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Nota di contenuto	Error Correction Coding Mathematical Methods and Algorithms; Preface; Contents; List of Program Files; List of Laboratory Exercises; List of Algorithms; List of Figures; List of Tables; List of Boxes; Part I Introduction and Foundations; 1 A Context for Error Correction Coding; 1.1 Purpose of This Book; 1.2 Introduction: Where Are Codes?; 1.3 The Communications System; 1.4 Basic Digital Communications; 1.4.1 Binary Phase-Shift Keying; 1.4.2 More General Digital Modulation; 1.5 Signal Detection; 1.5.1 The Gaussian Channel; 1.5.2 MAP and ML Detection; 1.5.3 Special Case: Binary Detection 1.5.4 Probability of Error for Binary Detection1.5.5 Bounds on Performance: The Union Bound; 1.5.6 The Binary Symmetric Channel; 1.5.7 The BSC and the Gaussian Channel Model; 1.6 Memoryless Channels; 1.7 Simulation and Energy Considerations for Coded Signals; 1.8 Some Important Definitions; 1.8.1 Detection of Repetition Codes Over a BSC; 1.8.2 Soft-Decision Decoding of Repetition Codes Over the AWGN; 1.8.3 Simulation of Results; 1.8.4 Summary; 1.9 Hamming

Codes; 1.9.1 Hard-Input Decoding Hamming Codes; 1.9.2 Other Representations of the Hamming Code; An Algebraic Representation A Polynomial Representation A Trellis Representation; The Tanner Graph Representation; 1.10 The Basic Questions; 1.11 Historical Milestones of Coding Theory; 1.12 A Bit of Information Theory; 1.12.1 Definitions for Discrete Random Variables; Entropy and Conditional Entropy; Relative Entropy, Mutual Information, and Channel Capacity; 1.12.2 Definitions for Continuous Random Variables; 1.12.3 The Channel Coding Theorem; 1.12.4 "Proof" of the Channel Coding Theorem; 1.12.5 Capacity for the Continuous-Time AWGN Channel; 1.12.6 Transmission at Capacity with Errors  
1.12.7 The Implication of the Channel Coding Theorem  
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3 Linear Block Codes  
3.1 Basic Definitions; 3.2 The Generator Matrix Description of Linear Block Codes; 3.2.1 Rudimentary Implementation; 3.3 The Parity Check Matrix and Dual Codes; 3.3.1 Some Simple Bounds on Block Codes; 3.4 Error Detection and Correction over Hard-Input Channels; 3.4.1 Error Detection; 3.4.2 Error Correction: The Standard Array; 3.5 Weight Distributions of Codes and Their Duals; 3.6 Hamming Codes and Their Duals; 3.7 Performance of Linear Codes; 3.7.1 Error detection performance; 3.7.2 Error Correction Performance; 3.7.3 Performance for Soft-Decision Decoding  
3.8 Erasure Decoding

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## Sommario/riassunto

An unparalleled learning tool and guide to error correction coding  
Error correction coding techniques allow the detection and correction of errors occurring during the transmission of data in digital communication systems. These techniques are nearly universally employed in modern communication systems, and are thus an important component of the modern information economy.  
Error Correction Coding: Mathematical Methods and Algorithms provides a comprehensive introduction to both the theoretical and practical aspects of error correction coding, with a presentation suitable for a wi

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