2 Coherent Detection Schemes; 1.4 System Requirements for High-Speed Optical Coherent Communication; 1.4.1 Spectral Purity Requirements; 1.4.2 Spectral Linewidth Requirements; 1.5 Summary; 1.6 References 2. Principles of Distributed Feedback Semiconductor Laser Diodes: Coupled Wave Theory 2.1 Introduction; 2.2 Basic Principle of Lasers; 2.2.1 Absorption and Emission of Radiation; 2.2.2 The Einstein Relations and the Concept of Population Inversion; 2.2.3 Dispersive Properties of Atomic Transitions; 2.3 Basic Principles of Semiconductor Lasers; 2.3.1 Population Inversion in Semiconductor Junctions; 2.3.2

Principle of the Fabry-Perot Etalon; 2.3.3 Structural Improvements in Semiconductor Lasers; 2.3.4 Material Gain in Semiconductor Lasers 2.3.5 Total Radiative Recombination Rate in Semiconductors 2.4 Coupled Wave Equations in Distributed Feedback Semiconductor Laser Diodes; 2.4.1 A Purely Index-coupled DFB Laser Diode; 2.4.2 A Mixed-coupled DFB Laser Diode; 2.4.3 A Gain-coupled or Loss-coupled DFB Laser Diode; 2.5 Coupling Coefficient; 2.5.1 A Structural Definition of the Coupling Coefficient for DFB Semiconductor Lasers; 2.5.2 The Effect of Corrugation Shape on Coupling Coefficient; 2.5.3 Transverse Field Distribution in an Unperturbed Waveguide; 2.5.4 Results Based upon the Trapezoidal Corrugation; 2.6 Summary; 2.7 References 3. Structural Impacts on the Solutions of Coupled Wave Equations: An Overview 3.1 Introduction; 3.2 Solutions of the Coupled Wave Equations; 3.3 Solutions of Complex Transcendental Equations using the Newton-Raphson Approximation; 3.4 Concepts of Mode Discrimination and Gain Margin; 3.5 Threshold Analysis of a Conventional DFB Laser; 3.6 Impact of Corrugation Phase at Laser Facets; 3.7 The Effects of Phase Discontinuity along the DFB Laser Cavity; 3.7.1 Effects of Phase Shift on the Lasing Characteristics of a 1PS DFB Laser Diode 3.7.2 Effects of Phase Shift Position (PSP) on the Lasing Characteristics of a 1PS DFB Laser Diode 3.8 Advantages and Disadvantages of QWS DFB Laser Diodes; 3.9 Summary; 3.10 References; 4. Transfer Matrix Modelling in DFB Semiconductor Lasers; 4.1 Introduction; 4.2 Brief Review of Matrix Methods; 4.2.1 Formulation of Transfer Matrices; 4.2.2 Introduction of Phase Shift (or Phase Discontinuity); 4.2.3 Effects of Finite Facet Reflectivities; 4.3 Threshold Condition for the N-Sectioned Laser Cavity; 4.4 Formulation of the Amplified Spontaneous Emission Spectrum using the TMM 4.4.1 Green's Function Method Based on the Transfer Matrix Formulation

---

#### Sommario/riassunto

Advances in optical fibre based communications systems have played a crucial role in the development of the information highway. By offering a single mode oscillation and narrow spectral output, distributed feedback (DFB) semiconductor laser diodes offer excellent optical light sources as well as optical filters for fibre based communications and dense wavelength division multiplexing (DWDM) systems. This comprehensive text focuses on the basic working principles of DFB laser diodes and optical filters and details the development of a new technique for enhanced system performance. Consi

---