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Nota di contenuto	Channel Coding in Communication Networks; Table of Contents; Homage to Alain Glavieux; Chapter 1. Information Theory; 1.1. Introduction: the Shannon paradigm; 1.2. Principal coding functions; 1.2.1. Source coding; 1.2.2. Channel coding; 1.2.3. Cryptography; 1.2.4. Standardization of the Shannon diagram blocks; 1.2.5. Fundamental theorems; 1.3. Quantitative measurement of information; 1.3.1. Principle; 1.3.2. Measurement of self-information; 1.3.3. Entropy of a source; 1.3.4. Mutual information measure; 1.3.5. Channel capacity; 1.3.6. Comments on the measurement of information 1.4. Source coding1.4.1. Introduction; 1.4.2. Decodability, Kraft-McMillan inequality; 1.4.3. Demonstration of the fundamental theorem; 1.4.4. Outline of optimal algorithms of source coding; 1.5. Channel coding; 1.5.1. Introduction and statement of the fundamental theorem; 1.5.2. General comments; 1.5.3. Need for redundancy; 1.5.4. Example of the binary symmetric channel; 1.5.4.1. Hamming's metric; 1.5.4.2. Decoding with minimal Hamming distance; 1.5.4.3. Random coding;

1.5.4.4. Gilbert-Varshamov bound; 1.5.5. A geometrical interpretation; 1.5.6. Fundamental theorem: Gallager's proof
 1.5.6.1. Upper bound of the probability of error; 1.5.6.2. Use of random coding; 1.5.6.3. Form of exponential limits; 1.6. Channels with continuous noise; 1.6.1. Introduction; 1.6.2. A reference model in physical reality: the channel with Gaussian additive noise; 1.6.3. Communication via a channel with additive white Gaussian noise; 1.6.3.1. Use of a finite alphabet, modulation; 1.6.3.2. Demodulation, decision margin; 1.6.4. Channel with fadings; 1.7. Information theory and channel coding; 1.8. Bibliography; Chapter 2. Block Codes; 2.1. Unstructured codes
 2.1.1. The fundamental question of message redundancy; 2.1.2. Unstructured codes; 2.1.2.1. Code parameters; 2.1.2.2. Code, coding and decoding; 2.1.2.3. Bounds of code parameters; 2.2. Linear codes; 2.2.1. Introduction; 2.2.2. Properties of linear codes; 2.2.2.1. Minimum distance and minimum weight of a code; 2.2.2.2. Linear code base, coding; 2.2.2.3. Singleton bound; 2.2.3. Dual code; 2.2.3.1. Reminders of the Gaussian method; 2.2.3.2. Lateral classes of a linear code C ; 2.2.3.3. Syndromes; 2.2.3.4. Decoding and syndromes; 2.2.3.5. Lateral classes, syndromes and decoding
 2.2.3.6. Parity check matrix and minimum code weight; 2.2.3.7. Minimum distance of C and matrix H ; 2.2.4. Some linear codes; 2.2.5. Decoding of linear codes; 2.3. Finite fields; 2.3.1. Basic concepts; 2.3.2. Polynomial modulo calculations: quotient ring; 2.3.3. Irreducible polynomial modulo calculations: finite field; 2.3.4. Order and the opposite of an element of $F_2[X]/(p(X))$; 2.3.4.1. Order; 2.3.4.2. Properties of the order; 2.3.4.3. Primitive elements; 2.3.4.4. Use of the primitives; 2.3.4.5. How to find a primitive; 2.3.4.6. Exponentiation; 2.3.5. Minimum polynomials
 2.3.6. The field of n th roots of unity

Sommario/riassunto

This book provides a comprehensive overview of the subject of channel coding. It starts with a description of information theory, focusing on the quantitative measurement of information and introducing two fundamental theorems on source and channel coding. The basics of channel coding in two chapters, block codes and convolutional codes, are then discussed, and for these the authors introduce weighted input and output decoding algorithms and recursive systematic convolutional codes, which are used in the rest of the book. Trellis coded modulations, which have their primary applications in hi