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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_4 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
