Digital Communications

0e6c65aca8de0c7b411b375a6d55b8ca

DIGITAL AND ANALOG COMMUNICATION SYSTEMS
Digital Communication Systems Using MATLAB and Simulink
Principles of Digital Communication and Coding
Digital Communications Fundamentals
Digital Communications for Electrical and Computer Engineers
Implementing Software-Defined Radio
Digital Communication Systems
Theory and Design of Digital Communication Systems
Electromagnetic Field Theory and Transmission Lines
Digital Communications Test and Measurement
Spread Spectrum Communications
The Mobile Communications Handbook
Introduction to Digital Communications
Fundamentals in Information Theory and Coding
Contemporary Communication Systems Using MATLAB
Robust Modulation Methods and Smart Antennas in Wireless Communications
Dark Times Digital Communications: Fundamentals & Applications
Fundamentals of Communication Systems
The Communications Handbook
FK Digital Communications

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: Turbo codes, 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. The electrical engineering curriculum in every university now includes either a one-semester or one-year course in communications theory and practice and/or communications engineering. An indispensable supplement to the standard texts used in those courses, this book has been thoroughly revised and updated to conform to the latest changes in the engineering curriculum. It now features new chapters on signals and spectrums in digital transmission and filtering, information channel capacity, and error-control coding. It covers modern modulation theory, including amplitude and angle modulation, and includes expanded coverage of digital communications. It is a must-read for anyone serious about digital communications.

About the Book: The book provides a detailed, unified treatment of theoretical and practical aspects of digital and analog communication systems, with emphasis on digital communication systems. It integrates theory—keeping theoretical details to a minimum—while offering practical worked examples illustrating real-life methods. The text emphasizes deriving design equations that relate performance of functional blocks to design parameters. It illustrates how to trade off between power, bandwidth, and equipment complexity while maintaining an acceptable quality of performance. Material is modularized so that appropriate portions can be selected to teach several different courses. The book includes over 300 problems and an annotated bibliography in each chapter. Since the first edition of this book was published seven years ago, the field of modeling and simulation of communication systems has grown and matured in many ways, and the use of simulation as a day-to-day tool is now even more common practice. With the current interest in digital mobile communications, a primary area of application of modeling and simulation is now in wireless systems of a different flavor from the traditional ones. This second edition represents a substantial revision of the first, partly to accommodate the new applications that have arisen. New chapters include material on modeling and simulation of nonlinear systems, with a complementary section on related measurement techniques, channel modeling and three new case studies; a consolidated set of problems is provided at the end of the book. 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 multiplex 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, digital CATV distribution, digital cellular and radio systems, the narrowband and broadband 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. Software Defined Radio makes wireless communications easier, more efficient, and more reliable. This book bridges the gap between academic research and practical implementation. When beginning a project, practicing engineers, technical managers, and graduate students can save countless hours by considering the concepts presented in these pages. The author covers the myriad options and trade-offs available when selecting an appropriate hardware architecture. As demonstrated here, the choice between hardware- and software-centric architecture can mean the difference between meeting an aggressive schedule and bogging down in endless design iterations. Because of the author's experience overseeing dozens of failed and successful developments, he is able to present many real-life examples. Some of the key concepts covered are: Choosing the right architecture for the market: laboratory, military, or commercial, Hardware platforms - FPGAs, GPUs, specialized and hybrid devices, Standardization efforts to ensure interoperability and portability State-of-the-art components for radio frequency, mixed-signal, and baseband processing. The text requires only minimal knowledge of wireless communications; whenever possible, qualitative arguments are used instead of equations. An appendix provides a quick overview of wireless communications and introduces most of the concepts the readers will need to take advantage of the material. An essential introduction to SDR, this book is sure to be an invaluable addition to any technical bookshelf. 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. For one- or two-semester, senior-level undergraduate courses in Communication Systems for Electrical and Computer Engineering majors. This text introduces the basic techniques used in modern communication systems and provides...
fundamental tools and methodologies used in the analysis and design of these systems. The authors emphasize digital communication systems, including new generations of wireless communication systems, satellite communications, and data transmission networks. A background in calculus, linear algebra, basic electronic circuits, linear system theory, and probability and random variables is assumed.

provides the complete script for JFK, which details the investigation into President Kennedy's assassination, and includes responses and comments about the film, and official reports and documentation 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. A appendix of useful information appear throughout the text, and each chapter concludes with a set of problems, the solutions to which are available online. Based on the popular Artech House classic, Digital Communications Engineering with Software-Defined Radio, this book provides a practical approach to quickly learning the software-defined radio (SDR) concepts needed for work in the field. This up-to-date volume guides readers on how to quickly prototype wireless designs using SDR for real-world testing and experimentation. This book explores advanced wireless communication techniques such as OFDM, LTE, WLA, and hardware targeting. Readers will gain an understanding of the core concepts behind wireless hardware, such as the radio frequency front-end, analog-to-digital and digital-to-analog converters, as well as various processing technologies. Moreover, this volume includes chapters on timing estimation, matched filtering, frame synchronization message decoding, and source coding. The orthogonal frequency division multiplexing is explained and details about HDL code generation and deployment are provided. The book concludes with coverage of the WLAN toolbox with OFDM beacon reception and the LTE toolbox with downlink reception. Multiple case studies are provided throughout the book. Both MATLAB and Simulink code are included to assist readers with their projects in the field. 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 MATLAB® in modeling and simulating digital communication systems, including wireless communication systems. Readers will learn to model a wide selection of digital communication 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® simulation tools 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. In a single volume, The Mobile Communications Handbook 2nd. Edition covers the entire field—from principles of analog and digital communications to cordless telephones, wireless local area networks (LANs), and international technology standards. The amazing scope of the handbook ensures that it will be the primary reference for every aspect of mobile communications. For more than six years, The Communications Handbook stood as the definitive, one-stop reference for the entire field. With new chapters and extensive revisions that reflect recent technological advances, the second edition is now poised to take its place on the desks of engineers, researchers, and students around the world. From fundamental theory to state-of-the-art applications, The Communications Handbook covers more areas of specialty with greater depth that any other handbook available. Telephony Communications networks Optical communications Satellite communications Wireless communications Source compression Data recording Expertly written, skillfully presented, and masterfully compiled, the Communications Handbook provides a perfect balance of essential information, background material, technical details, and international telecommunications standards. Whether you design, implement, buy, or sell communications systems, components, or services, you'll find this to be the one resource you can turn to for fast, reliable, answers. Providing the underlying principles of digital communication and the design techniques of real-world systems, this textbook prepares senior undergraduate and graduate students for the engineering practices required in industry. Covering the core concepts, including modulation, demodulation, equalization, and channel coding, it provides step-by-step mathematical derivations to aid understanding of background material. In addition to describing the basic theory, the principles of system and subsystem design are introduced, enabling students to visualize the intricate connections between subsystems and understand how each aspect of the design supports the overall goal of achieving reliable communications. Throughout the book, theories are linked to practical applications with over 250 real-world examples, whilst 370 varied homework problems in three levels of difficulty enhance and extend the text material. With this textbook, students can understand how digital communications systems operate in the real world, learn how to design subsystems, and evaluate end-to-end performance with ease and confidence. This paperback is a color edition. Link to the black & white edition: https://www.amazon.com/gp/product/152149388X Digital Modulations using MATLAB is a learner-friendly, practical and example driven book, that gives you a solid background in building simulation models for digital modulation systems in MATLAB. This book, an essential guide for understanding the implementation aspects of a digital modulation system, shows how to simulate and model a digital modulation system from scratch. The implemented simulation models shown in this book, mostly will not use any of the inbuilt communication toolbox functions and hence provide an opportunity for an engineer to understand the basic implementation aspects of modeling various building blocks of a digital modulation system. It presents the following key topics with required theoretical background along with the implementation details in the form of MATLAB scripts. * Basics of signal processing essential for implementing digital modulation techniques - generation of test signals, interpreting FFT results, power and energy of a signal, methods to compute convolution, analytic signal and applications. * Waveform and complex equivalent baseband simulation models. * Digital modulation techniques covered: BPSK and its variants, QPSK and its variants, M-ary PSK, M-ary QAM, M-ary PAM, CP, MSK, GM SK, M-ary FSK. * Monte Carlo simulation for ascertaining performance of digital modulation techniques in AWGN and fading channels - Eb/N0 Vs BER curves. * Design and implementation of linear equalizers - zero forcing and MMSE equalizers, using
them in a communication link. * * Simulation and performance of modulation systems with receiver impairments. Featuring a variety of applications that motivate students, this book serves as a companion or supplement to any of the comprehensive textbooks in communication systems. The book provides a variety of exercises that may be solved on the computer using MATLAB. By design, the treatment of the various topics is brief. The authors provide the motivation and a short introduction to each topic, establish the necessary notation, and then illustrate the basic concepts by means of an example. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version. A concise introduction to the core concepts in digital communication, providing clarity and depth through examples, problems, and MATLAB exercises. Its simple structure maps a logical route to understand the most basic principles in digital communication, and also leads students through more in-depth treatment with examples and step-by-step instructions. Resource added for the Digital Media Technology program 102065. A Comprehensive Guide to Physical Layer Test and Measurement of Digital Communication Links Today's new data communication and computer interconnection systems run at unprecedented speeds, presenting new challenges not only in the design, but also in troubleshooting, test, and measurement. This book assembles contributions from practitioners at top test and measurement companies, component manufacturers, and universities. It brings together information that has never been broadly accessible before—information that was previously buried in application notes, seminar and conference presentations, short courses, and unpublished works. Readers will gain a thorough understanding of the inner workings of digital high-speed systems, and learn how the different aspects of such systems can be tested. The editors and contributors cover key areas in test and measurement of transmitters (digital waveform and jitter analysis and bit error ratio), receivers (sensitivity, jitter tolerance, and PLL/CDR characterization), and high-speed channel characterization (in time and frequency domain). Extensive illustrations are provided throughout. Coverage includes Signal integrity from a measurement point of view Digital waveform analysis using high bandwidth real-time and sampling (equivalent time) oscilloscopes Bit error ratio measurements for both electrical and optical links Extensive coverage on the topic of jitter in high-speed networks State-of-the-art optical sampling techniques for analysis of 100 Gbit/s+ signals Receiver characterization: clock recovery, phase locked loops, jitter tolerance and transfer functions, sensitivity testing, and stressed-waveform receiver testing Channel and system characterization: TDR/T and frequency domain-based alternatives Testing and measuring PC architecture communication links: PCIeexpress, SATA, and FB DIMM Electromagnetic Field Theory and Transmission Lines is ideal for a single semester, first course on Electromagnetic Field Theory (EM FT) at the undergraduate level. TDM and optical waveform diagrams and design examples help explain the full comprehensive examination of digital communication systems and signal processing techniques. 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. Introduction to Digital Communications explores the basic principles in the analysis and design of digital communication systems, including design objectives, constraints and trade-offs. After portraying the big picture and laying the background material, this book lucidly progresses to a comprehensive and detailed discussion of all critical elements and key functions in digital communications. The first undergraduate-level textbook exclusively on digital communications, with a complete coverage of source and channel coding, modulation, and synchronization. Discusses major aspects of communication networks and multiuser communications. Provides insightful descriptions and intuitive explanations of all complex concepts. Focuses on practical applications and illustrative examples. A companion Web site includes solutions to end-of-chapter problems and computer exercises, lecture slides, and figures and tables from the text. His book forms the first part of a complete MSc course in an area that is fundamental to the continuing revolution in information technology and communication systems. Massively exhaustive, authoritative, comprehensive and reinforced with software, this is an introduction to modern methods in the developing field of Digital Signal Processing (DSP). The focus is on the design of algorithms and the processing of digital signals in areas of communications and control, providing the reader with a comprehensive introduction to the underlying principles and mathematical models. Provides an introduction to modern methods in the developing field of Digital Signal Processing (DSP) Focuses on the design of algorithms and the processing of digital signals in areas of communications and control Provides a comprehensive introduction to the underlying principles and mathematical models of Digital Signal Processing Digital Communication using MATLAB and Simulink is intended for a broad audience. For the student taking a traditional course, the text provides simulations of the MATLAB and Simulink systems, and the opportunity to go beyond the lecture or laboratory and develop investigations and projects. For the professional, the text facilitates an expansive review of and experience with the tenets of digital communication systems. Today sees the rise of nationalism, the return of totalitarian parties in Europe to electoral success, and the rise of the alt-right and white supremacists in the US. Psychoanalyst Jonathan Sklar brings his understanding of cruelty, sadomasochism, perversion, and other mental mechanisms to shine a light on what has led to this. Unlike most current news outlets, Sklar goes against the grain of brief sound bites, which are an aid to pass quickly over painful knowledge. Instead, he goes into detail to give extremely dark occurrences, and the human beings affected, respect and understanding. This gives the reader the ability to make unconscious things more conscious, highlighting the quality of humanity in human beings. Listening to these stories enables us to become more aware. By ridding ourselves of the illusions of our political times, we can find greater freedom to think, develop, challenge, and create hope, for the future of our children and our grandchildren, as well as for ourselves. Dark Times is a timely, thought-provoking, and, at times, upsetting work that is a must-read for all those looking for a deeper understanding of today's world. Do you need to know how to develop more efficient digital communication systems? Based on the author's experience of over thirty years in industrial design, this practical guide provides detailed coverage of synchronization subsystems and their relationship with other system components. Readers will gain a comprehensive understanding of the techniques needed for the design, performance analysis and implementation of synchronization functions for a range of different modern communication technologies. Specific topics covered include frequency-looked loops in wireless receivers, optimal OFDM timing phase determination and implementation, and interpolation filter design and analysis in digital resamplers. Numerous implementation examples help readers to develop the necessary practical skills, and slides summarizing key concepts accompany the book online. This is an invaluable guide and essential reference for both practicing engineers and graduate students working in digital communications. 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 communications 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's SystemView DSP design software, as well as detailed notes for getting started, a comprehensive DSP tutorial, and over 50 additional communications exercises. The work introduces the fundamentals concerning the measure of discrete information, the modeling of discrete sources without and with a memory, as well as of channels and coding. The understanding of the theoretical matter is supported by many examples. One particular emphasis is put on the explanation of Genomic Coding. Many examples throughout the book are chosen from this particular area and several parts of the book are devoted to this exciting implication of coding. 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. This book provides the communications engineer involved in the physical layer of communications systems, the signal processing techniques and design tools needed to develop efficient algorithms for the design of various systems. These systems include satellite modems, cable modems, wire-line modems, cell-phones, various radios, multi-channel receivers, audio encoders, surveillance receivers, laboratory instruments, and various sonar and radar systems. The emphasis woven through the book material is that of intuitive understanding obtained by the liberal use of figures and examples. The book contains examples of all these types of systems. The book also will contain MatLab script files that implement the examples as well as design tools for filters similar to the examples. Covers all important topics in digital transmission at the intuitive level of physical systems. The presentation attempts to bridge the gap between communication practice and theory, emphasizing the interplay between modulation and coding and their receiver counterparts. KEY TOPICS: Emphasizes the engineering tradeoffs in signal design, energy and spectral properties of modulation choices, and receiver design aspects including synchronization. Presents expanded material on lattices and block coding theory and applications. Reed-Solomon and BCH encoding and decoding algorithms are treated at length along with applications to bandlimited Gaussian channels and fading channels. This book provides an introduction to the basic concepts in digital communications for readers with little or no previous exposure to either digital or analog communications. The intent is to help learners develop a firm understanding of digital communication system engineering—and to enable them to conduct system-level design and analysis for digital communications systems of the future. As a result, the book emphasizes the basic principles of digital communications theory and techniques, rather than presenting specific technologies for implementation. Chapter topics include probability and random variables—review and notation, introduction to random processes, linear filtering of random processes, frequency-domain analysis of random processes in linear systems, baseband transmission of binary data, coherent communications, noncoherent communications, intersymbol interference, and spread-spectrum communications systems. For individuals preparing for a career in wireless communications system design.

Copyright code: edc65aca8de0c7b411b375a6d55b8ca