Justesen, Jørn; **Høholdt, Tom**

A course in error-correcting codes. (English) Zbl 1048.94001

EMS Textbooks in Mathematics. Zürich: European Mathematical Society (EMS) (ISBN 3-03719-001-9/hbk). ix, 194 p. (2004).

The book covers most of the basic problems related to codes for error-correction. The authors give an introduction to linear codes, vector spaces, finite fields, channel models and channel capacity.

Based on such fundamental knowledge the authors present principles of Reed-Solomon codes and their decoding algorithms – attaching also definitions and theorems on properties of specific Reed-Solomon codes. The authors investigate cyclic codes, which are still important. Also in this chapter BCH and Reed-Solomon codes are considered. In the following chapters convolutional codes with their properties and decoding schemes are presented.

The next chapters cover the performance and properties of concatenated codes. The authors also present, in more detail, selected decoding problems, including the Euclidean and list decoding algorithms for Reed-Solomon codes, factorization problems, iterative decoding for low density codes, and algebraic geometry codes.

The book material is illustrated with a set of example problems and their solutions. All of this makes the book a useful compendium of fundamentals on error-correcting codes.

Reviewer: Jozef Woźniak (Gdańsk)

MSC:

94-01 Textbooks (information and communication)
94B05 General theory of linear codes
94B10 Convolutional codes
94B15 Cyclic codes
94A40 Channel models (including quantum)
94B35 Decoding
94B27 Geometric methods in coding theory

Keywords:

error-correcting codes; linear codes; convolutional codes; decoding algorithms; Reed-Solomon codes; concatenated codes; channel models; cyclic codes