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# Digital Communications A Discrete Time Approach

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Introduction to Digital Communications  
Introduction to Communication Systems  
Digital Communications and Signal Processing (Second Edition)  
Multirate Signal Processing For Communication Systems  
Principles of Digital Communication  
Understanding Digital Signal Processing  
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## BRIGGS CLINTON

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### Introduction to Digital Communications Springer

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.

### Introduction to Communication Systems Elsevier

The book starts with a completely fresh perspective on introduction to signals and continues to dealing with complex numbers without any complicated mathematics. The only skills you require are addition, multiplication and knowing what cos and sin are! The topics of discrete domains - both time and frequency - are explained in an intuitive manner such that traveling between the two through Discrete Fourier Transform (DFT) becomes quite natural. Furthermore, the concepts needed to implement modern digital communication systems such as convolution, filters and multirate signal processing are illustrated through the help of beautiful figures. Next, the book demystifies modulation and demodulation in a way easy to grasp even for a non-technical reader. The focus is on linear modulations, particularly Pulse Amplitude Modulation (PAM), Quadrature Amplitude Modulation (QAM) and Phase Shift Keying (PSK). Matched filtering is clarified in time, frequency and mathematical details in a story-like development. In addition, the topic of pulse shape filtering is covered in a depth and from angles never described anywhere before. The book continues with stethoscopes of a communication system, namely eye diagrams and scatter plots and towards the error rates of various modulation schemes along with the energy scaling factors of respective blocks. Finally, their spectral efficiencies are described taking into account the bandwidth, signal-to-noise ratio and data rates. This text is a simple way for you to enter at the beginner level and make your way up to wireless system design. Mathematics is included at a school level. I rely more on visualizing equations through beautiful figures. Therefore, you will encounter numerous figures throughout the text with logical and intuitive explanations. But you will not encounter any integrals, probability theory and detection/estimation theory. You will not even find any e or j of complex numbers either. The most complicated notation I have used is "sum everything from N1 to N2."

*Digital Communications and Signal Processing (Second Edition)* Springer Science & Business Media  
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.

Multirate Signal Processing For Communication Systems Springer Science & Business Media

This textbook takes a unified view of the fundamentals of wireless communication and explains cutting-edge concepts in a simple and intuitive way. An abundant supply of exercises make it ideal for graduate courses in electrical and computer engineering and it will also be of great interest to practising engineers.

*Principles of Digital Communication* Pearson Education India

Digital Signal Processing 101: Everything You Need to Know to Get Started provides a basic tutorial on digital signal processing (DSP). Beginning with discussions of numerical representation and complex numbers and exponentials, it goes on to explain difficult concepts such as sampling, aliasing, imaginary numbers, and frequency response. It does so using easy-to-understand examples and a minimum of mathematics. In addition, there is an overview of the DSP functions and implementation used in several DSP-intensive fields or applications, from error correction to CDMA mobile communication to airborne radar systems. This book is intended for those who have absolutely no previous experience with DSP, but are comfortable with high-school-level math skills. It is also for those who work in or provide components for industries that are made possible by DSP. Sample industries include wireless mobile phone and infrastructure equipment, broadcast and cable video, DSL modems, satellite communications, medical imaging, audio, radar, sonar, surveillance, and electrical motor control. Dismayed when presented with a mass of equations as an explanation of DSP? This is the book for you! Clear examples and a non-mathematical approach gets you up to speed with DSP. Includes an overview of the DSP functions and implementation used in typical DSP-intensive applications, including error correction, CDMA mobile communication, and radar systems

**Understanding Digital Signal Processing** Springer Science & Business Media

Introduces digital mobile communications with an emphasis on digital transmission methods This book presents mathematical analyses of signals, mobile radio channels, and digital modulation methods. The new edition covers the evolution of wireless communications technologies and systems. The major new topics are OFDM (orthogonal frequency domain multiplexing), MIMO (multi-input multi-output) systems, frequency-domain equalization, the turbo codes, LDPC (low density parity check code), ACELP (algebraic code excited linear predictive) voice coding, dynamic scheduling for wireless packet data transmission and nonlinearity compensating digital pre-distorter amplifiers. The new systems using the above mentioned technologies include the second generation evolution systems, the third generation systems with their evolution systems, LTE and LTE-advanced systems, and advanced wireless local area network systems. The second edition of Digital Mobile Communication: Presents basic concepts and applications to a variety of mobile communication systems Discusses current applications of modern digital mobile communication systems Covers the evolution of wireless communications technologies and systems in conjunction with their background The second edition of Digital Mobile Communication is an important textbook for university students, researchers, and engineers involved in wireless communications.

**Digital Signal Processing 101** Academic Internet Pub Incorporated

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.

*Digital Communication* Cambridge University Press

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.

**Software Receiver Design: Build Your Own Digital Communications System in Five Easy Steps** Createspace Independent Publishing Platform

Offers a fresh approach to digital signal processing (DSP), combining heuristic reasoning and physical appreciation with mathematical methods.

**Digital Communications** Artech House Publishers

This text uses the principles of discrete-time signal processing to introduce and analyze digital communications - connecting continuous-time and discrete-time ideas. The text brings under one cover the theoretical and practical issues from discrete-time signal processing, discrete-time filter design, multi-rate discrete-time processing, estimation theory, signal space analysis, numerical algorithms - all focused on digital communications. A useful reference for programmers.

Digital Communication Newnes

Digital signal processing (DSP) has been applied to a very wide range of applications. This includes voice processing, image processing, digital communications, the transfer of data over the internet, image and data compression, etc. Engineers who develop DSP applications today, and in the future, will need to address many implementation issues including mapping algorithms to computational structures, computational efficiency, power dissipation, the effects of finite precision arithmetic, throughput and hardware implementation. It is not practical to cover all of these in a single text. However, this text emphasizes the practical implementation of DSP algorithms as well as the fundamental theories and analytical procedures that form the basis for modern DSP applications. *Digital Signal Processing: Principles, Algorithms and System Design* provides an introduction to the principals of digital signal processing along with a balanced analytical and practical treatment of algorithms and applications for digital signal processing. It is intended to serve as a suitable text for a one semester junior or senior level undergraduate course. It is also intended for use in a following one semester first-year graduate level course in digital signal processing. It may also be used as a reference by professionals involved in the design of embedded computer systems, application specific integrated circuits or special purpose computer systems for digital signal processing, multimedia, communications, or image processing. Covers fundamental theories and analytical procedures that form the basis of modern DSP Shows practical implementation of DSP in software and hardware Includes Matlab for design and implementation of signal processing algorithms and related discrete time systems Bridges the gap between reference texts and the knowledge needed to implement DSP applications in software or hardware

Wireless Communications from the Ground Up Cambridge University Press

A comprehensive text that takes a unique top-down approach to teaching the fundamentals of

digital communication for a one-semester course.

[Digital Communications](#) Cambridge University Press

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.

[Digital Signal Processing](#) Cambridge University Press

This textbook provides engineering students with instruction on processing signals encountered in speech, music, and wireless communications using software or hardware by employing basic mathematical methods. The book starts with an overview of signal processing, introducing readers to the field. It goes on to give instruction in converting continuous time signals into digital signals and discusses various methods to process the digital signals, such as filtering. The author uses MATLAB throughout as a user-friendly software tool to perform various digital signal processing algorithms and to simulate real-time systems. Readers learn how to convert analog signals into digital signals; how to process these signals using software or hardware; and how to write algorithms to perform useful operations on the acquired signals such as filtering, detecting digitally modulated signals, correcting channel distortions, etc. Students are also shown how to convert MATLAB codes into firmware codes. Further, students will be able to apply the basic digital signal processing techniques in their workplace. The book is based on the author's popular online course at University of California, San Diego.

**Discrete-Time Processing of Speech Signals** Collection le savoir suisse

Never HIGHLIGHT a Book Again! Virtually all of the testable terms, concepts, persons, places, and events from the textbook are included. Cram101 Just the FACTS101 studyguides give all of the outlines, highlights, notes, and quizzes for your textbook with optional online comprehensive practice tests. Only Cram101 is Textbook Specific. Accompanys: 9780130304971 .

[Introduction to Digital Communications](#) Cambridge University Press

Amazon.com's Top-Selling DSP Book for Seven Straight Years—Now Fully Updated! Understanding Digital Signal Processing, Third Edition, is quite simply the best resource for engineers and other

technical professionals who want to master and apply today's latest DSP techniques. Richard G. Lyons has updated and expanded his best-selling second edition to reflect the newest technologies, building on the exceptionally readable coverage that made it the favorite of DSP professionals worldwide. He has also added hands-on problems to every chapter, giving students even more of the practical experience they need to succeed. Comprehensive in scope and clear in approach, this book achieves the perfect balance between theory and practice, keeps math at a tolerable level, and makes DSP exceptionally accessible to beginners without ever oversimplifying it. Readers can thoroughly grasp the basics and quickly move on to more sophisticated techniques. This edition adds extensive new coverage of FIR and IIR filter analysis techniques, digital differentiators, integrators, and matched filters. Lyons has significantly updated and expanded his discussions of multirate processing techniques, which are crucial to modern wireless and satellite communications. He also presents nearly twice as many DSP Tricks as in the second edition—including techniques even seasoned DSP professionals may have overlooked. Coverage includes New homework problems that deepen your understanding and help you apply what you've learned Practical, day-to-day DSP implementations and problem-solving throughout Useful new guidance on generalized digital networks, including discrete differentiators, integrators, and matched filters Clear descriptions of statistical measures of signals, variance reduction by averaging, and real-world signal-to-noise ratio (SNR) computation A significantly expanded chapter on sample rate conversion (multirate systems) and associated filtering techniques New guidance on implementing fast convolution, IIR filter scaling, and more Enhanced coverage of analyzing digital filter behavior and performance for diverse communications and biomedical applications Discrete sequences/systems, periodic sampling, DFT, FFT, finite/infinite impulse response filters, quadrature (I/Q) processing, discrete Hilbert transforms, binary number formats, and much more

*A Foundation in Digital Communication* Springer Nature

Learn the key concepts and get hands-on experience with this step-by-step guide to constructing a fully functioning software receiver.

**Introduction to Digital Mobile Communication** Academic Press

Since the 1970's, there has been a great deal of research effort spent on studying chaotic systems and the properties of the chaotic signals generated. Characterized by their wideband, impulse-like autocorrelation and low cross-correlation properties, chaotic signals are useful spread-spectrum signals for carrying digital information. Spectrum spreading has become one of the most popular modulation techniques for high-speed wireless communications. It makes use of signals of very wide bandwidth to carry information at relatively low data rates, and possesses advantages such as low probability of interception, resistance to jamming, multiple-access capability and mitigation to multipath effect, which are particularly important in a wireless scenario. In addition to enjoying the aforementioned benefits, chaotic signals can be generated using simple circuitries, thus lowering the cost of transceivers. Early study of chaos-based communication systems was focused on a single-user case. In the past few years, more effort has been put on investigating systems with multiple-access capability, which is a key feature of spread-spectrum communication systems. Digital Communications with Chaos presents a detailed study of some multiple-access schemes used for chaos-based communications, and evaluates their performance. In addition, the effectiveness of the

multiuser detection techniques, whose primary objective is to reduce interference between users and hence improve performance, is evaluated in the context of multiple-access digital communication systems. Hot research topic Describes communication technologies for the future Authors among the pioneers researching in chaos-based communications

*Principles of Digital Communication* Universities Press

This book is for designers and would-be designers of digital communication systems. The general approach of this book is to extract the common principles underlying a range of media and applications and present them in a unified framework. Digital Communication is relevant to the design of a variety of systems, including voice and video digital cellular telephone, digital CATV distribution, wireless LANs, digital subscriber loop, metallic Ethernet, voiceband data modems, and satellite communication systems. New in this Third Edition: New material on recent advances in wireless communications, error-control coding, and multi-user communications has been added. As a result, two new chapters have been added, one on the theory of MIMO channels, and the other on diversity techniques for mitigating fading. Error-control coding has been rewritten to reflect the

current state of the art. Chapters 6 through 9 from the Second Edition have been reorganized and streamlined to highlight pulse-amplitude modulation, becoming the new Chapters 5 through 7. Readability is increased by relegating many of the more detailed derivations to appendices and exercise solutions, both of which are included in the book. Exercises, problems, and solutions have been revised and expanded. Three chapters from the previous edition have been moved to the book's Web site to make room for new material. This book is ideal as a first-year graduate textbook, and is essential to many industry professionals. The book is attractive to both audiences through the inclusion of many practical examples and a practical flavor in the choice of topics. Digital Communication has a Web site at : <http://www.ece.gatech.edu/~barry/digital/>, where the reader may find additional information from the Second Edition, other supplementary materials, useful links, a problem solutions manual, and errata.

**Outlines and Highlights for Digital Communications** McGraw-Hill College

One of the first books in this area, this text focuses on important aspects of the system operation, analysis and performance evaluation of selected chaos-based digital communications systems - a hot topic in communications and signal processing.