

1. Record Nr.	UNINA9910830174803321
Autore	Moon Todd K
Titolo	Error correction coding [[electronic resource]] : mathematical methods and algorithms // Todd K. Moon
Pubbl/distr/stampa	Hoboken, N.J., : Wiley-Interscience, 2005
ISBN	1-280-27717-3 9786610277179 0-470-36081-X 0-471-73921-9 0-471-73914-6
Descrizione fisica	1 online resource (802 p.)
Disciplina	621.382/0285/572 621.3820285572
Soggetti	Engineering mathematics Error-correcting codes (Information theory)
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	"A John Wiley & Sons, Inc. publication."
Nota di bibliografia	Includes bibliographical references and index.
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 RepresentationA 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 TheoremLab 1 Simulating
a Communications Channel; Objective; Background; Use of Coding in
Conjunction with the BSC; Assignment; Programming Part; Resources
and Implementation Suggestions; 1.13 Exercises; 1.14 References; Part
II Block Codes; 2 Groups and Vector Spaces; 2.1 Introduction; 2.2
Groups; 2.2.1 Subgroups; 2.2.2 Cyclic Groups and the Order of an
Element; 2.2.3 Cosets; 2.2.4 Lagrange's Theorem; 2.2.5 Induced
Operations; Isomorphism; 2.2.6 Homomorphism; 2.3 Fields: A Prelude;
2.4 Review of Linear Algebra; 2.5 Exercises; 2.6 References
3 Linear Block Codes3.1 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

Sommario/riassunto

An unparalleled learning tool and guide to error correction codingError
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
