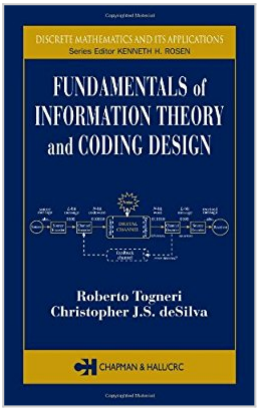

Fundamentals of Information Theory and Coding Design (Discrete Mathematics and Its Applications)

By Roberto Togneri, Christopher J.S deSilva

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Books on information theory and coding have proliferated over the last few years, but few succeed in covering the fundamentals without losing students in mathematical abstraction. Even fewer build the essential theoretical framework when presenting algorithms and implementation details of modern coding systems.

Without abandoning the theoretical foundations, Fundamentals of Information Theory and Coding Design presents working algorithms and implementations that can be used to design and create real systems. The emphasis is on the underlying concepts governing information theory and the mathematical basis for modern coding systems, but the authors also provide the practical details of important codes like Reed-Solomon, BCH, and Turbo codes. Also setting this text apart are discussions on the cascading of information channels and the additivity of information, the details of arithmetic coding, and the connection between coding of extensions and Markov modelling.

Complete, balanced coverage, an outstanding format, and a wealth of examples and exercises make this an outstanding text for upper-level students in computer science, mathematics, and engineering and a valuable reference for telecommunications engineers and coding theory researchers.

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Editorial Review

Review
This book is one of the few (if not the only) texts that comprehensively deal with both the fundamentals of information theory and coding theory. The extensive use of worked examples throughout the text, especially in the more theoretical chapters 6 and 7, will greatly aid students understanding of the principles and methods discussed. The highlighting of definitions, theorems and results allows students to quickly identify and remember the important concepts. The exercise sets at the end of each chapter are quite complete with the routine questions balanced by more challenging and interesting questions. The introduction to the main concepts of abstract algebra used for the design of advanced error detecting and error correcting codes is rigorous, complete and the use of many worked examples makes it one of the best I have seen. The material is also quite extensive with discussions on additivity of mutual information, implementation details of arithmetic coding, rate distortion theory and the important Hamming and Gilbert bounds for channel codes. Overall, this is an excellent and timely textbook for senior undergraduate courses in information and coding theory for students in computer science, mathematics, and engineering.

-Li Deng, Ph.D., Senior Researcher, Microsoft Research, Redmond, WA, USA

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