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# Digital Communications

Proakis, John G.

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# Digital Communication John Proakis 4th Edition

**John G. Proakis, Vinay K. Ingle**



## **Digital Communication John Proakis 4th Edition:**

**Theory and Design of Digital Communication Systems** Tri T. Ha, 2010-10-28 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 communication systems operate in the real world learn how to design subsystems and evaluate end to end performance with ease and confidence

*MATLAB/Simulink for Digital Communication* Won Y. Yang, 2018-03-02 Chapter 1 Fourier Analysis 1 1 1 CONTINUOUS TIME FOURIER SERIES CTFS 2 1 2 PROPERTIES OF CTFS 6 1 2 1 Time Shifting Property 6 1 2 2 Frequency Shifting Property 6 1 2 3 Modulation Property 6 1 3 CONTINUOUS TIME FOURIER TRANSFORM CTFT 7 1 4 PROPERTIES OF CTFT 13 1 4 1 Linearity 13 1 4 2 Conjugate Symmetry 13 1 4 3 Real Translation Time Shifting and Complex Translation Frequency Shifting 14 1 4 4 Real Convolution and Correlation 14 1 4 5 Complex Convolution Modulation Windowing 14 1 4 6 Duality 17 1 4 7 Parseval Relation Power Theorem 18 1 5 DISCRETE TIME FOURIER TRANSFORM DTFT 18 1 6 DISCRETE TIME FOURIER SERIES DFS DFT 19 1 7 SAMPLING THEOREM 21 1 7 1 Relationship between CTFS and DFS 21 1 7 2 Relationship between CTFT and DTFT 27 1 7 3 Sampling Theorem 27 1 8 POWER ENERGY AND CORRELATION 29 1 9 LOWPASS EQUIVALENT OF BANDPASS SIGNALS 30 Chapter 2 PROBABILITY AND RANDOM PROCESSES 39 2 1 PROBABILITY 39 2 1 1 Definition of Probability 39 2 1 2 Joint Probability and Conditional Probability 40 2 1 3 Probability Distribution Density Function 41 2 1 4 Joint Probability Density Function 41 2 1 5 Conditional Probability Density Function 41 2 1 6 Independence 41 2 1 7 Function of a Random Variable 42 2 1 8 Expectation Covariance and Correlation 43 2 1 9 Conditional Expectation 47 2 1 10 Central Limit Theorem Normal Convergence Theorem 47 2 1 11 Random Processes 49 2 1 12 Stationary Processes and Ergodic Processes 51 2 1 13 Power Spectral Density PSD 53 2 1 14 White Noise and Colored Noise 53 2 2 LINEAR FILTERING OF A RANDOM PROCESS 57 2 3 PSD OF A RANDOM PROCESS 58 2 4 FADING EFFECT OF A MULTIPATH CHANNEL 58 Chapter 3 ANALOG MODULATION 71 3 1 AMPLITUDE MODULATION AM 71 3 1 1 DSB Double Sideband AM Amplitude Modulation 71 3 1 2 Conventional AM Amplitude Modulation 75 3 1 3 SSB Single Sideband AM Amplitude Modulation 78 3 2 ANGLE MODULATION AGM FREQUENCY PHASE MODULATIONS 82 Chapter 4 ANALOG TO DIGITAL CONVERSION 87 4 1 QUANTIZATION 87 4 1 1 Uniform Quantization 88 4 1 2 Non uniform Quantization 89 4 1

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*Digital Communication* John R. Barry, Edward A. Lee, David G. Messerschmitt, 2004  
 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](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

**Digital Transmission** Dayan Adionel Guimaraes, 2010-01-18 Digital Transmission A Simulation Aided Introduction with VisSim Comm is a book in which basic principles of digital communication mainly pertaining to the physical layer are emphasized Nevertheless these principles can serve as the fundamentals that will help the reader to understand more advanced topics and the associated technology In this book each topic is addressed in two different and complementary ways theoretically and by simulation The theoretical approach encompasses common subjects covering principles of digital transmission like notions of probability and stochastic processes signals and systems baseband and passband signaling signal space representation spread spectrum multi carrier and ultra wideband transmission carrier and symbol timing recovery information theory and error correcting codes The simulation approach revisits the same subjects focusing on the capabilities of the communication system simulation software VisSim Comm on helping the reader to fulfill the gap between the theory and its practical meaning The presentation of the theory is made easier with the help of 357 illustrations A total of 101 simulation files supplied in the accompanying CD support the simulation oriented approach A full evaluation version and a viewer only version of VisSim Comm are also supplied in the CD

**Wiley Encyclopedia of Telecommunications, Volume 4** John G. Proakis, 2003 Contains 275 tutorial articles focused on modern telecommunications topics The contents include articles on communication networks source coding and decoding channel coding and decoding modulation and demodulation optical communications satellite communications underwater acoustic communications radio propagation antennas multiuser communications magnetic storage systems and a variety of standards V 1 p v

**Chaotic Signals in Digital Communications** Marcio Eisenkraft, Romis Attux, Ricardo Suyama, 2013-10-25 Chaotic Signals in Digital

Communications combines fundamental background knowledge with state of the art methods for using chaotic signals and systems in digital communications The book builds a bridge between theoretical works and practical implementation to help researchers attain consistent performance in realistic environments It shows the possible shortcomings of the chaos based communication systems proposed in the literature particularly when they are subjected to non ideal conditions It also presents a toolbox of techniques for researchers working to actually implement such systems A Combination of Tutorials and In Depth Cutting Edge Research Featuring contributions by active leading researchers the book begins with an introduction to communication theory dynamical systems and chaotic communications suitable for those new to the field This lays a solid foundation for the more applied chapters that follow A Toolbox of Techniques Including New Ways to Tackle Channel Imperfections The book covers typical chaos communication methods namely chaotic masking chaotic modulation chaotic shift key and symbolic message bearing as well as bidirectional communication and secure communication It also presents novel methodologies to deal with communication channel imperfections These tackle band limited channel chaos communication radio channels with fading and the resistance of a special chaotic signal to multipath propagations In addition the book addresses topics related to engineering applications such as optical communications chaotic matched filters and circuit implementations and microwave frequency modulated differential chaos shift keying FM DCSK systems Insights for Both Theoretical and Experimental Researchers Combining theory and practice this book offers a unique perspective on chaotic communication in the context of non ideal conditions Written for theoretical and experimental researchers it tackles the practical issues faced in implementing chaos based signals and systems in digital communications applications

**Detection and Estimation Theory and Its Applications** Thomas A. Schonhoff, Arthur Anthony Giordano, 2006 For courses in Estimation and Detection Theory offered in departments of Electrical Engineering This is the first student friendly textbook to comprehensively address the topics of both detection and estimation with a thorough discussion of the underlying theory as well as the practical applications By addressing detection and estimation theory in the same volume the authors encourage a greater appreciation of the strong coupling and often blurring of these fields of study In order to modernize classical topics the text focuses on discrete signal processing with continuous signal presentations included to demonstrate uniformity and consistency of the results *The Handbook of Computer Networks, Key Concepts, Data Transmission, and Digital and Optical Networks* Hossein Bidgoli, 2008 A complete and in depth introduction to computer networks and networking In this first volume of The Handbook of Computer Networks readers will get a complete overview of the key concepts of computers networks data transmission and digital and optical networks Providing a comprehensive examination of computer networks the book is designed for both undergraduate students and professionals working in a variety of computer network dependent industries With input from over 270 experts in the field the text offers an easy to follow progression through each topic and focuses on fields and technologies that have widespread application in the real world

*Digital Communication Over Fading Channels* Marvin K. Simon, Mohamed-Slim Alouini, 2000-08-14 A unified presentation broad coverage single volume convenience This timesaving reference provides a unified approach to the performance analysis of digital communication systems over generalized fading channels Employing alternative forms of such classical mathematical functions as the Gaussian Q function the Marcum Q function and the incomplete Gamma function the book expresses communication system error probability performance in terms of the moment generation function MGF of the fading process This MGF based approach provides the unifying backbone of the book *Digital Communication over Fading Channels* discusses in detail coherent differentially 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 also includes single and multichannel reception and in the case of the latter a large variety of diversity types For each combination of communication type channel fading model and diversity type the average bit error rate and or symbol error rate is expressed in an easy to evaluate form Special features include Important results previously scattered over many publications now in a single volume Simplified results heretofore available only in complex forms Extremely broad coverage of topics Explores practical applications including the problem of optimum combining in the presence of co channel interference **Wiley**

**Encyclopedia of Telecommunications** John G. Proakis, 2003 *Digital Communications* Michael Rice, 2009 Digital Communications A Discrete Time Approach by Michael Rice presents the traditional topics in digital communications such as modulation PAM and QAM detection using the matched filter and performance in AWGN It also includes less traditional topics as pulse shaping carrier phase synchronization symbol timing synchronization automatic gain control channel selection and advanced discrete time architectures BOOK JACKET [American Book Publishing Record](#) ,2002 [BMAS ...](#) ,2002 [A Self-study Guide for Digital Signal Processing](#) John G. Proakis, Vinay K. Ingle, 2004 [The British National Bibliography](#) Arthur James Wells, 2009 [Error Control Coding](#) Peter Sweeney, 2002-04-29 Error Control Coding From Theory to Practice provides a concise introduction to basic coding techniques and their application The fundamental concepts of coding theory are explained using simple examples with minimum use of complex mathematical tools The selection of appropriate codes and the design of decoders are discussed Bridging the gap between digital communications and information theory this accessible approach will appeal to students and practising engineers alike The clear presentation and practical emphasis make this book an excellent tool for both communications and electronic engineering students Practitioners new to the field will find this text an essential guide to coding Features include End of chapter problems to test and develop the readers understanding of the most popular codes and decoding methods Finite field arithmetic and algebraic decoding methods for BCH and Reed Solomon codes Detailed coverage of Viterbi decoding and related implementation issues Turbo codes and related code types including Gallager codes and turbo product codes Practical examples of MAP and SOVA decoding for turbo codes **Engineering Education** ,1982 [Student Manual for Digital Signal Processing with MATLAB](#) John G.

Proakis, Vinay K. Ingle, 2007      **Books in Series** ,1985 Vols for 1980 issued in three parts Series Authors and Titles  
**Scientific and Technical Books and Serials in Print** ,1984

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