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| Altri autori (Persone) | FarrellPatrick G |
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| Note generali | "This book sets out to provide a clear description of the essentials of the topic, with comprehensive and up-to-date coverage of the most useful codes and their decoding algorithms. The book has a practical engineering and information technology emphasis, but includes relevant background materials and fundamental theoretical aspects"--Preface (p. [xiii]). |
| Nota di bibliografia | Includes bibliographical references and index. |
| Nota di contenuto | ESSENTIALS OF ERROR-CONTROL CODING; Contents; Preface; Acknowledgements; List of Symbols; Abbreviations; 1 Information and Coding Theory; 1.1 Information; 1.1.1 A Measure of Information; 1.2 Entropy and Information Rate; 1.3 Extended DMSs; 1.4 Channels and Mutual Information; 1.4.1 Information Transmission over Discrete Channels; 1.4.2 Information Channels; 1.5 Channel Probability Relationships; 1.6 The A Priori and A Posteriori Entropies; 1.7 Mutual Information; 1.7.1 Mutual Information: Definition; 1.7.2 Mutual Information: Properties; 1.8 Capacity of a Discrete Channel<br>1.9 The Shannon Theorems1.9.1 Source Coding Theorem; 1.9.2 Channel Capacity and Coding; 1.9.3 Channel Coding Theorem; 1.10 Signal Spaces and the Channel Coding Theorem; 1.10.1 Capacity of the Gaussian Channel; 1.11 Error-Control Coding; 1.12 Limits to Communication and their Consequences; Bibliography and References; Problems; 2 Block Codes; 2.1 Error-Control Coding; 2.2 Error Detection |

and Correction; 2.2.1 Simple Codes: The Repetition Code; 2.3 Block Codes: Introduction and Parameters; 2.4 The Vector Space over the Binary Field; 2.4.1 Vector Subspaces; 2.4.2 Dual Subspace; 2.4.3 Matrix Form
2.4.4 Dual Subspace Matrix2.5 Linear Block Codes; 2.5.1 Generator Matrix G; 2.5.2 Block Codes in Systematic Form; 2.5.3 Parity Check Matrix H; 2.6 Syndrome Error Detection; 2.7 Minimum Distance of a Block Code; 2.7.1 Minimum Distance and the Structure of the H Matrix; 2.8 Error-Correction Capability of a Block Code; 2.9 Syndrome Detection and the Standard Array; 2.10 Hamming Codes; 2.11 Forward Error Correction and Automatic Repeat ReQuest; 2.11.1 Forward Error Correction; 2.11.2 Automatic Repeat ReQuest; 2.11.3 ARQ Schemes; 2.11.4 ARQ Scheme Efficiencies; 2.11.5 Hybrid-ARQ Schemes Bibliography and ReferencesProblems; 3 Cyclic Codes; 3.1 Description; 3.2 Polynomial Representation of Codewords; 3.3 Generator Polynomial of a Cyclic Code; 3.4 Cyclic Codes in Systematic Form; 3.5 Generator Matrix of a Cyclic Code; 3.6 Syndrome Calculation and Error Detection; 3.7 Decoding of Cyclic Codes; 3.8 An Application Example: Cyclic Redundancy Check Code for the Ethernet Standard; Bibliography and References; Problems; 4 BCH Codes; 4.1 Introduction: The Minimal Polynomial; 4.2 Description of BCH Cyclic Codes
4.2.1 Bounds on the Error-Correction Capability of a BCH Code: The Vandermonde Determinant4.3 Decoding of BCH Codes; 4.4 Error-Location and Error-Evaluation Polynomials; 4.5 The Key Equation; 4.6 Decoding of Binary BCH Codes Using the Euclidean Algorithm; 4.6.1 The Euclidean Algorithm; Bibliography and References; Problems; 5 Reed-Solomon Codes; 5.1 Introduction; 5.2 Error-Correction Capability of RS Codes: The Vandermonde Determinant; 5.3 RS Codes in Systematic Form; 5.4 Syndrome Decoding of RS Codes; 5.5 The Euclidean Algorithm: Error-Location and Error-Evaluation Polynomials 5.6 Decoding of RS Codes Using the Euclidean Algorithm

Sommario/riassunto

Rapid advances in electronic and optical technology have enabled the implementation of powerful error-control codes, which are now used in almost the entire range of information systems with close to optimal performance. These codes and decoding methods are required for the detection and correction of the errors and erasures which inevitably occur in digital information during transmission, storage and processing because of noise, interference and other imperfections. Error-control coding is a complex, novel and unfamiliar area, not yet widely understood and appreciated. This book sets out t