
Applied Coding And Information Theory For Engineers

Elements of Information Theory
A Student's Guide to Coding and Information Theory
Coding Theory
Information Theory and Coding
Information Theory for Data Communications and Processing
Principles and Practice of Information Theory
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Information Theory, Evolution, and the Origin of Life
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Coding Theory
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RHODES ANGELIQUE

Elements of Information Theory Oxford University Press

This book presents a succinct and mathematically rigorous treatment of the main pillars of Shannon's information theory, discussing the fundamental concepts and indispensable results of Shannon's mathematical theory of communications. It includes five meticulously written core chapters (with accompanying problems), emphasizing the key topics of information measures; lossless and lossy data compression; channel coding; and joint source-channel coding for single-user (point-to-point) communications systems. It also features two appendices covering necessary background material in real analysis and in probability theory and stochastic processes. The book is ideal for a one-semester foundational course on information theory for senior undergraduate and entry-level graduate students in mathematics, statistics, engineering, and computing and information sciences. A comprehensive instructor's solutions manual is available.

A Student's Guide to Coding and Information Theory Cambridge University Press

Coding theory is concerned with successfully transmitting data through a noisy channel and correcting errors in corrupted messages. It is of central importance for many applications in computer science or engineering. This book gives a comprehensive introduction to coding theory whilst only assuming basic linear algebra. It contains a detailed and rigorous introduction to the theory of block codes and moves on to more advanced topics like BCH codes, Goppa codes and Sudan's algorithm for list decoding. The issues of bounds and decoding, essential to the design of good codes, features prominently. The authors of this book have, for several years, successfully taught a course on coding theory to students at the National University of Singapore. This book is based on their experiences and provides a thoroughly modern introduction to the subject. There are numerous examples and exercises, some of which introduce students to novel or more advanced material.

Coding Theory CRC Press

This book is an introduction to information and coding theory at the graduate or advanced undergraduate level. It assumes a basic knowledge of probability and modern algebra, but is otherwise self-contained. The intent is to describe as clearly as possible the fundamental issues involved in these subjects, rather than covering all aspects in an encyclopedic fashion. The first quarter of the book is devoted to information theory, including a proof of Shannon's famous Noisy Coding Theorem. The remainder of the book is devoted to coding theory and is independent of the information theory portion of the book. After a brief discussion of general families of codes, the author discusses linear codes (including the Hamming, Golay, the Reed-Muller codes), finite fields, and cyclic codes (including the BCH, Reed-Solomon, Justesen, Goppa, and Quadratic Residue codes). An appendix reviews relevant topics from modern algebra.

Information Theory and Coding Cambridge University Press

Information Theory and Statistics: A Tutorial is concerned with applications of information theory concepts in statistics, in the finite alphabet setting. The topics covered include large deviations, hypothesis testing, maximum likelihood estimation in exponential families, analysis of contingency tables, and iterative algorithms with an "information geometry" background. Also, an introduction is provided to the theory of universal coding, and to statistical inference via the minimum description length principle motivated by that theory. The tutorial does not assume the reader has an in-depth knowledge of Information Theory or statistics. As such, Information Theory and Statistics: A Tutorial, is an excellent introductory text to this highly-important topic in mathematics, computer science and electrical engineering. It provides both students and researchers with an invaluable resource to quickly get up to speed in the field.

Information Theory for Data Communications and Processing Prentice Hall

This book is an evolution from my book A First Course in Information Theory published in 2002 when network coding was still at its infancy. The last few years have witnessed the rapid development of network coding into a research field of its own in information science. With its root in information theory, network coding has not only brought about a paradigm shift in network communications at large, but also had significant influence on such specific research fields as coding theory, networking, switching, wireless communications, distributed data storage, cryptography, and optimization theory. While new applications of network coding keep emerging, the fundamental results that lay the foundation of the subject are more or less mature. One of the main goals of this book therefore is to present these results in a unifying and coherent manner. While the previous book focused only on information theory for discrete random variables, the current book contains two new chapters on information theory for continuous random variables, namely the chapter on differential entropy and the chapter on continuous-valued channels. With these topics included, the book becomes more comprehensive and is more suitable to be used as a textbook for a course in an electrical engineering department.

Principles and Practice of Information Theory Springer Science & Business Media

In this highly readable book, H.S. Green, a former student of Max Born and well known as an author in physics and in the philosophy of science, presents a timely analysis of theoretical physics and related fundamental problems.

Source Coding Theory Elsevier

Information Theory: Coding Theorems for Discrete Memoryless Systems presents mathematical models that involve independent random variables with finite range. This three-chapter text specifically describes the characteristic phenomena of information theory. Chapter 1 deals with information measures in simple coding problems, with emphasis on some formal properties of Shannon's information and the non-block source coding. Chapter 2 describes the properties and practical aspects of the two-terminal systems. This chapter also examines the noisy channel coding problem, the computation of channel capacity, and the arbitrarily varying channels. Chapter 3 looks into the theory and practicality of multi-terminal systems. This book is intended primarily for

graduate students and research workers in mathematics, electrical engineering, and computer science.

Information Theory, Evolution, and the Origin of Life Cambridge University Press

Various measures of information are discussed in first chapter. Information rate, entropy and mark off models are presented. Second and third chapter deals with source coding. Shannon's encoding algorithm, discrete communication channels, mutual information, Shannon's first theorem are also presented. Huffman coding and Shannon-Fano coding is also discussed. Continuous channels are discussed in fourth chapter. Channel coding theorem and channel capacity theorems are also presented. Block codes are discussed in chapter fifth, sixth and seventh. Linear block codes, Hamming codes, syndrome decoding is presented in detail. Structure and properties of cyclic codes, encoding and syndrome decoding for cyclic codes is also discussed. Additional cyclic codes such as RS codes, Golay codes, burst error correction is also discussed. Last chapter presents convolutional codes. Time domain, transform domain approach, code tree, code trellis, state diagram, Viterbi decoding is discussed in detail.

Information-Spectrum Methods in Information Theory Courier Corporation

Algebraic coding theory is a new and rapidly developing subject, popular for its many practical applications and for its fascinatingly rich mathematical structure. This book provides an elementary yet rigorous introduction to the theory of error-correcting codes. Based on courses given by the author over several years to advanced undergraduates and first-year graduated students, this guide includes a large number of exercises, all with solutions, making the book highly suitable for individual study.

Introduction to Coding and Information Theory Tata McGraw-Hill Education

From the reviews: "This book nicely complements the existing literature on information and coding theory by concentrating on arbitrary nonstationary and/or nonergodic sources and channels with arbitrarily large alphabets. Even with such generality the authors have managed to successfully reach a highly unconventional but very fertile exposition rendering new insights into many problems." -- MATHEMATICAL REVIEWS

Information Theory, Inference and Learning Algorithms Springer Science & Business Media

This is a concise, easy-to-read guide, introducing beginners to coding theory and information theory.

Applied Coding and Information Theory for Engineers World Scientific

Publisher Description

Mathematical Foundations of Information Theory Technical Publications

The last few years have witnessed rapid advancements in information and coding theory research and applications. This book provides a comprehensive guide to selected topics, both ongoing and emerging, in information and coding theory. Consisting of contributions from well-known and high-profile researchers in their respective specialties, topics that are covered include source coding; channel capacity; linear complexity; code construction, existence and analysis; bounds on codes and designs; space-time coding; LDPC codes; and codes and cryptography. All of the chapters are integrated in a manner that renders the book as a supplementary reference volume or textbook for use in both undergraduate and graduate courses on information and coding theory. As such, it will be a valuable text for students at both undergraduate and graduate levels as well as instructors,

researchers, engineers, and practitioners in these fields. Supporting Powerpoint Slides are available upon request for all instructors who adopt this book as a course text.

Information Theory and Statistics John Wiley & Sons

It has long been recognized that there are fascinating connections between coding theory, cryptology, and combinatorics. Therefore it seemed desirable to us to organize a conference that brings together experts from these three areas for a fruitful exchange of ideas. We decided on a venue in the Huang Shan (Yellow Mountain) region, one of the most scenic areas of China, so as to provide the additional inducement of an attractive location. The conference was planned for June 2003 with the official title Workshop on Coding, Cryptography and Combinatorics (CCC 2003). Those who are familiar with events in East Asia in the first half of 2003 can guess what happened in the end, namely the conference had to be cancelled in the interest of the health of the participants. The SARS epidemic posed too serious a threat. At the time of the cancellation, the organization of the conference was at an advanced stage: all invited speakers had been selected and all abstracts of contributed talks had been screened by the program committee. Thus, it was decided to call on all invited speakers and presenters of accepted contributed talks to submit their manuscripts for publication in the present volume. Altogether, 39 submissions were received and subjected to another round of refereeing. After careful scrutiny, 28 papers were accepted for publication.

Selected Topics In Information And Coding Theory Springer Science & Business Media

The success of Newton's mechanics, Maxwell's electrodynamic, Einstein's theories of relativity, and quantum mechanics is a strong argument for the space-time continuum. Nevertheless, doubts have been expressed about the use of a continuum in a science squarely based on observation and measurement. An exact science requires that qualitative arguments must be reduced to quantitative statements. The observability of a continuum can be reduced from qualitative arguments to quantitative statements by means of information theory. Information theory was developed during the last decades within electrical communications, but it is almost unknown in physics. The closest approach to information theory in physics is the calculus of propositions, which has been used in books on the frontier of quantum mechanics and the general theory of relativity. Principles of information theory are discussed in this book. The ability to think readily in terms of a finite number of discrete samples is developed over many years of using information theory and digital computers, just as the ability to think readily in terms of a continuum is developed by long use of differential calculus.

Applied Coding and Information Theory for Engineers World Scientific

This book provides a systematic mathematical analysis of entropy and stochastic processes, especially Gaussian processes, and its applications to information theory. The contents fall roughly into two parts. In the first part a unified treatment of entropy in information theory, probability theory and mathematical statistics is presented. The second part deals mostly with information theory for continuous communication systems. Particular emphasis is placed on the Gaussian channel. An advantage of this book is that, unlike most books on information theory, it places emphasis on continuous communication systems, rather than discrete ones.

Introduction to Information Theory and Data Compression, Second Edition Springer

The latest edition of this classic is updated with new problem sets and material The Second Edition

of this fundamental textbook maintains the book's tradition of clear, thought-provoking instruction. Readers are provided once again with an instructive mix of mathematics, physics, statistics, and information theory. All the essential topics in information theory are covered in detail, including entropy, data compression, channel capacity, rate distortion, network information theory, and hypothesis testing. The authors provide readers with a solid understanding of the underlying theory and applications. Problem sets and a telegraphic summary at the end of each chapter further assist readers. The historical notes that follow each chapter recap the main points. The Second Edition features: * Chapters reorganized to improve teaching * 200 new problems * New material on source coding, portfolio theory, and feedback capacity * Updated references Now current and enhanced, the Second Edition of Elements of Information Theory remains the ideal textbook for upper-level undergraduate and graduate courses in electrical engineering, statistics, and telecommunications.

An Introduction to Single-User Information Theory Oxford University Press

This book is devoted to one of the essential functions of modern telecommunications systems: channel coding or error correction coding. Its main topic is iteratively decoded algebraic codes, convolutional codes and concatenated codes.

Applied Information Theory Springer Science & Business Media

Since the main principles of applied information theory were formulated in the 1940s, the science has been greatly developed and today its areas of application range from traditional communication

engineering problems to humanities and the arts. Interdisciplinary in scope, this book is a single-source reference for all applications areas, including engineering, radar, computing technology, television, the life sciences (including biology, physiology and psychology) and arts criticism. A review of the current state of information theory is provided; the author also presents several generalized and original results, and gives a treatment of various problems. This is a reference for both specialists and non-professionals in information theory and general cybernetics.

Coding Theorems of Information Theory Pearson

This book offers a comprehensive overview of information theory and error control coding, using a different approach than in existed literature. The chapters are organized according to the Shannon system model, where one block affects the others. A relatively brief theoretical introduction is provided at the beginning of every chapter, including a few additional examples and explanations, but without any proofs. And a short overview of some aspects of abstract algebra is given at the end of the corresponding chapters. The characteristic complex examples with a lot of illustrations and tables are chosen to provide detailed insights into the nature of the problem. Some limiting cases are presented to illustrate the connections with the theoretical bounds. The numerical values are carefully selected to provide in-depth explanations of the described algorithms. Although the examples in the different chapters can be considered separately, they are mutually connected and the conclusions for one considered problem relate to the others in the book.