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| 1. Record Nr. | UNINA9910830536703321 |
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| Titolo | Error correcting coding and security for data networks [[electronic resource]] : analysis of the superchannel concept // G. Kabatiansky, E. Krouk, S. Semenov |
| Pubbl/distr/stampa | Hoboken, N.J., : John Wiley, 2005 |
| ISBN | 1-280-24186-1 9786610241866 0-470-30049-3 0-470-86757-4 0-470-86756-6 |
| Descrizione fisica | 1 online resource (290 p.) |
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| Disciplina | 003.54 005.72 005.8 |
| Soggetti | Computer networks - Security measures Error-correcting codes (Information theory) |
| Lingua di pubblicazione | Inglese |
| Formato | Materiale a stampa |
| Livello bibliografico | Monografia |
| Note generali | Description based upon print version of record. |
| Nota di bibliografia | Includes bibliographical references and index. |
| Nota di contenuto | Error Correcting Coding and Security for Data Networks; Contents; Preface; ACKNOWLEDGMENTS; 1 Problems Facing Error Control Coding in Data Networks; 1.1 International Recommendations on Using Error Control Coding at Different Network Layers; 1.2 Classification of Problems on Coding in Networks; 2 Block Codes; 2.1 Main Definitions; 2.2 Algebraic Structures; 2.3 Linear Block Codes; 2.4 Cyclic Codes; 2.5 Bounds on Minimum Distance; 3 General Methods of Decoding of Linear Codes; 3.1 Minimum Distance Decoding; 3.2 Information Set Decoding; 3.3 A Supercode Decoding Algorithm 3.4 The Complexity of Decoding in the Channel with Independent Errors4 Codes with Algebraic Decoding; 4.1 Hamming Codes; 4.2 Reed-Solomon Codes; 4.3 BCH Codes; 4.4 Decoding of BCH Codes; 4.5 |

The Sudan Algorithm and its Extensions; 5 Decoding of LDPC Codes; 5.1 Low-Density Parity-Check Codes; 5.2 LDPC Constructions; 5.3 Estimating the Minimum Distance of EG-LDPC Codes; 5.4 Burst-Error-Correcting LDPC Codes; 5.5 Decoding Schemes of LDPC Codes; 5.6 Simulation Results in AWGN; Appendix 5.A Euclidean Geometries; 6 Convolutional Codes and Turbo-Codes 6.1 Convolutional Codes Representation and Encoding 6.2 Viterbi Decoding Algorithm; 6.3 List Decoding; 6.4 Sequential Decoding; 6.5 Parallel-Concatenated Convolutional Codes and Soft Input Soft Output Decoding; 6.6 SISO Decoding Algorithms; 7 Coding of Messages at the Transport Layer of the Data Network; 7.1 Decreasing the Message Delay with the help of Transport Coding; 7.2 Transmission of Message during Limited Time; 7.3 Transmission of Priority Messages without using Priority Packets; 7.4 Estimation of the Effectiveness of Transport Coding for the Nonexponential Model of Packet Delay 8 Providing Security of Data in a Network with the Help of Coding Methods 8.1 Public-Key Cryptography; 8.2 Codebased Cryptosystems: McEliece and Niederreiter; 8.3 Cryptosystems Based on Full Decoding; 8.4 Further Development of Codebased Cryptosystems; 8.5 Codebased Cryptosystems and RSA: Comparison and Perspectives; 8.6 Codebased Signature; 9 Reconciliation of Coding at Different Layers of a Network; 9.1 Transport Coding in a Network with Unreliable Channels; 9.2 Reconciliation of Channel and Transport Coding; 9.3 Use of Tornado Codes for Reconciliation of Channel and Transport Coding 9.4 Development of Coding Methods at the Presentation Layer 9.5 Reconciliation of Coding at Neighbour Layers of a Network; Index

Sommario/riassunto

Error correcting coding is often analyzed in terms of its application to the separate levels within the data network in isolation from each other. In this fresh approach, the authors consider the data network as a superchannel (a multi-layered entity) which allows error correcting coding to be evaluated as it is applied to a number of network layers as a whole. By exposing the problems of applying error correcting coding in data networks, and by discussing coding theory and its applications, this original technique shows how to correct errors in the network through joint codin
