
Digital Communication

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Digital Communication

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ONEILL HUFFMAN

A Foundation in Digital Communication

New Age International

This intuitive yet rigourous introduction derives the core results of digital communication from first principles.

Theory, rather than industry standards,

motivates the engineering approaches, and key results are stated with all the required assumptions. The book emphasizes the geometric view, opening with the inner product, the matched filter for its computation, Parseval's theorem, the sampling theorem as an orthonormal expansion, the isometry between passband signals and their

baseband representation, and the spectral-efficiency optimality of quadrature amplitude modulation (QAM). Subsequent chapters address noise, hypothesis testing, Gaussian stochastic processes, and the sufficiency of the matched filter outputs. Uniquely, there is a treatment of white noise without generalized functions, and of the power spectral density without artificial random jitters and random phases in the analysis of QAM. This systematic and insightful book, with over 300 exercises, is ideal for graduate courses in digital communication, and for anyone asking 'why' and not just 'how'.

New Research, Approaches and Methodologies John Wiley & Sons

The four short years since *Digital Communication over Fading Channels*

became an instant classic have seen a virtual explosion of significant new work on the subject, both by the authors and by numerous researchers around the world. Foremost among these is a great deal of progress in the area of transmit diversity and space-time coding and the associated multiple input-multiple output (MIMO) channel. This new edition gathers these and other results, previously scattered throughout numerous publications, into a single convenient and informative volume. Like its predecessor, this Second Edition discusses in detail coherent and noncoherent communication systems as well as a large variety of fading channel models typical of communication links found in the real world. Coverage includes single- and

multichannel reception and, in the case of the latter, a large variety of diversity types. The moment generating function (MGF)-based approach for performance analysis, introduced by the authors in the first edition and referred to in literally hundreds of publications, still represents the backbone of the book's presentation. Important features of this new edition include: * An all-new, comprehensive chapter on transmit diversity, space-time coding, and the MIMO channel, focusing on performance evaluation * Coverage of new and improved diversity schemes * Performance analyses of previously known schemes in new and different fading scenarios * A new chapter on the outage probability of cellular mobile radio systems * A new chapter on the capacity of fading channels * And much

more Digital Communication over Fading Channels, Second Edition is an indispensable resource for graduate students, researchers investigating these systems, and practicing engineers responsible for evaluating their performance.

Principles of Digital Communication and Coding Cambridge University Press
Digital communications plays an important role in numerical transmission systems due to the proliferation of radio beams, satellite, optic fibers, radar, and mobile wireless systems. This book provides the fundamentals and basic design techniques of digital communications with an emphasis on the systems of telecommunication and the principles of baseband transmission. With a focus on examples and exercises,

this book will prepare you with a practical and real-life treatment of communication problems. A complete analysis of the structures used for emission or reception technology A set of approaches for implementation in current and future circuit design A summary of the design steps with examples and exercises for each circuit
The Routledge Handbook of Language and Digital Communication Springer Nature

This book offers students, scientists, and engineers an extensive introduction to the theoretical fundamentals of digital communications, covering single-input single-output (SISO), multiple-input multiple-output (MIMO), and time-variant systems. Further, the main content is supplemented by a wealth of

representative examples and computer simulations. The book is divided into three parts, the first of which addresses the principles of wire-line and wireless digital transmission over SISO links. Digital modulation, intersymbol interference, and various detection methods are discussed; models for realistic time-variant, wireless channels are introduced; and the equivalent time-variant baseband system model is derived. This book covers two new topics such as blockwise signal transmission and multicarrier modulation with orthogonal frequency-division multiplexing (OFDM) systems. Since not all readers may be familiar with this topic, Part II is devoted to the theory of linear time-variant systems. The generalized convolution is derived, and

readers are introduced to impulse response, the delay spread function, and system functions in the frequency domain. In addition, randomly changing systems are discussed. Several new examples and graphs have been added to this book. In turn, Part III deals with MIMO systems. It describes MIMO channel models with and without spatial correlation, including the Kronecker model. Both linear and nonlinear MIMO receivers are investigated. The question of how many bits per channel use can be transmitted is answered, and maximizing channel capacity is addressed. Principles of space-time coding are outlined in order to improve transmission quality and increase data rates. In closing, the book describes multi-user MIMO schemes, which reduce

interference when multiple users in the same area transmit their signals in the same time slots and frequency bands.

Routledge

The renowned communications theorist Robert Gallager brings his lucid writing style to the study of the fundamental system aspects of digital communication for a one-semester course for graduate students. With the clarity and insight that have characterized his teaching and earlier textbooks, he develops a simple framework and then combines this with careful proofs to help the reader understand modern systems and simplified models in an intuitive yet precise way. A strong narrative and links between theory and practice reinforce this concise, practical presentation. The book begins with data compression for

arbitrary sources. Gallager then describes how to modulate the resulting binary data for transmission over wires, cables, optical fibers, and wireless channels. Analysis and intuitive interpretations are developed for channel noise models, followed by coverage of the principles of detection, coding, and decoding. The various concepts covered are brought together in a description of wireless communication, using CDMA as a case study.

Digital Communication for Practicing Engineers Artech House

The director of communication is an impassioned profession that discovers which strategies are the best and the most intelligent. There are few manuals, and there are some that offer general

and sparsely updated information about the change that new technologies imply. We find the literature isolated that can be directly useful. However, we will say that there is no single recipe for DirCom or communication consultants. Each one will offer different models according to the variables or factors that seem to them to be able to rectify the direction of a company according to his or her personal mood.

Analog and Digital Communications

John Wiley & Sons Incorporated

This book concerns digital communication. Specifically, we treat the transport of bit streams from one geographical location to another over various physical media, such as wire pairs, coaxial cable, optical fiber, and radio waves. Further, we cover the mul

tiptexting, multiple access, and synchronization issues relevant to constructing communication networks that simultaneously transport bit streams from many users. The material in this book is thus directly relevant to the design of a multitude of digital communication systems, including for example local and metropolitan area data networks, voice and video telephony systems, the integrated services digital network (ISDN), computer communication systems, voiceband data modems, and satellite communication systems. We extract the common principles underlying these and other applications and present them in a unified framework. This book is intended for designers and would-be designers of digital communication systems. To limit

the scope to manageable proportions we have had to be selective in the topics covered and in the depth of coverage. In the case of advanced information, coding, and detection theory, for example, we have not tried to duplicate the in-depth coverage of many advanced textbooks, but rather have tried to cover those aspects directly relevant to the design of digital communication systems.

A Top-Down Approach Springer Science & Business Media

Routledge Introductions to Applied Linguistics is a series of introductory level textbooks covering the core topics in Applied Linguistics, primarily designed for those beginning postgraduate studies or taking an introductory MA course, as well as advanced undergraduates. Titles

in the series are also ideal for language professionals returning to academic study. The books take an innovative 'practice to theory' approach, with a 'back-to-front' structure. This leads the reader from real-world problems and issues, through a discussion of intervention and how to engage with these concerns, before finally relating these practical issues to theoretical foundations. Exploring Digital Communication aims to discuss real-world issues pertaining to digital communication, and to explore how linguistic research addresses these challenges. The text is divided into three sections (Problems and practices; Interventions; and Theory), each of which is further divided into two subsections which reflect linguistic

issues relating to digital communication. The author seeks to demystify any perceived divide between online and offline communication, arguing that issues raised in relation to digital communication throw light on language use and practices in general, and thus linguistic interventions in this area have implications not only for users of digital communication but for linguists' general understanding of language and society. Including relevant research examples, tasks and a glossary, this textbook is an invaluable resource for postgraduate and upper undergraduate students taking New Media or Communication Studies modules within Applied Linguistics and English Language courses.

Digital Communications John Wiley &

Sons

A comprehensive and detailed treatment of the program SIMULINK® that focuses on SIMULINK® for simulations in Digital and Wireless Communications Modeling of Digital Communication Systems Using SIMULINK® introduces the reader to SIMULINK®, an extension of the widely-used MATLAB modeling tool, and the use of SIMULINK® in modeling and simulating digital communication systems, including wireless communication systems. Readers will learn to model a wide selection of digital communications techniques and evaluate their performance for many important channel conditions. Modeling of Digital Communication Systems Using SIMULINK® is organized in two parts. The first addresses Simulink® models of

digital communications systems using various modulation, coding, channel conditions and receiver processing techniques. The second part provides a collection of examples, including speech coding, interference cancellation, spread spectrum, adaptive signal processing, Kalman filtering and modulation and coding techniques currently implemented in mobile wireless systems. Covers case examples, progressing from basic to complex Provides applications for mobile communications, satellite communications, and fixed wireless systems that reveal the power of SIMULINK modeling Includes access to useable SIMULINK® simulations online All models in the text have been updated to R2018a; only problem sets require updating to the latest release by the

user Covering both the use of SIMULINK® in digital communications and the complex aspects of wireless communication systems, Modeling of Digital Communication Systems Using SIMULINK® is a great resource for both practicing engineers and students with MATLAB experience.

Theory and Design of Digital Communication Systems John Wiley & Sons

The Accessible Guide to Modern Wireless Communication for Undergraduates, Graduates, and Practicing Electrical Engineers Wireless communication is a critical discipline of electrical engineering and computer science, yet the concepts have remained elusive for students who are not specialists in the area. This text makes digital

communication and receiver algorithms for wireless communication broadly accessible to undergraduates, graduates, and practicing electrical engineers. Notably, the book builds on a signal processing foundation and does not require prior courses on analog or digital communication. Introduction to Wireless Digital Communication establishes the principles of communication, from a digital signal processing perspective, including key mathematical background, transmitter and receiver signal processing algorithms, channel models, and generalizations to multiple antennas. Robert Heath's "less is more" approach focuses on typical solutions to common problems in wireless engineering. Heath presents digital communication

fundamentals from a signal processing perspective, focusing on the complex pulse amplitude modulation approach used in most commercial wireless systems. He describes specific receiver algorithms for implementing wireless communication links, including synchronization, carrier frequency offset estimation, channel estimation, and equalization. While most concepts are presented for systems with single transmit and receive antennas, Heath concludes by extending those concepts to contemporary MIMO systems. To promote learning, each chapter includes previews, bullet-point summaries, examples, and numerous homework problems to help readers test their knowledge. Basics of wireless communication: applications, history,

and the central role of signal processing
Digital communication essentials: components, channels, distortion, coding/decoding, encryption, and modulation/demodulation
Signal processing: linear time invariant systems, probability/random processes, Fourier transforms, derivation of complex baseband signal representation and equivalent channels, and multi-rate signal processing
Least-squared estimation techniques that build on the linear algebra typically taught to electrical engineering undergraduates
Complex pulse amplitude modulation: symbol mapping, constellations, signal bandwidth, and noise
Synchronization, including symbol, frame, and carrier frequency offset
Frequency selective channel estimation and equalization

MIMO techniques using multiple transmit and/or receive antennas, including SIMO, MISO, and MIMO-OFDM Register your product at informit.com/register for convenient access to downloads, updates, and corrections as they become available.

Digital Communication John Wiley & Sons

Revised to reflect all the current trends in the digital communications field, this all-inclusive guide delivers an outstanding introduction to the analysis and design of digital communication systems. Includes expert coverage of new topics: TurboCodes, Turboequalization, Antenna Arrays, Digital Cellular Systems, and Iterative Detection. Convenient, sequential organization begins with a look at the

history and classification of channel models and builds from there.

Exploring Digital Communication
Pearson Education India

Offering comprehensive, up-to-date coverage on the principles of digital communications, this book focuses on basic issues, relating theory to practice wherever possible. Topics covered include the sampling process, digital modulation techniques and error-control coding.

Introduction to Digital Communications
BoD - Books on Demand

The clear, easy-to-understand introduction to digital communications Completely updated coverage of today's most critical technologies Step-by-step implementation coverage Trellis-coded modulation, fading channels, Reed-

Solomon codes, encryption, and more Exclusive coverage of maximizing performance with advanced "turbo codes" "This is a remarkably comprehensive treatment of the field, covering in considerable detail modulation, coding (both source and channel), encryption, multiple access and spread spectrum. It can serve both as an excellent introduction for the graduate student with some background in probability theory or as a valuable reference for the practicing communication system engineer. For both communities, the treatment is clear and well presented." - Andrew Viterbi, The Viterbi Group Master every key digital communications technology, concept, and technique. Digital Communications, Second Edition is a thoroughly revised

and updated edition of the field's classic, best-selling introduction. With remarkable clarity, Dr. Bernard Sklar introduces every digital communication technology at the heart of today's wireless and Internet revolutions, providing a unified structure and context for understanding them -- all without sacrificing mathematical precision. Sklar begins by introducing the fundamentals of signals, spectra, formatting, and baseband transmission. Next, he presents practical coverage of virtually every contemporary modulation, coding, and signal processing technique, with numeric examples and step-by-step implementation guidance. Coverage includes: Signals and processing steps: from information source through transmitter, channel, receiver, and

information sink Key tradeoffs: signal-to-noise ratios, probability of error, and bandwidth expenditure Trellis-coded modulation and Reed-Solomon codes: what's behind the math Synchronization and spread spectrum solutions Fading channels: causes, effects, and techniques for withstanding fading The first complete how-to guide to turbo codes: squeezing maximum performance out of digital connections Implementing encryption with PGP, the de facto industry standard Whether you're building wireless systems, xDSL, fiber or coax-based services, satellite networks, or Internet infrastructure, Sklar presents the theory and the practical implementation details you need. With nearly 500 illustrations and 300 problems and exercises, there's

never been a faster way to master advanced digital communications. CD-ROM INCLUDED The CD-ROM contains a complete educational version of Elanix' SystemView DSP design software, as well as detailed notes for getting started, a comprehensive DSP tutorial, and over 50 additional communications exercises. Cambridge University Press This is a concise presentation of the concepts underlying the design of digital communication systems, without the detail that can overwhelm students. Many examples, from the basic to the cutting-edge, show how the theory is used in the design of modern systems and the relevance of this theory will motivate students. The theory is supported by practical algorithms so that the student can perform computations

and simulations. Leading edge topics in coding and wireless communication make this an ideal text for students taking just one course on the subject. Fundamentals of Digital Communications has coverage of turbo and LDPC codes in sufficient detail and clarity to enable hands-on implementation and performance evaluation, as well as 'just enough' information theory to enable computation of performance benchmarks to compare them against. Other unique features include space-time communication and geometric insights into noncoherent communication and equalization. Digital Communication Performance Parameters for Proposed Federal Standard 1003 Routledge
This second edition of Multi-Carrier

Digital Communications: Theory and Applications of OFDM begins with a brief overview of multi-carrier communications. The authors then focus on the bandwidth efficient technology of OFDM, in particular the DSP techniques that have made the modulation format practical. Several chapters describe and analyze the sub-systems of an OFDM implementation, such as clipping, synchronization channel estimation, equalization, and coding. Analysis of performance over channels with various impairments is presented. The book continues with descriptions of three very important and diverse applications of OFDM that have been standardized and are now being deployed: ADSL, digital broadcasting, and wireless LANs for multi-Mbps communications. Finally, the

book concludes with describing the OFDM-based multiple access techniques, ultra wideband technology, and WiMAX.

Introduction to Digital

Communications Springer Science & Business Media

Communication is complicated, and so is the ethics of communication. We communicate about innumerable topics, to varied audiences, using a gamut of technologies. The ethics of communication, therefore, has to address a wide range of technical, ethical and epistemic requirements. In this book, Onora O'Neill shows how digital technologies have made communication more demanding: they can support communication with huge numbers of distant and dispersed recipients; they can amplify or suppress

selected content; and they can target or ignore selected audiences. Often this is done anonymously, making it harder for readers and listeners, viewers and browsers, to assess which claims are true or false, reliable or misleading, flaky or fake. So how can we empower users to assess and evaluate digital communication, so that they can tell which standards it meets and which it flouts? That is the challenge which this book explores.

Introduction to Analog and Digital

Communication Cambridge University Press

Digital Communications McGraw-Hill College

Digital Communication Performance

Parameters for Proposed Federal

Standard 1003 Digital Communications

Written by two distinguished experts in the field of digital communications, this classic text remains a vital resource three decades after its initial publication. Its treatment is geared toward advanced students of communications theory and to designers of channels, links, terminals, modems, or networks used to transmit and receive digital messages. The three-part approach begins with the fundamentals of digital communication and block coding, including an analysis of block code ensemble performance. The second part introduces convolutional coding, exploring ensemble performance and sequential decoding. The final section addresses source coding and rate distortion theory, examining fundamental concepts for memoryless sources as well as precepts related to

memory, Gaussian sources, and universal coding. Appendixes of useful information appear throughout the text, and each chapter concludes with a set of problems, the solutions to which are available online.

Digital Communications Elsevier

This is a modern textbook on digital communications and is designed for senior undergraduate and graduate students, whilst also providing a valuable reference for those working in the telecommunications industry. It provides a simple and thorough access to a wide range of topics through use of figures, tables, examples and problem sets. The author provides an integrated approach between RF engineering and statistical theory of communications. Intuitive explanations of the theoretical

and practical aspects of telecommunications help the reader to acquire a deeper understanding of the topics. The book covers the fundamentals of antennas, channel modelling, receiver system noise, A/D conversion of signals, PCM, baseband transmission, optimum receiver, modulation techniques, error control coding, OFDM, fading channels, diversity and combining techniques, MIMO systems and cooperative communications. It will be an essential reference for all students and practitioners in the electrical engineering field.

Principles of Digital Communication John Wiley & Sons

This book concerns digital communication. Specifically, we treat

the transport of bit streams from one geographical location to another over various physical media, such as wire pairs, coaxial cable, optical fiber, and radio. We also treat multiple-access channels, where there are potentially multiple transmitters and receivers sharing a common medium. Ten years have elapsed since the Second Edition, and there have been remarkable advances in wireless communication, including cellular telephony and wireless local-area networks. This Third Edition expands treatment of communication theories underlying wireless, and especially advanced techniques involving multiple antennas, which turn the traditional single-input single-output channel into a multiple-input multiple-output (MIMO) channel. This is more

than a trivial advance, as it stimulates many advanced techniques such as adaptive antennas and coding techniques that take advantage of space as well as time. This is reflected in the addition of two new chapters, one on the theory of MIMO channels, and the other on diversity techniques for mitigating fading. The field of error-control coding has similarly undergone tremendous changes in the past decade, brought on

by the invention of turbo codes in 1993 and the subsequent rediscovery of Gallager's low-density parity-check codes. Our treatment of error-control coding has been rewritten to reflect the current state of the art. Other materials have been reorganized and reworked, and three chapters from the previous edition have been moved to the book's Web site to make room.