

1. Record Nr.	UNINA9910829966703321
Autore	Pless Vera
Titolo	Introduction to the theory of error-correcting codes // Vera Pless
Pubbl/distr/stampa	New York, New York : , : John Wiley & Sons, Inc., , 1998 ©1998
ISBN	1-283-33200-0 9786613332004 1-118-03274-8 1-118-03099-0
Edizione	[3rd ed.]
Descrizione fisica	1 online resource (226 p.)
Collana	Wiley-Interscience Series in Discrete Mathematics and Optimization
Disciplina	003.54 005.7/2 005.72
Soggetti	Error-correcting codes (Information theory)
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	"A Wiley-Interscience Publication."
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Introduction to the Theory of Error-Correcting Codes; Contents; Preface; 1 Introductory Concepts; 1.1 Introduction; 1.2 Basic Definitions; 1.3 Weight, Minimum Weight, and Maximum-Likelihood Decoding; Problems; 2 Useful Background; 2.1 Syndrome Decoding; 2.2 Perfect Codes, Hamming Codes, Sphere-Packing Bound; 2.3 Packing Radius, Covering Radius, MDS Codes, and Some Bounds; 2.4 Self-Dual Codes, Golay Codes; 2.5 Reed-Muller Codes; 2.6 Puncturing, Extending, and Shortening; Problems; 3 A Double-Error-Correcting BCH Code and a Finite Field of 16 Elements; 3.1 The Problem; 3.2 Polynomials 3.3 A Finite Field of 16 Elements3.4 Double-Error-Correcting Bose-Chaudhuri-Hocquenghem (BCH) Code; Problems; 4 Finite Fields; 4.1 Groups; 4.2 Structure of a Finite Field; 4.3 Minimal Polynomials; 4.4 Factoring $x^n - 1$ ; Problems; 5 Cyclic Codes; 5.1 Origin and Definition of Cyclic Codes; 5.2 How to Find Cyclic Codes: The Generator Polynomial; 5.3 Generator Polynomial of the Dual Code; 5.4 Idempotents and Minimal Ideals for Binary Cyclic Codes; Problems; 6 Group of a Code and Quadratic Residue (QR) Codes; 6.1 Some Cyclic Codes We Know;

6.2 Permutation Groups; 6.3 Group of a Code  
 6.4 Definition of Quadratic Residue (QR) Codes  
 6.5 Extended QR Codes, Square Root Bound, and Groups of QR Codes; 6.6 Permutation Decoding; 6.7 Decoding the Golay Code; Problems; 7 Bose-Chaudhuri-Hocquenghem (BCH) Codes; 7.1 Cyclic Codes Given in Terms of Roots; 7.2 Vandermonde Determinants; 7.3 Definition and Properties of BCH Codes; 7.4 Reed-Solomon Codes; 7.5 More on the Minimum Distance; 7.6 Decoding BCH Codes; Problems; 8 Weight Distributions; 8.1 Preliminary Concepts and a Theorem on Weights in Homogeneous Codes; 8.2 MacWilliams Equations; 8.3 Pless Power Moments; 8.4 Gleason Polynomials  
 Problems  
 9 Designs and Games; 9.1 Designs; 9.2 Designs and Codes; 9.3 Assmus-Mattson Theorem and a Design-Decoding Scheme; 9.4 Symmetry Codes; 9.5 Games; 9.6 Games and Codes; 9.7 Greedy Codes; Problems; 10 Some Codes Are Unique; 10.1 The Hamming Code and the Ternary Golay Code Are Unique; 10.2 The Steiner System  $S(5, 8, 24)$  Is Unique and So Is a Binary  $[24, 12, 8]$  Code; 10.3 "Glue"; 10.4 Residual Codes and the Griesmer Bound; 10.5 Some Nonlinear Codes; 10.6 Z<sub>4</sub> Codes and Their Gray Images; Problems; Appendix; References; Index

---

## Sommario/riassunto

A complete introduction to the many mathematical tools used to solve practical problems in coding. Mathematicians have been fascinated with the theory of error-correcting codes since the publication of Shannon's classic papers fifty years ago. With the proliferation of communications systems, computers, and digital audio devices that employ error-correcting codes, the theory has taken on practical importance in the solution of coding problems. This solution process requires the use of a wide variety of mathematical tools and an understanding of how to find mathematical techniques to solve

---