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Principles of Spread-Spectrum Communication Systems, Second Edition-Don Torrieri 2011-07-15 This book provides a concise but lucid explanation of the fundamentals of spread-spectrum systems with an emphasis on theoretical principles. Throughout the book, learning is facilitated by many new or streamlined derivations of the classical theory. Problems at the end of each chapter are intended to assist readers in consolidating their knowledge and to provide practice in analytical techniques. The choice of specific topics is tempered by the author's judgment of their practical significance and interest to both researchers and system designers. The evolution of spread spectrum communication systems and the prominence of new mathematical methods in their design provided the motivation to undertake this new edition of the book. This edition is intended to enable readers to understand the current state-of-the-art in this field. More than 20 percent of the material in this edition is new, including a chapter on systems with iterative channel estimation, and the remainder of the material has been thoroughly revised.

CDMA-Andrew J. Viterbi 1995 Spread spectrum multiple access communication, known commercially as CDMA (Code Division Multiple Access), is a driving technology behind the rapidly advancing personal communications industry. Its greater bandwidth efficiency and multiple access capabilities make it the leading technology for relieving spectrum congestion caused by the explosion in popularity of cellular mobile and fixed wireless telephones and wireless data terminals. Written by a leader in the creation of CDMA and an internationally recognized authority on wireless digital communication, this book gives you the technical information you need. It presents the fundamentals of digital communications and covers all aspects of commercial direct-sequence spread spectrum technology, incorporating both physical-level principles and network concepts. You will find detailed information on signal generation, synchronization, modulation, and coding of direct-sequence spread spectrum signals. In addition, the book shows how these physical layer functions relate to link and network properties involving cellular coverage, Erlang capacity, and network control. With this book, you will attain a deeper understanding of personal communications system concepts and will be better equipped to develop systems and products at the forefront of the personal wireless communications market.

Spread Spectrum and CDMA-Valeri P. Ipatov 2005-12-13 Spread spectrum and CDMA are cutting-edge technologies widely used in operational radar, navigation and telecommunication systems and play a pivotal role in the development of the forthcoming generations of systems and networks. This comprehensive resource presents the spread spectrum concept as a product of the advancements in wireless IT, shows how and when the classical problems of signal transmission/processing stimulate the application of spread spectrum, and clarifies the advantages of spread spectrum philosophy. Detailed coverage is provided of the tools and instruments for designing spread spectrum and CDMA signals answering why a designer will prefer one solution over another. The approach adopted is wide-ranging, covering issues that apply to both data transmission and data collection systems such as telecommunications, radar, and navigation. Presents a theory-based analysis complemented by practical examples and real world case studies resulting in a self-sufficient treatment of the subject Contains detailed discussions of new trends in spread spectrum technology such as multi-user reception, multicarrier modulation, OFDM, MIMO and space-time coding Provides advice on designing discrete spread spectrum signals and signal sets for time-frequency measuring, synchronization and multi-user communications Features numerous Matlab-based problems and other exercises to encourage the reader to initiate independent investigations and simulations This valuable text provides timely guidance on the current status and future potential of spread spectrum and CDMA and is an invaluable resource for senior undergraduates and postgraduate students, lecturers and practising engineers and researchers involved in the deployment and development of spread spectrum and CDMA technology. Supported by a Companion website on which instructors and lecturers can find a solutions manual for the problems and Matlab programming, electronic versions of some of the figures and other useful resources such as a list of abbreviations.

Principles of Spread-Spectrum Communication Systems-Don Torrieri 2018-05-03 This thoroughly revised textbook provides the fundamentals of spread-spectrum systems with a continued emphasis on theoretical principles. The revision includes new sections and appendices on characteristic functions and LaPlace transforms, orthonormal expansions of functions, the SNR wall in detection, multiple-input multiple-output systems, multicode and multirate systems, interference cancelers, complementary codes, chaos and ultrawideband systems, and the normalized LMS algorithm. As with previous editions, the author presents topics in a practical way that is of interest to both researchers and system designers. He includes updated problems at the end of each chapter, which are intended to assist readers in consolidating their knowledge and to provide practice in analytical techniques. In addition to the new and revised material, the author adds 50 new pages to make the book more accessible to graduate students in electrical engineering.

Chaos-Based Digital Communication Systems-Francis C.M. Lau 2013-03-09 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.

Understanding Communications Systems Principles – A Tutorial Approach-Héctor J. De Los Santos 2021-06-07 Wireless communications and sensing systems are nowadays ubiquitous: cell phones and automotive radars typifying two of the most familiar examples. This book introduces the field by addressing its fundamental principles, proceeding from its very beginnings up to today's emerging technologies related to the fifth-generation wireless systems (5G), Multi-Input Multiple Output (MIMO) connectivity, and Aerospace/Electronic Warfare Radar. The tone is tutorial. Problems are included at the end of each chapter to facilitate the understanding and assimilation of the material to electrical engineering undergraduate/graduate students and beginning and non-specialist professionals. Free temporary access to Keysight's SystemVue system simulation is provided to further enhance reader learning through hands-on tutorial exercises. Chapter 1 introduces wireless communications and sensing and in particular how curiosity-driven scientific research led to the foundation of the field. Chapter 2 presents a brief introduction to the building blocks that make up wireless systems. Chapter 3 focuses on developing an understanding of the performance parameters that characterize a wireless system. Chapter 4 deals with circuit topologies for modulation and detection. In Chapter 5 we cover the fundamental transmitter and receiver systems architectures that enable the transmission of information at precise frequencies and their reception from among a rather large multitude of other signals present in space. Chapter 6 introduces 5G, its motivation, and its development and adoption challenges for providing unprecedented levels of highest speed wireless connectivity. Chapter 7 takes on the topic of MIMO, its justification and its various architectures. Chapter 8 addresses the topic of aerospace/electronic warfare radar and finally Chapter 9 presents three Tutorials utilizing the SystemVue simulation tool.

Principles of Communications-Rodger E. Ziemer 2002 Sections on important areas such as spread spectrum, cellular communications, and orthogonal frequency-division multiplexing are provided. * Computational examples are included, illustrating how to use the computer as a simulation tool, thereby allowing waveforms, spectra, and performance curves to be generated. * Overviews of the necessary background in signal, system, probability, and random process theory required for the analog and digital communications topics covered in the book.

Modern Communications Jamming Principles and Techniques-Richard Poisel 2011 This edition features a wealth of new material on urban warfare, including a computer simulation of EW architecture alternatives for land-based forces based on urban constraints. It also includes an expanded section on time-hopped spread spectrum communications, more details on modern communication system technologies such as CDMA and OFDM, and an in-depth discussion on sources of urban noise. This practical resource is focused on showing the reader how to design and build jammers specifically targeted at spread spectrum, anti-jam communications. Moreover, it gives assistance in evaluating the expected performance of jamming systems against modern communications systems, and discover the best waveform to use to counter communication systems designed to be effective in jamming environments. While mathematical derivations in general are avoided, the book presents

error rate performance equations for most modern digital anti-jam communication systems

Spread Spectrum CDMA Systems for Wireless Communications-Savo G. Glisic 1997 Spread spectrum CDMA systems are becoming widely accepted and promise to play a key role in the future of wireless communications. This comprehensive new book explains the main issues of spread spectrum CDMA and makes its practical applications available to network engineers and managers. Packed with nearly 1,000 equations, it also provides the mathematical tools necessary to apply the technology to your own wireless system.

Introduction to Spread-spectrum Communications-Roger L. Peterson 1995 Besides the traditional military application areas, there is a growing and intense interest in spread spectrum communications systems for evolving civil applications, e.g., cellular-mobile communications, personal communications, and satellite-mobile communications. Ideal for those who need to get up to speed or current quickly in this area, this self-contained exploration of spread spectrum system analysis and applications provides a solid theoretical background along with an abundance of examples of specific analysis/design situations, and exposes readers to the most recent research and developments in the field. Covers basic digital communication and spread spectrum concepts, and features exceptionally complete treatments of important hot topics such as spectrum spreading sequences; the code acquisition and tracking process; the effects of jamming on spread spectrum communications and the use of coding/interleaving to combat the detrimental effects of jamming; designing spread spectrum systems for low probability of the intercept; and the design of code division multiple access systems, with examples. Contains a complete set of technical appendices. For electrical engineers and others with a background in linear systems and probability/random processes who want a cutting-edge overview of the principles, research, and developments of spread spectrum systems.

Spread Spectrum Systems for GNSS and Wireless Communications-Jack Kenneth Holmes 2007 This cutting-edge resource offers a modern treatment of spread spectrum (SS) communications, including direct sequence and frequency hopping. This comprehensive volume presents the principles of design and analysis for all SS systems, and places special emphasis on wireless systems and global navigation satellite systems (GNSS).

Introduction to CDMA Wireless Communications-Mosa Ali Abu-Rgheff 2007-09-10 The book gives an in-depth study of the principles of the spread spectrum techniques and their applications in mobile communications. It starts with solid foundations in the digital communications that are essential to unequivocal understanding of the CDMA technology, and guides the reader through the fundamentals and characteristics of cellular CDMA communications. Features include: * A very clear and thorough description of the principles and applications of spread spectrum techniques in multi-user mobile communications. * Matlab-based worked examples, exercises and practical sessions to clearly explain the theoretical concepts. * An easy-to-read explanation of the air interface standards used in IS-95 A/B, cdma2000, and 3G WCDMA. * Clear presentations of the high speed downlink and uplink packet access (HSDPA/HSUPA) techniques used in 3G WCDMA. The book is a very suitable introduction to the principles of CDMA communications for senior undergraduate and graduate students, as well researchers and engineers in industry who are looking to develop their expertise. A very clear and thorough description of the principles and applications of spread spectrum techniques in multi-user mobile communications. Matlab-based worked examples, exercises and practical sessions to clearly explain the theoretical concepts. An easy-to-read explanation of the air interface standards used in IS-95 A/B, cdma2000, and 3G WCDMA. Clear presentations of the high speed downlink and uplink packet access (HSDPA/HSUPA) techniques used in 3G WCDMA.

Fundamentals of Wireless Communication-David Tse 2005-05-26 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.

Multi-Carrier and Spread Spectrum Systems-K. Fazel 2004-02-06 Frequency spectrum is a limited and valuable resource for wireless communications. A good example can be observed among network operators in Europe for the prices to pay for UMTS-frequency bands. Therefore, the first goal when designing future wireless communication systems (e.g. 4G - fourth generation) has to be the increase in spectral efficiency. The development in digital communications in the past years has enabled efficient modulation and coding techniques for robust and spectral efficient data, speech, audio and video transmission. These are the multi-carrier modulation (e.g. OFDM) and the spread spectrum technique (e.g. DS-CDMA), where OFDM was chosen for broadcast applications (DVB, DAB) as well as for broadband wireless indoor standards (ETSI HIPERLAN-II, IEEE-802.11) and the DS-CDMA was selected in mobile communications (IS-95, third generation mobile radio systems world wide, UMTS/JMT 2000). Since 1993 various combinations of multi-carrier (MC) modulation and the spread spectrum (SS) technique have been introduced and the field of MC-SS communications has become an independent and important research topic with increasing activities. New application fields have been proposed such as high rate cellular mobile, high rate wireless indoor and LMDS. It has been shown that MC-SS offers the high spectral efficiency, robustness and flexibility that is required for the next generation systems. Meanwhile, different alternative hybrid schemes such as OFDM/OFDMA, MC-TDMA, etc. have been deeply analysed and adopted in different international standards (ETSI-BRAN, IEEE-802 & MMAC). Multi-Carrier & Spread-Spectrum: Analysis of Hybrid Air Interfaces draws together all of the above mentioned hybrid schemes therefore providing a greatly needed resource for system engineers, telecommunication designers and researchers in order to enable them to develop, build and deploy several schemes based on MC-transmission for the next generation systems (which will be an integration of broadband multimedia services covering both 4G mobile and fixed wireless systems). * Offers a complete treatment of multi-carrier, spread-spectrum (SS) and time division multiplexing (TDM) techniques * Provides an in-depth insight into hybrid multiple access techniques based on multi-carrier (MC) transmission * Presents numerous hybrid multiple access and air interface architectures including OFDM/CDMA, MC-CDMA, MC-DS-CDMA and MT-CDMA * Covers new techniques such as space-time coding and software radio Telecommunications engineers, hardware & software system designers and researchers as well as students, lecturers and technicians will all find this an invaluable addition to their bookshelf.

Signal Processing, Perceptual Coding, and Watermarking of Digital Audio-Xing He 2011-04-30 "This book focuses on watermarking, in which data is marked with hidden ownership information, as a promising solution to copyright protection issues and deals with understanding human perception processes and including them in effective psychoacoustic models"--

Principles of Mobile Communication-Gordon L. Stüber 2013-03-09 Principles of Mobile Communication provides an authoritative treatment of the fundamentals of mobile communications, one of the fastest growing areas of the modern telecommunications industry. The book stresses the fundamentals of mobile communications engineering that are important for the design of any mobile system. Less emphasis is placed on the description of existing and proposed wireless standards. This focus on fundamental issues should be of benefit not only to students taking formal instruction but also to practising engineers who are likely to already have a detailed familiarity with the standards and are seeking to deepen their knowledge of this important field. The book stresses mathematical modeling and analysis, rather than providing a qualitative overview. It has been specifically developed as a textbook for graduate level instruction and a reference book for practising engineers and those seeking to pursue research in the area. The book contains sufficient background material for the novice, yet enough advanced material for a sequence of graduate level courses. Principles of Mobile Communication treats a variety of contemporary issues, many of which have been treated before only in the journals. Some material in the book has never appeared before in the literature. The book provides an up-to-date treatment of the subject area at a level of detail that is not available in other books. Also, the book is unique in that the whole range of topics covered is not presently available in any other book. Throughout the book, detailed derivations are provided and extensive references to the literature are made. This is of value to the reader wishing to gain detailed knowledge of a particular topic.

Fundamentals of Spread Spectrum Modulation-Rodger E. Ziemer 2007 This lecture covers the fundamentals of spread spectrum modulation, which can be defined as any modulation technique that requires a transmission bandwidth much greater than the modulating signal bandwidth, independently of the bandwidth of the modulating signal. After reviewing basic digital modulation techniques, the principal forms of spread spectrum modulation are described. One of the most important components of a spread spectrum system is the spreading code, and several types and their characteristics are described. The most essential operation required at the receiver in a spread spectrum system is the code synchronization, which is usually broken down into the operations of acquisition and tracking. Means for performing these operations are discussed next. Finally, the performance of spread spectrum systems is of fundamental interest and the effect of jamming is considered, both without and with the use of forward error correction coding. The presentation ends with consideration of spread spectrum systems in the presence of other users.

Principles of Spread-Spectrum Communication Systems-Don Torrieri 2008-11-01 Originally adopted in military networks as a means of ensuring secure communication when confronted with the threats of jamming and interception, spread-spectrum systems are now the core of commercial applications such as mobile cellular and satellite communication. This book provides a concise but lucid explanation and derivation of the fundamentals of spread-spectrum communication systems. The level of presentation is suitable for graduate students with a prior graduate-level course in digital communication and for practicing engineers with a solid background in the theory of digital communication. As the title indicates, the author focuses on principles rather than specific current or planned systems. Although the exposition emphasizes theoretical principles, the choice of specific topics is tempered by their practical significance and interest to both researchers and system designers. Throughout the book, learning is facilitated by many new or streamlined derivations of the classical theory. Problems at the end of each chapter are intended to assist readers in consolidating their knowledge and to provide practice in analytical techniques. Principles of Spread-Spectrum Communication Systems is largely self-contained mathematically because of the four appendices, which give detailed derivations of mathematical results used in the main text.

Communication systems-Athol Bruce Carlson 1981

Communication Systems Principles Using MATLAB-John W. Leis 2018-07-31 Discover the basic telecommunications systems principles in an accessible learn-by-doing format Communication Systems Principles Using MATLAB covers a variety of systems principles in telecommunications in an accessible format without the need to master a large body of theory. The text puts the focus on topics such as radio and wireless modulation, reception and transmission, wired networks and fiber optic communications. The book also explores packet networks and TCP/IP as well as digital source and channel coding, and the fundamentals of data encryption. Since MATLAB® is widely used by telecommunications engineers, it was chosen as the vehicle to demonstrate many of the basic ideas, with code examples presented in every chapter. The text addresses digital communications with coverage of packet-switched networks. Many fundamental concepts such as routing via shortest-path are introduced with simple and concrete examples. The treatment of advanced telecommunications topics extends to OFDM for wireless modulation, and public-key exchange algorithms for data encryption. Throughout the book, the author puts the emphasis on understanding rather than memorization. The text also: Includes many useful take-home skills that can be honed while studying each aspect of telecommunications Offers a coding and experimentation approach with many real-world examples provided Gives information on the underlying theory in order to better understand conceptual developments Suggests a valuable learn-by-doing approach to the topic Written for students of telecommunications engineering, Communication Systems Principles Using MATLAB® is the hands-on resource for mastering the basic concepts of telecommunications in a learn-by-doing format.

Automatic Modulation Classification-Zhechen Zhu 2015-02-16 Automatic Modulation Classification (AMC) has been a key technology in many military, security, and civilian telecommunication applications for decades. In military and security applications, modulation often serves as another level of encryption; in modern civilian applications, multiple modulation types can be employed by a signal transmitter to control the data rate and link reliability. This book offers comprehensive documentation of AMC models, algorithms and implementations for successful modulation recognition. It provides an invaluable theoretical and numerical comparison of AMC algorithms, as well as guidance on state-of-the-art classification designs with specific military and civilian applications in mind. Key Features: Provides an important collection of AMC algorithms in five major categories, from likelihood-based classifiers and distribution-test-based classifiers to feature-based classifiers, machine learning assisted classifiers and blind modulation classifiers Lists detailed implementation for each algorithm based on a unified theoretical background and a comprehensive theoretical and numerical performance comparison Gives clear guidance for the design of specific automatic modulation classifiers for different practical applications in both civilian and military communication systems Includes a MATLAB toolbox on a companion website offering the implementation of a selection of methods discussed in the book

Multi-Carrier Spread Spectrum & Related Topics-Khaled Fazel 2012-12-06 Khaled Fazel Stefan Kaiser Digital Microwave Systems German Aerospace Center (DLR) Bosch Telecom GmbH Institute for Communications Technology D-71522 Backnang, Germany D-82234 Wessling, Germany In this last decade of this millennium the technique of multi-carrier transmission for wireless broadband multimedia applications has been receiving wide interests. Its first great success was in 1990 as it was selected in the European Digital Audio Broadcasting (DAB) standard. Its further prominent successes were in 1995 and 1998 as it was selected as modulation scheme in the European Digital Video Broadcasting (DVB-T) and in three broadband wireless indoor standards, namely ETSI-Hiperlan-II, American IEEE-802. 11 and Japanese MMAC, respectively. The benefits and success of multi-carrier (MC) modulation in one side and the flexibility offered by spread spectrum (SS) technique in other hand motivated many researchers to investigate the combination of both techniques, known as multi-carrier spread-spectrum (MC-SS). This combination benefits from the main advantages of both systems and offers high flexibility, high spectral efficiency, simple detection strategies, narrow band interference rejection capability, etc. . The basic principle of this combination is straightforward: The spreading is performed as direct SS (DS-SS) but instead of transmitting the chips over a single sequence carrier, several sub-carriers could be employed. As depicted in Figure 1, after spreading with assigned user specific code of processing gain G the frequency mapping and multi-carrier modulation is applied. In the receiver side after multi-carrier demodulation and frequency de-mapping, the corresponding detection algorithm will be performed.

Principles of Spread-spectrum Communication Systems-Don J. Torrieri 2018 This thoroughly revised textbook provides the fundamentals of spread-spectrum systems with a continued emphasis on theoretical principles. The revision includes new sections and appendices on characteristic functions and Laplace transforms, orthonormal expansions of functions, the SNR wall in detection, multiple-input multiple-output systems, multicode and multirate systems, interference cancelers, complementary codes, chaos and ultrawideband systems, and the normalized LMS algorithm. As with previous editions, the author presents topics in a practical way that is of interest to both researchers and system designers. He includes updated problems at the end of each chapter, which are intended to assist readers in consolidating their knowledge and to provide practice in analytical techniques. In addition to the new and revised material, the author adds 50 new pages to make the book more accessible to graduate students in electrical engineering.

The Evolution of Untethered Communications-National Research Council 1998-01-01 In response to a request from the Defense Advanced Research Projects Agency, the committee studied a range of issues to help identify what strategies the Department of Defense might follow to meet its need for flexible, rapidly deployable communications systems. Taking into account the military's particular requirements for security, interoperability, and other capabilities as well as the extent to which commercial technology development can be expected to support these and related needs, the book recommends systems and component research as well as organizational changes to help the DOD field state-of-the-art, cost-effective untethered communications systems. In addition to advising DARPA on where its investment in information technology for mobile wireless communications systems can have the greatest impact, the book explores the evolution of wireless technology, the often fruitful synergy between commercial and military research and development efforts, and the technical challenges still to be overcome in making the dream of "anytime, anywhere" communications a reality.

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.

Fundamentals of Communication Systems-John G. Proakis 2014 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.

Digital Communication-Apurba Das 2010-08-02 "Digital Communications" presents the theory and application of the philosophy of Digital Communication systems in a unique but lucid form. The book inserts equal importance to the theory and application aspect of the subject whereby the authors selected a wide class of problems. The Salient features of the book are: 1. The foundation of Fourier series, Transform and wavelets are introduced in a unique way but in lucid language. 2. The application area is rich and resemblance to the present trend of research, as we are attached with those areas professionally. 3. Elegant exercise section is designed in such a way that, the readers can get the flavor of the subject and get attracted towards the future scopes of the subject. 4. Unparallel tabular, flow chart based and pictorial methodology description will be there for sustained impression of the proposed design/algorithms in mind.

Principles of Digital Communication-Robert G. Gallager 2008-02-28 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.

Wireless Communications-Andrea Goldsmith 2005-08-08 Wireless technology is a truly revolutionary paradigm shift, enabling multimedia communications between people and devices from any location. It also underpins exciting applications such as sensor networks, smart homes, telemedicine, and automated highways. This book provides a comprehensive introduction to the underlying theory, design techniques and analytical tools of wireless communications, focusing primarily on the core principles of wireless system design. The book begins with an overview of wireless systems and standards. The characteristics of the wireless channel are then described, including their fundamental capacity limits. Various modulation, coding, and signal processing schemes are then discussed in detail, including state-of-the-art adaptive modulation, multicarrier, spread spectrum, and multiple antenna techniques. The concluding chapters deal with multiuser communications, cellular system design, and ad-hoc network design. Design insights and tradeoffs are emphasized throughout the book. It contains many worked examples, over 200 figures, almost 300 homework exercises, over 700 references, and is an ideal textbook for students.

Code Division Multiple Access Communications-Savo G. Glisic 2012-12-06 Code Division Multiple Access (CDMA) has become one of the main candidates for the next generation of mobile land and satellite communication systems. CDMA is based on spread spectrum techniques, which have been used in military applications for over half a century. Only recently, however, has it been recognised that spread spectrum techniques, combined with some additional steps, can provide higher capacity and better flexibility for the mobile cellular radio communications. Code Division Multiple Access Communications comprises a set of contributions from the most distinguished world scientists in the field. These papers review the basic theory and some of the most important problems related to spread spectrum and CDMA. The topics covered centre on the information theory aspects of CDMA; interference suppression and performance analysis. The material presented in this book summarises the main problems in modern CDMA theory and practice and gives a solid starting point for studying this complex and still challenging field. As such Code Division Multiple Access Communications is essential reading for all researchers and designers working in mobile communication systems and provides an excellent text for a course on the subject.

Spread Spectrum Techniques-Robert C. Dixon 1976-11-01

Digital Communication-Edward A. Lee 2012-12-06 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 multiplexing, multiple access, and synchronization issues relevant to constructing communication networks that simultaneously transport bit streams from many users. The material in this book is thus directly relevant to the design of a multitude of digital communication systems, including for example local and metropolitan area data networks, voice and video telephony systems, the integrated services digital network (ISDN), computer communication systems, voiceband data modems, and satellite communication systems. We extract the common principles underlying these and other applications and present them in a unified framework. This book is intended for designers and would-be designers of digital communication systems. To limit the scope to manageable proportions we have had to be selective in the topics covered and in the depth of coverage. In the case of advanced information, coding, and detection theory, for example, we have not tried to duplicate the in-depth coverage of many advanced textbooks, but rather have tried to cover those aspects directly relevant to the design of digital communication systems.

Short-range Wireless Communication-Alan Bensky 2004-03-05 The Complete "Tool Kit for the Hottest Area in RF/Wireless Design! Short-range wireless—communications over distances of less than 100 meters—is the most rapidly growing segment of RF/wireless engineering. Alan Bensky is an internationally recognized expert in short-range wireless, and this new edition of his bestselling book is completely revised to cover the latest developments in this fast moving field. You'll find coverage of such cutting-edge topics as: • architectural trends in RF/wireless integrated circuits • compatibility and conflict issues between different short-range wireless systems • Zigbee and related new IEEE standards for short-range communications • latest U.S. and international regulatory standards for spread spectrum, ultra wideband, and other advanced communications techniques Alan Bensky also thoroughly discusses the fundamentals of radio signal propagation, communications protocols and modulation methods, information theory, antennas and transmission lines, receivers, transmitters, radio system design, and how to successfully implement a short-range wireless system. All material has been carefully updated and revised to make it as technically up-to-the-minute as possible. You'll also find coverage of Bluetooth, "Wi-Fi and related 802.11 variants, digital modulation methods, and other essential information for planning and designing short-range wireless hardware and networks. This new edition will, like the first edition, be an invaluable reference for engineers and technical professionals who design, support, market, and maintain short-range wireless communications systems. No other book contains EVERYTHING pertaining to short-range wireless design. Covers all the hot topics like 802.11, Zigbee, Wi-Fi and Bluetooth.

Principles of Secure Communication Systems-Don J. Torrieri 1992 Presents the latest techniques with a view towards practical applications. The book delivers an analytical study of communication theory and other disciplines that have special relevance to secure communication systems and concentrates on principles, concepts and systems-level analyses.

Digital Underwater Acoustic Communications-Lufen Xu 2016-09-16 Digital Underwater Acoustic Communications focuses on describing the differences between underwater acoustic communication channels and radio channels, discusses loss of transmitted sound in underwater acoustic channels, describes digital underwater acoustic communication signal processing, and provides a comprehensive reference to digital underwater acoustic communication equipment. This book is designed to serve as a reference for postgraduate students and practicing engineers involved in the design and analysis of underwater acoustic communications systems as well as for engineers involved in underwater acoustic engineering. Introduces the basics of underwater acoustics, along with the advanced functionalities needed to achieve reliable communications in underwater environment

Identifies challenges in underwater acoustic channels relative to radio channels, underwater acoustic propagation, and solutions Shows how multi-path structures can be thought of as time diversity signals Presents a new, robust signal processing system, and an advanced FH-SS system for multimedia underwater acoustic communications with moderate communication ranges (above 20km) and rates (above 600bps) Describes the APNFM system for underwater acoustic communication equipment (including both civil and military applications), to be employed in active sonar to improve its performance

Principles of Communication Systems Simulation with Wireless Applications-William H. Tranter 2004 This volume presents an overview of computer-based simulation models and methodologies for communication systems. Topics covered include probability, random, process, and estimation theory and roles in the design of computer-based simulations.

Codes, Graphs, and Systems-G. David Forney 2002-03-31 Foreword by James L. Massey. Codes, Graphs, and Systems is an excellent reference for both academic researchers and professional engineers working in the fields of communications and signal processing. A collection of contributions from world-renowned experts in coding theory, information theory, and signal processing, the book provides a broad perspective on contemporary research in these areas. Survey articles are also included. Specific topics covered include convolutional codes and turbo codes; detection and equalization; modems; physics and information theory; lattices and geometry; and behaviors and codes on graphs. Codes, Graphs, and Systems is a tribute to the leadership and profound influence of G. David Forney, Jr. The 35 contributors to the volume have assembled their work in his honor.

Theory of Code Division Multiple Access Communication-Kamil Sh. Zigangirov 2004-04-13 A comprehensive

introduction to CDMA theory and application Code division multiple access (CDMA) communication is rapidly replacing time- and frequency-division methods as the cornerstone of wireless communication and mobile radio. Theory of Code Division Multiple Access Communication provides a lucid introduction and overview of CDMA concepts and methods for both the professional and the advanced student. Emphasizing the role CDMA has played in the development of wireless communication and cellular mobile radio systems, the author leads you through the basic concepts of mobile radio systems and considers the different principles of multiple access-time division, frequency division, and code division. He then analyzes three major CDMA systems-direct sequence (DS) CDMA systems, frequency hopped (FH) CDMA systems, and pulse position hopped (PPH) CDMA systems. Other topics covered include: * Spread spectrum (SS) technology * Forward error control coding * CDMA communication on fading channels * Pseudorandom signals * Information theory in relation to CDMA communication * CDMA cellular networks Complete with useful appendices providing analyses of the moments of CDMA system decision statistics, Theory of Code Division Multiple Access Communication is a ready reference for every engineer seeking an understanding of the history and concepts of this key communications technology.

Wireless Communications: Principles And Practice, 2/E-Rappaport Theodore S. 2010-09

The Selfish Gene-Richard Dawkins 1989 An ethologist shows man to be a gene machine whose world is one of savage competition and deceit