



Contemporary Communication Systems

using **MATLAB®**

and
Simulink™

Second Edition

John G. Proakis
Masoud Salehi
Gerhard Bauch



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Contemporary Communication Systems Using Matlab

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Contemporary Communication Systems Using MATLAB John G. Proakis, Masoud Salehi, 1998 This text contains a large number of MATLAB based problems dealing with topics covered in a first course in communication systems Each chapter contains fundamental concepts briefly reviewed and presents illustration problems using MATLAB Each chapter contains a list of MATLAB files used

Contemporary Communication Systems Using MATLAB and Simulink John G. Proakis, Masoud Salehi, Gerhard Bauch, 2004 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 The authors assume that the student is familiar with the fundamentals of 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

Contemporary Communication Systems Using MATLAB John G. Proakis, Masoud Salehi, 2000 This supplement to any standard communication systems text is one of the first books to successfully integrate the use of MATLAB in the study of communication systems concepts and problems It has been developed for instructors and students who wish to make use of MATLAB as an integral part of their study The former will find the means by which to use MATLAB as a powerful tool to motivate students and illustrate essential theory without having to customize the applications themselves the latter will find relevant problems quickly and easily The book includes numerous MATLAB based simulations and examples of communication systems while providing a good balance of theory and hands on computer experience This Updated Printing revises the book and MATLAB files available for downloading from the Brooks Cole Bookware Companion Resource Center Web Site to MATLAB V5

Contemporary Communication Systems Using MATLAB John G. Proakis, Masoud Salehi, Gerhard Bauch, 2012-07-19 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

Modeling of Digital Communication Systems Using SIMULINK Arthur A. Giordano, Allen H. Levesque, 2015-04-01 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 [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 3 Non uniform Quantization Considering the Absolute Errors 91 4 2 Pulse Code Modulation PCM 95 4 3 Differential Pulse Code Modulation DPCM 97 4 4

Delta Modulation DM 100 Chapter 5 BASEBAND TRANSMISSION 107 5 1 RECEIVER RCVR and SNR 107 5 1 1 Receiver of RC Filter Type 109 5 1 2 Receiver of Matched Filter Type 110 5 1 3 Signal Correlator 112 5 2 PROBABILITY OF ERROR WITH SIGNALING 114 5 2 1 Antipodal Bipolar Signaling 114 5 2 2 On Off Keying OOK Unipolar Signaling 118 5 2 3 Orthogonal Signaling 119 5 2 4 Signal Constellation Diagram 121 5 2 5 Simulation of Binary Communication 123 5 2 6 Multi Level amplitude PAM Signaling 127 5 2 7 Multi Dimensional Signaling 129 5 2 8 Bi Orthogonal Signaling 133 Chapter 6 BANDLIMITED CHANNEL AND EQUALIZER 139 6 1 BANDLIMITED CHANNEL 139 6 1 1 Nyquist Bandwidth 139 6 1 2 Raised Cosine Frequency Response 141 6 1 3 Partial Response Signaling Duobinary Signaling 143 6 2 EQUALIZER 148 6 2 1 Zero Forcing Equalizer ZFE 148 6 2 2 MMSE Equalizer MMSEE 151 6 2 3 Adaptive Equalizer ADE 154 6 2 4 Decision Feedback Equalizer DFE 155 Chapter 7 BANDPASS TRANSMISSION 169 7 1 AMPLITUDE SHIFT KEYING ASK 169 7 2 FREQUENCY SHIFT KEYING FSK 178 7 3 PHASE SHIFT KEYING PSK 187 7 4 DIFFERENTIAL PHASE SHIFT KEYING DPSK 190 7 5 QUADRATURE AMPLITUDE MODULATION QAM 195 7 6 COMPARISON OF VARIOUS SIGNALINGS 200 Chapter 8 CARRIER RECOVERY AND SYMBOL SYNCHRONIZATION 227 8 1 INTRODUCTION 227 8 2 PLL PHSE LOCKED LOOP 228 8 3 ESTIMATION OF CARRIER PHASE USING PLL 233 8 4 CARRIER PHASE RECOVERY 235 8 4 1 Carrier Phase Recovery Using a Squaring Loop for BPSK Signals 235 8 4 2 Carrier Phase Recovery Using Costas Loop for PSK Signals 237 8 4 3 Carrier Phase Recovery for QAM Signals 240 8 5 SYMBOL SYNCHRONIZATION TIMING RECOVERY 243 8 5 1 Early Late Gate Timing Recovery for BPSK Signals 243 8 5 2 NDA ELD Synchronizer for PSK Signals 246 Chapter 9 INFORMATION AND CODING 257 9 1 MEASURE OF INFORMATION ENTROPY 257 9 2 SOURCE CODING 259 9 2 1 Huffman Coding 259 9 2 2 Lempel Zip Welch Coding 262 9 2 3 Source Coding vs Channel Coding 265 9 3 CHANNEL MODEL AND CHANNEL CAPACITY 266 9 4 CHANNEL CODING 271 9 4 1 Waveform Coding 272 9 4 2 Linear Block Coding 273 9 4 3 Cyclic Coding 282 9 4 4 Convolutional Coding and Viterbi Decoding 287 9 4 5 Trellis Coded Modulation TCM 296 9 4 6 Turbo Coding 300 9 4 7 Low Density Parity Check LDPC Coding 311 9 4 8 Differential Space Time Block Coding DSTBC 316 9 5 CODING GAIN 319 Chapter 10 SPREAD SPECTRUM SYSTEM 339 10 1 PN Pseudo Noise Sequence 339 10 2 DS SS Direct Sequence Spread Spectrum 347 10 3 FH SS Frequency Hopping Spread Spectrum 352 Chapter 11 OFDM SYSTEM 359 11 1 OVERVIEW OF OFDM 359 11 2 FREQUENCY BAND AND BANDWIDTH EFFICIENCY OF OFDM 363 11 3 CARRIER RECOVERY AND SYMBOL SYNCHRONIZATION 364 11 4 CHANNEL ESTIMATION AND EQUALIZATION 381 11 5 INTERLEAVING AND DEINTERLEAVING 384 11 6 PUNCTURING AND DEPUNCTURING 386 11 7 IEEE STANDARD 802 11A 1999 388

Modern Communication Systems Using Matlab Masoud Salehi, Gerhard Bauch, 2013 Optical Fiber

Communication Systems with MATLAB® and Simulink® Models Le Nguyen Binh, 2014-12-01 Carefully structured to instill practical knowledge of fundamental issues Optical Fiber Communication Systems with MATLAB and Simulink Models describes the modeling of optically amplified fiber communications systems using MATLAB and Simulink This lecture based

book focuses on concepts and interpretation mathematical procedures and engineering **Digital Signal Processing with Matlab Examples, Volume 1** Jose Maria Giron-Sierra,2016-11-19 This is the first volume in a trilogy on modern Signal Processing The three books provide a concise exposition of signal processing topics and a guide to support individual practical exploration based on MATLAB programs This book includes MATLAB codes to illustrate each of the main steps of the theory offering a self contained guide suitable for independent study The code is embedded in the text helping readers to put into practice the ideas and methods discussed The book is divided into three parts the first of which introduces readers to periodic and non periodic signals The second part is devoted to filtering which is an important and commonly used application The third part addresses more advanced topics including the analysis of real world non stationary signals and data e g structural fatigue earthquakes electro encephalograms birdsong etc The book s last chapter focuses on modulation an example of the intentional use of non stationary signals **Digital Communication Systems Engineering with Software-defined Radio** Alexander M. Wyglinski,Di Pu,2013 For a senior level undergraduate course on digital

communications this unique resource provides you with a practical approach to quickly learning the software defined radio concepts you need to know for your work in the field Contemporary Linear Systems Using MATLAB Robert D. Strum,Donald E. Kirk,1994 This is a title in the PWS series BookWare Companion Series It is a set of correlated self contained courseware modules covering fundamental concepts in engineering and applied mathematics Students work through example problems electronically and are encouraged to experiment with problems and data in an electronic lab setting Each BookWare Companion features a software script for the electronic examples based on a popular applications software package for the IBM PC or the Macintosh and a printed volume containing computer based exploration exercises and a variety of learning aids and hints The text bolstered by illustrative examples 200 problems and MATLAB exploration exercises on the accompanying data disk should enable students to work with linear systems problems in a virtual laboratory at the computer changing problem values at will in a what if fashion **Communication System Design Using DSP Algorithms** Steven A. Tretter,2012-12-06 Designed for senior electrical engineering students this textbook explores the

theoretical concepts of digital signal processing and communication systems by presenting laboratory experiments using real time DSP hardware The experiments are designed for the Texas Instruments TMS320C6701 Evaluation Module or TMS320C6711 DSK but can easily be adapted to other DSP boards Each chapter begins with a presentation of the required theory and concludes with instructions for performing experiments to implement the theory In the process of performing the experiments students gain experience in working with software tools and equipment commonly used in industry

Essentials of Modern Communications Djafar K. Mynbaev,Lowell L. Scheiner,2020-07-14 Explore Modern Communications and Understand Principles of Operations Appropriate Technologies and Elements of Design of Communication Systems Modern society requires a different set of communication systems than has any previous generation

To maintain and improve the contemporary communication systems that meet ever changing requirements engineers need to know how to recognize and solve cardinal problems In Essentials of Modern Communications readers will learn how modern communication has expanded and will discover where it is likely to go in the future By discussing the fundamental principles methods and techniques used in various communication systems this book helps engineers assess troubleshoot and fix problems that are likely to occur In this reference readers will learn about topics like How communication systems respond in time and frequency domains Principles of analog and digital modulations Application of spectral analysis to modern communication systems based on the Fourier series and Fourier transform Specific examples and problems with discussions around their optimal solutions limitations and applications Approaches to solving the concrete engineering problems of modern communications based on critical logical creative and out of box thinking For readers looking for a resource on the fundamentals of modern communications and the possible issues they face Essentials of Modern Communications is instrumental in educating on real life problems that engineering students and professionals are likely to encounter

Practical MATLAB for Engineers - 2 Volume Set Misza Kalechman, 2018-10-08 A comprehensive and accessible primer this two volume tutorial immerses engineers and engineering students in the essential technical skills that will allow them to put Matlab to immediate use The first volume covers concepts such as functions algebra geometry arrays vectors matrices trigonometry graphs pre calculus and calculus It then delves into the Matlab language covering syntax rules notation operations computational programming The second volume illustrates the direct connection between theory and real applications Each chapter reviews basic concepts and then explores those concepts with a number of worked out examples

Practical MATLAB Applications for Engineers Misza Kalechman, 2018-10-08 Practical Matlab Applications for Engineers provides a tutorial for those with a basic understanding of Matlab It can be used to follow Misza Kalechman's Practical Matlab Basics for Engineers cat no 47744 This volume explores the concepts and Matlab tools used in the solution of advanced course work for engineering and technology students It covers the material encountered in the typical engineering and technology programs at most colleges It illustrates the direct connection between theory and real applications Each chapter reviews basic concepts and then explores those concepts with a number of worked out examples

Principles of Modern Communication Systems Samuel O. Agbo, Matthew N. O. Sadiku, 2017-02-06 Written specifically for a one semester course this textbook introduces the physical and engineering principles of communication systems using an accessible yet mathematically rigorous approach Beginning with valuable background material on signals and systems and random processes the text then guides students through the core topics including amplitude modulation pulse modulation and noise Key terms and formulae are highlighted throughout to help students identify essential points easily Worked examples practice problems and review questions reinforce concepts and enable students to develop confidence in solving problems on their own To help visualize the concepts discussed MATLAB based exercises and examples are provided

throughout supported by an introductory appendix for students who are new to MATLAB Each chapter ends with a practical applications section showing students how concepts are used in real life communication scenarios and devices Figures from the book and a solutions manual password protected for instructors are available online Signals and Systems Using MATLAB® Aydin Akan,Luis F. Chaparro,2024-03-22 Signals and Systems Using MATLAB Fourth Edition features a pedagogically rich and accessible approach to what can commonly be a mathematically dry subject Historical notes and common mistakes combined with applications in controls communications and signal processing help students understand and appreciate the usefulness of the techniques described in the text This new edition features more worked examples and a variety of new end of chapter problems suggestions for labs and more explanation of MATLAB code Introduces both continuous and discrete systems early and then studies each separately more in depth Contains an extensive set of worked examples and homework assignments with applications to controls communications and signal processing Begins with a review of all the background math necessary to study the subject Includes MATLAB problems and applications in every chapter *Modern Electronics Devices and Communication Systems* Rajeev Agrawal,Chandramani Kishore Singh,Ayush Goyal,Dinesh Kumar Singh,2023-02-18 This book presents select and peer reviewed proceedings of the International Conference on Smart Communication and Imaging Systems MEDCOM 2021 The contents explore the recent technological advances in the field of next generation electronics devices and communication systems The topics include the design and development of smart secure and reliable future communication networks satellite radar and microwave techniques for intelligent communication The book also covers methods and applications of GIS and remote sensing medical image analysis and its applications in smart health This book can be useful for students researchers and professionals working in the field of communication systems and image processing **Signals and Systems using MATLAB** Luis F. Chaparro,2010-11-10 This new textbook in signals and systems provides a pedagogically rich approach to what can commonly be a mathematically dry subject With features like historical notes highlighted common mistakes and applications in controls communications and signal processing Chaparro helps students appreciate the usefulness of the techniques described in the book Each chapter contains a section with MatLab applications Pedagogically rich introduction to signals and systems using historical notes pointing out common mistakes and relating concepts to realistic examples throughout to motivate learning the material Introduces both continuous and discrete systems early then studies each separately in more depth later Extensive set of worked examples and homework assignments with applications to controls communications and signal processing throughout Provides review of all the background math necessary to study the subject MatLab applications in every chapter

Discrete Systems Laboratory Using MATLAB Martin Schetzen,Vinay K. Ingle,2000 This brief paperbound supplement provides 16 hands on laboratory experiments that students can perform using MATLAB in lab sections that accompany lecture courses in Linear Systems or DSP The 16 experiments are grouped in four main topic areas sampling and digital to

analog D A conversion the discrete time Fourier transform gain and phase shift studies of digital filters and analog to digital A D quantization See TOC below for a listing of specific lab experiments The goal of these experiments is to enable students to understand the full physical significance of key concepts through a deeper understanding of the underlying mathematical formulas not to teach MATLAB In each experiment students enter problem parameter values plot the results using MATLAB s powerful plotting functions and then respond to questions in the manual that require them to analyze and interpret these results The experiments challenge students to approach the study of these topics in the role of an experimental investigator students are required to define the quantitative values and size properties of each design criterion in a problem As a result students develop an appreciation of the physical meaning of the derived results their theoretical and physical implications and the use of the scientific method

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Table of Contents Contemporary Communication Systems Using Matlab Contemporary Communication Systems Using Matlab

1. Understanding the eBook Contemporary Communication Systems Using Matlab Contemporary Communication Systems Using Matlab
 - The Rise of Digital Reading Contemporary Communication Systems Using Matlab Contemporary Communication Systems Using Matlab
 - Advantages of eBooks Over Traditional Books
2. Identifying Contemporary Communication Systems Using Matlab Contemporary Communication Systems Using Matlab
 - Exploring Different Genres
 - Considering Fiction vs. Non-Fiction
 - Determining Your Reading Goals
3. Choosing the Right eBook Platform
 - Popular eBook Platforms

- Features to Look for in an Contemporary Communication Systems Using Matlab Contemporary Communication Systems Using Matlab
- User-Friendly Interface
- 4. Exploring eBook Recommendations from Contemporary Communication Systems Using Matlab Contemporary Communication Systems Using Matlab
 - Personalized Recommendations
 - Contemporary Communication Systems Using Matlab Contemporary Communication Systems Using Matlab User Reviews and Ratings
 - Contemporary Communication Systems Using Matlab Contemporary Communication Systems Using Matlab and Bestseller Lists
- 5. Accessing Contemporary Communication Systems Using Matlab Contemporary Communication Systems Using Matlab Free and Paid eBooks
 - Contemporary Communication Systems Using Matlab Contemporary Communication Systems Using Matlab Public Domain eBooks
 - Contemporary Communication Systems Using Matlab Contemporary Communication Systems Using Matlab eBook Subscription Services
 - Contemporary Communication Systems Using Matlab Contemporary Communication Systems Using Matlab Budget-Friendly Options
- 6. Navigating Contemporary Communication Systems Using Matlab Contemporary Communication Systems Using Matlab eBook Formats
 - ePub, PDF, MOBI, and More
 - Contemporary Communication Systems Using Matlab Contemporary Communication Systems Using Matlab Compatibility with Devices
 - Contemporary Communication Systems Using Matlab Contemporary Communication Systems Using Matlab Enhanced eBook Features
- 7. Enhancing Your Reading Experience
 - Adjustable Fonts and Text Sizes of Contemporary Communication Systems Using Matlab Contemporary Communication Systems Using Matlab
 - Highlighting and Note-Taking Contemporary Communication Systems Using Matlab Contemporary Communication Systems Using Matlab

- Interactive Elements Contemporary Communication Systems Using Matlab Contemporary Communication Systems Using Matlab
- 8. Staying Engaged with Contemporary Communication Systems Using Matlab Contemporary Communication Systems Using Matlab
 - Joining Online Reading Communities
 - Participating in Virtual Book Clubs
 - Following Authors and Publishers Contemporary Communication Systems Using Matlab Contemporary Communication Systems Using Matlab
- 9. Balancing eBooks and Physical Books Contemporary Communication Systems Using Matlab Contemporary Communication Systems Using Matlab
 - Benefits of a Digital Library
 - Creating a Diverse Reading Collection Contemporary Communication Systems Using Matlab Contemporary Communication Systems Using Matlab
- 10. Overcoming Reading Challenges
 - Dealing with Digital Eye Strain
 - Minimizing Distractions
 - Managing Screen Time
- 11. Cultivating a Reading Routine Contemporary Communication Systems Using Matlab Contemporary Communication Systems Using Matlab
 - Setting Reading Goals Contemporary Communication Systems Using Matlab Contemporary Communication Systems Using Matlab
 - Carving Out Dedicated Reading Time
- 12. Sourcing Reliable Information of Contemporary Communication Systems Using Matlab Contemporary Communication Systems Using Matlab
 - Fact-Checking eBook Content of Contemporary Communication Systems Using Matlab Contemporary Communication Systems Using Matlab
 - Distinguishing Credible Sources
- 13. Promoting Lifelong Learning
 - Utilizing eBooks for Skill Development
 - Exploring Educational eBooks

14. Embracing eBook Trends

- Integration of Multimedia Elements
- Interactive and Gamified eBooks

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