

Linear Block Codes

Channel Codes Designs of Coding and Decoding for Short Linear Block Codes List Decoding of Linear Block Codes Trellises and Trellis-Based Decoding Algorithms for Linear Block Codes Efficient Reliability Based Decoding of Linear Block Codes Fundamentals of Classical and Modern Error-Correcting Codes Further Study on Decoding for Short Linear Block Codes Decoding of Linear Block Codes Based on Ordered Statistics Wireless Communications Sequential Decoding of Linear Block Codes Linear Block Codes for Error Detection Channel Coding - Linear Block Codes Optimal Encoding, Trellis Structure, and Normalized Weight of Linear Block Codes Coding Techniques for Linear Block Codes with Applications to Fault Identification OFDM Wireless LANs On the Best Source Word to Codeword Assignment for Linear Block Codes A Statistical Decoding Algorithm for Linear Block Codes IEEE International Symposium on Information Theory Codes on Finite Geometries A New Decoding Algorithm for Complete Decoding of Linear Block Codes William Ryan 阮昊 Rasmus Refslund Nielsen Shu Lin Wenyi Jin Shu Lin 舒林 Marc P. C. Fossorier Andrea Goldsmith Dirk J. Tempel R. Dodunekova Hou-Shou Chen Yingquan Wu John Terry Omar A. Mian Ankit Goyal Heng Tang Yung-hsiang Han

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channel coding lies at the heart of digital communication and data storage and this detailed introduction describes the core theory as well as decoding algorithms implementation details and performance analyses in this book professors ryan and lin provide clear information on modern channel codes including turbo and low density parity check ldpc codes they also present detailed coverage of bch codes reed solomon codes convolutional codes finite geometry codes and product codes providing a one stop resource for both classical and modern coding techniques assuming no prior knowledge in the field of channel coding the opening chapters begin with basic theory to introduce newcomers to the subject later chapters then extend to advanced topics such as code ensemble performance analyses and algebraic code design 250 varied and stimulating end of chapter problems are also included to test and enhance learning making this an essential resource for students and practitioners alike

as the demand for data reliability increases coding for error control becomes increasingly

important in data transmission systems and has become an integral part of almost all data communication system designs in recent years various trellis based soft decoding algorithms for linear block codes have been devised new ideas developed in the study of trellis structure of block codes can be used for improving decoding and analyzing the trellis complexity of convolutional codes these recent developments provide practicing communication engineers with more choices when designing error control systems trellises and trellis based decoding algorithms for linear block codes combines trellises and trellis based decoding algorithms for linear codes together in a simple and unified form the approach is to explain the material in an easily understood manner with minimal mathematical rigor trellises and trellis based decoding algorithms for linear block codes is intended for practicing communication engineers who want to have a fast grasp and understanding of the subject only material considered essential and useful for practical applications is included this book can also be used as a text for advanced courses on the subject

an accessible textbook that uses step by step explanations relatively easy mathematics and numerous examples to aid student understanding

a comprehensive introduction to the basic principles design techniques and analytical tools of wireless communications

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linear block codes are used in modern communication and digital storage systems to combat random errors that are introduced by communication channels e g telephone lines atmosphere and compact discs the idea is that the redundant bits contained in each codeword of a code can be used by the receiver to recover the actual transmitted codeword or message the process of recovering the original codeword from a corrupted version of it is called decoding it is implemented by an algorithm located at the receiver s end informally speaking a good code is one that has a high rate that is it does not use much redundancy to allow error correction but it also has an efficient decoding algorithm therefore finding good

codes is a relevant problem in the design of communication systems decoding a general linear code is an np hard problem the best known general decoding algorithm for linear codes a k a syndrome decoding increases exponentially in complexity with the length of the code the objective of the present work is to implement analyze a statistical decoding algorithm in a robust manner that is efficient with regards to both the amount of storage space needed and computation complexity at least for codes of lengths less than 100 it has proven to work much faster than syndrome decoding and even some well established decoding algorithms the application of the algorithm is mainly illustrated with quadratic residue codes the choice was due to the fact that qr codes have a high rate but finding efficient decoding algorithms for them is still a challenging problem

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