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A practical guide to error-control coding using MATLAB. With DVD. (English)

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Error control coding is an essential area in digital communications and storage systems. Its goal is to encode information in such a way that when the channel induces errors, the receiver can correct the errors and recover the original information.

The book under review provides a practical introduction to error control coding and includes the most useful classic and modern codes. It is mainly written for engineers and students interested in digital communications. The author uses MATLAB as a tool to facilitate the presentation of key concepts. The DVD that accompanies this book includes more than 90 MATLAB programs. This book emphasizes mainly concepts and rationales. Therefore many mathematical theorems and proofs are omitted.

Chapter 1 gives a short overview of error control coding. Since many codes use algebraic methods, Chapter 2 provides some basic facts of abstract algebra. In Chapter 3, linear block codes and cyclic codes (including binary BCH codes) are described. Nonbinary BCH codes (including Reed–Solomon codes) are discussed in Chapter 4. Convolutional codes are studied in Chapter 5. Finally, Chapter 6 presents modern error correcting codes, namely so-called turbo codes and low-density parity codes. Problems and hints to further literature are given at the end of each chapter.

Reviewer: [Manfred Tasche \(Rostock\)](#)

MSC:

- 94-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to information and communication theory
- 94B05 Linear codes, general
- 94B10 Convolutional codes
- 94B15 Cyclic codes
- 94-04 Software, source code, etc. for problems pertaining to information and communication theory

Keywords:

error control coding; error correcting code; textbook; practical guide; MATLAB programs; digital communication; linear block code; cyclic code; BCH code; Reed-Solomon code; convolutional code; turbo code; low-density parity code

Software:

LDPC; Matlab