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Modelling the Wireless Propagation Channel - Fernando Pérez Fontán 2008-09-15

A practical tool for propagation channel modeling with MATLAB® simulations. Many books on wireless propagation channel provide a highly theoretical coverage, which for some interested readers, may be difficult to follow. This book takes a very practical approach by introducing the theory in each chapter first, and then carrying out simulations showing how exactly put the theory into practice. The resulting plots are analyzed and commented for clarity, and conclusions are drawn and explained from the obtained results. Key features include: A unique approach to propagation channel modeling with accompanying MATLAB® simulations to demonstrate the theory in practice Contains step by step commentary and analysis of the obtained simulation results in order to provide a comprehensive and structured learning tool Covers a wide range of topics including shadowing effects, coverage and interference, Multipath Narrowband channel, Multipath Wideband channel, propagation in micro and pico-cells, the land mobile satellite (LMS) channel, the directional Multipath channel and MIMO and propagation effects in fixed radio links (terrestrial and satellite) The book comes with an accompanying website that contains the MATLAB® simulations and allows readers to try them out themselves Well suited for lab-use, as reference and as a self-learning tool both for advanced students and professionals Modeling the Wireless Propagation Channel: A simulation approach with MATLAB® will be best suited for postgraduate (Masters and PhD) students and practicing engineers in telecommunications and electrical engineering fields, who are seeking to familiarise themselves with the topic without too many formulas. The book will also be of interest to network engineers, system engineers and researchers

Understanding LTE with MATLAB - Houman Zarrinkoub 2014-01-28

An introduction to technical details related to the Physical Layer of the LTE standard with MATLAB® The LTE (Long Term Evolution) and LTE-Advanced are among the latest mobile communications standards, designed to realize the dream of a truly global, fast, all-IP-based, secure broadband mobile access technology. This book examines the Physical Layer (PHY) of the LTE standards by incorporating three conceptual elements: an overview of the theory behind key enabling technologies; a concise discussion regarding standard specifications; and the MATLAB® algorithms needed to simulate the standard. The use of MATLAB®, a widely used technical computing language, is one of the distinguishing features of this book. Through a series of MATLAB® programs, the author explores each of the enabling technologies, pedagogically synthesizes an LTE PHY system model, and evaluates system performance at each stage. Following this step-by-step process, readers will achieve deeper understanding of LTE concepts and specifications through simulations. Key Features: • Accessible, intuitive, and progressive; one of the few books to focus primarily on the modeling, simulation, and implementation of the LTE PHY standard • Includes case studies and test benches in MATLAB®, which build knowledge gradually and incrementally until a functional specification for the LTE PHY is attained • Accompanying Web site includes all MATLAB® programs, together

with PowerPoint slides and other illustrative examples Dr Houman Zarrinkoub has served as a development manager and now as a senior product manager with MathWorks, based in Massachusetts, USA. Within his 12 years at MathWorks, he has been responsible for multiple signal processing and communications software tools. Prior to MathWorks, he was a research scientist in the Wireless Group at Nortel Networks, where he contributed to multiple standardization projects for 3G mobile technologies. He has been awarded multiple patents on topics related to computer simulations. He holds a BSc degree in Electrical Engineering from McGill University and MSc and PhD degrees in Telecommunications from the Institut Nationale de la Recherche Scientifique, in Canada.

<http://www.wiley.com/go/zarrinkoub> www.wiley.com/go/zarrinkoub/a

Proceedings of the Second International Conference on Computer and Communication Technologies - Suresh Chandra Satapathy 2015-09-03

The book is about all aspects of computing, communication, general sciences and educational research covered at the Second International Conference on Computer & Communication Technologies held during 24-26 July 2015 at Hyderabad. It hosted by CMR Technical Campus in association with Division - V (Education & Research) CSI, India. After a rigorous review only quality papers are selected and included in this book. The entire book is divided into three volumes. Three volumes cover a variety of topics which include medical imaging, networks, data mining, intelligent computing, software design, image processing, mobile computing, digital signals and speech processing, video surveillance and processing, web mining, wireless sensor networks, circuit analysis, fuzzy systems, antenna and communication systems, biomedical signal processing and applications, cloud computing, embedded systems applications and cyber security and digital forensic. The readers of these volumes will be highly benefited from the technical contents of the topics.

Digital Communication Systems Using MATLAB and Simulink - Dennis Silage 2009

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.

Problem-Based Learning in Communication Systems Using MATLAB and Simulink - Kwonhue Choi 2016-02-10

Designed to help teach and understand communication systems using a classroom-tested, active learning approach. Discusses communication concepts and algorithms, which are explained using simulation projects, accompanied by MATLAB and Simulink Provides step-by-step code exercises and instructions to implement execution sequences Includes a companion website that has MATLAB and Simulink model samples and templates

Emerging Technologies for Health and Medicine - Dac-Nhuong Le 2018-10-02

With the current advances in technology innovation, the field of medicine and healthcare is rapidly expanding and, as a result, many different areas of human health diagnostics, treatment and care are emerging. Wireless technology is getting faster and 5G mobile technology allows the Internet of Medical Things (IoMT) to greatly improve patient care and more effectively prevent illness from developing. This book provides an overview and review of the current and anticipated changes in medicine and healthcare due to new technologies and faster communication between users and devices. This groundbreaking book presents state-of-the-art chapters on many subjects including: A review of the implications of VR and AR healthcare applications A review of current augmenting dental care An overview of typical human-computer interaction (HCI) that can help inform the development of user interface designs and novel ways to evaluate human behavior to responses in virtual reality (VR) and other new technologies A review of telemedicine technologies Building empathy in young children using augmented reality AI technologies for mobile health of stroke monitoring & rehabilitation robotics control Mobile doctor brain AI App An artificial intelligence mobile cloud computing tool Development of a robotic teaching aid for disabled children Training system design of lower limb rehabilitation robot based on virtual reality

Simulating Wireless Communication Systems - C. Britton Rorabaugh 2004-06-17

Simulating Wireless Communication Systems: Practical Models in C++ C. Britton Rorabaugh The practical, inclusive reference for engineers simulating wireless systems In order to keep prices within reach of the average consumer, cellular phone and wireless data transceiver manufacturers resort to mass producing millions of units from a single design. Considering the design complexity and fabrication expense involved, typical prototyping is not practical—designs must first be tested and honed using simulation. Author C. Britton Rorabaugh brings to the table more than 20 years of experience simulating large, state-of-the-art communications systems. In Simulating Wireless Communication Systems, Rorabaugh explores, using C++, practical and authoritative techniques for simulating even the most complex wireless communication systems. Along the way he shows you how to create custom simulations that fit your project's intended design, so that you and your engineering team aren't forced to resort to inadequate commercial simulation packages. This book includes nearly two hundred models of practical devices for implementing wireless communication systems and major subsystems. Mathematical and statistical appendices are also included to provide useful information for those seeking to understand, set up, and use any of Rorabaugh's detailed device models. Contents include: A background and overview of simulation Discussion of a variety of model types, including Random Process, Filter, and Channel models Practical modulation and demodulation Synchronization, signal shifting, and recovery Detailed instructions for working with Galois fields A comprehensive companion Web site featuring dozens of ready-to-run software modules If you're an engineer or wireless communication project manager, then Simulating Wireless Communication Systems: Practical Models in C++ will prove to be both a convenient reference and an ideal instructional manual for the creation of specialized wireless communication simulations that will enable you to bring your product to market in a cost-effective and efficient manner. C. BRITTON RORABAUGH has a BS and MS in Electrical Engineering from Drexel University and currently holds the position of Chief Scientist for a company that develops and manufactures specialized military communications equipment. He is the author of several publications on topics such as DSP, Digital Filters, and Error Coding and has experience in object-oriented design, realtime software, numerical methods, computer graphics, C++, C, SPW, MATLAB®, Visio®, TEX/LATEX, Microsoft® Office, and assembly languages for various microprocessors and DSP devices. ISBN: 0-13-022268-2 PRENTICE HALL Professional Technical Reference Upper Saddle River, NJ 07458 www.phptr.com © Copyright Pearson Education. All rights reserved.

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.

Technologies for the Wireless Future - Rahim Tafazolli 2006-05-01

This fully updated second volume of the highly successful WWRF Book of Visions is a unique and timely book, presenting up-to-the-minute ideas and trends in mobile communications. This is a comprehensive single point of reference, focusing on the specifications and requirements of 4G and identifying potential business models, the research areas and required spectrum and enabling technologies. Comprising material from White Papers edited within the working expert groups as well as those from the Vision Committee of WWRF, a top-down approach has been adopted starting from perceived users requirements and their expectations in the Future Wireless World.

Single Carrier FDMA - Hyung G. Myung 2008-12-08

Single Carrier Frequency Division Multiple Access (SC-FDMA) is a novel method of radio transmission under consideration for deployment in future cellular systems; specifically, in 3rd Generation Partnership Project Long Term Evolution (3GPP LTE) systems. SC-FDMA has drawn great attention from the communications industry as an attractive alternative to Orthogonal Frequency Division Multiple Access (OFDMA). Introduction to Single Carrier FDMA places SC-FDMA in the wider context of wireless communications, providing the reader with an in-depth tutorial on SC-FDMA technology. The book introduces the reader to this new multiple access technique that utilizes single carrier modulation along with orthogonal frequency multiplexing and frequency domain equalization, plus its applications in communications settings. It considers the similarities with and differences from orthogonal frequency division modulation, multiplexing, and multiple access used extensively in cellular, broadcasting, and digital subscriber loop applications. Particular reference is made to the peak power characteristics of an SC-FDMA signal as an added advantage over OFDMA. Provides an extensive overview of the principles of SC-FDMA and its relation to other transmission techniques. Explains how the details of a specific implementation influence the tradeoffs among various figures of merit. Describes in detail the configuration of the SC-FDMA uplink transmission scheme published by 3GPP. Features link level simulation of an uplink SC-FDMA system using MATLAB. This is an essential text for industry engineers who are researching and developing 3GPP LTE systems. It is suitable for engineers designing wireless network equipment, handsets, data cards, modules, chipsets, and test equipment as well as those involved in designing LTE infrastructure. It would also be of interest to academics, graduate students, and industry researchers involved in advanced wireless communications, as well as business analysts who follow the cellular market.

Problem-Based Learning in Communication Systems Using MATLAB and Simulink -

Kwonhue Choi 2016-02-29

Designed to help teach and understand communication systems using a classroom-tested, active learning approach. Discusses communication concepts and algorithms, which are explained using simulation projects, accompanied by MATLAB and Simulink Provides step-by-step code exercises and instructions to implement execution sequences Includes a companion website that has MATLAB and Simulink model samples and templates (password: matlab)

Optical Wireless Communications - Z. Ghassemlooy 2017-07-12

Detailing a systems approach, Optical Wireless Communications: System and Channel Modelling with MATLAB®, is a self-contained volume that concisely and comprehensively covers the theory and technology of optical wireless communications systems (OWC) in a way that is suitable for undergraduate and graduate-level students, as well as researchers and professional engineers. Incorporating MATLAB® throughout, the authors highlight past and current research activities to illustrate optical sources, transmitters, detectors, receivers, and other devices used in optical wireless communications. They also discuss both indoor and outdoor environments, discussing how different factors—including various channel models—affect system performance and

mitigation techniques. In addition, this book broadly covers crucial aspects of OWC systems: Fundamental principles of OWC Devices and systems Modulation techniques and schemes (including polarization shift keying) Channel models and system performance analysis Emerging visible light communications Terrestrial free space optics communication Use of infrared in indoor OWC One entire chapter explores the emerging field of visible light communications, and others describe techniques for using theoretical analysis and simulation to mitigate channel impact on system performance. Additional topics include wavelet denoising, artificial neural networks, and spatial diversity. Content also covers different challenges encountered in OWC, as well as outlining possible solutions and current research trends. A major attraction of the book is the presentation of MATLAB simulations and codes, which enable readers to execute extensive simulations and better understand OWC in general.

Optical Wireless Communications - Z. Ghassemlooy 2019-04-30

The 2nd Edition of Optical Wireless Communications: System and Channel Modelling with MATLAB® with additional new materials, is a self-contained volume that provides a concise and comprehensive coverage of the theory and technology of optical wireless communication systems (OWC). The delivery method makes the book appropriate for students studying at undergraduate and graduate levels as well as researchers and professional engineers working in the field of OWC. The book gives a detailed description of OWC, focusing mainly on the infrared and visible bands, for indoor and outdoor applications. A major attraction of the book is the inclusion of Matlab codes and simulations results as well as experimental test-beds for free space optics and visible light communication systems. This valuable resource will aid the readers in understanding the concept, carrying out extensive analysis, simulations, implementation and evaluation of OWC links. This 2nd edition is structured into nine compact chapters that cover the main aspects of OWC systems: History, current state of the art and challenges Fundamental principles Optical source and detector and noise sources Modulation, equalization, diversity techniques Channel models and system performance analysis Visible light communications Terrestrial free space optics communications Relay-based free space optics communications Matlab codes. A number of Matlab based simulation codes are included in this 2nd edition to assist the readers in mastering the subject and most importantly to encourage them to write their own simulation codes and enhance their knowledge.

Novel Algorithms and Techniques in Telecommunications and Networking - Tarek Sobh 2010-01-30

Novel Algorithms and Techniques in Telecommunications and Networking includes a set of rigorously reviewed world-class manuscripts addressing and detailing state-of-the-art research projects in the areas of Industrial Electronics, Technology and Automation, Telecommunications and Networking. Novel Algorithms and Techniques in Telecommunications and Networking includes selected papers from the conference proceedings of the International Conference on Telecommunications and Networking (TeNe 08) which was part of the International Joint Conferences on Computer, Information and Systems Sciences and Engineering (CISSE 2008).

Channel Coding Techniques for Wireless Communications - K. Deerga Rao 2019-11-22

This book discusses the latest channel coding techniques, MIMO systems, and 5G channel coding evolution. It provides a comprehensive overview of channel coding, covering modern techniques such as turbo codes, low-density parity-check (LDPC) codes, space-time coding, polar codes, LT codes, and Raptor codes as well as the traditional codes such as cyclic codes, BCH, RS codes, and convolutional codes. It also explores MIMO communications, which is an effective method for high-speed or high-reliability wireless communications. It also examines the evolution of 5G channel coding techniques. Each of the 13 chapters features numerous illustrative examples for easy understanding of the coding techniques, and MATLAB-based programs are integrated in the text to enhance readers' grasp of the underlying theories. Further, PC-based MATLAB m-files for illustrative examples are included for students and researchers involved in advanced and current concepts of coding theory.

New Horizons in Mobile and Wireless Communications, Volume 1 - Alben Mihovska 2009

Based on cutting-edge research projects in the field, this book (part of a comprehensive 4-volume series) provides the latest details and covers the most impactful aspects of mobile, wireless, and broadband communications development. These books present key systems and enabling technologies in a clear and accessible manner, offering you a detailed roadmap the future evolution of next generation communications. Other volumes cover Networks, Services and Applications; Reconfigurability; and Ad Hoc Networks.

Wireless Power Transfer for Electric Vehicles: Foundations and Design Approach - Alicia Triviño-Cabrera 2019-09-19

This book describes the fundamentals and applications of wireless power transfer (WPT) in electric vehicles (EVs). Wireless power transfer (WPT) is a technology that allows devices to be powered without having to be connected to the electrical grid by a cable. Electric vehicles can greatly benefit from WPT, as it does away with the need for users to manually recharge the vehicles' batteries, leading to safer charging operations. Some wireless chargers are available already, and research is underway to develop even more efficient and practical chargers for EVs. This book brings readers up to date on the state-of-the-art worldwide. In particular, it provides:

- The fundamental principles of WPT for the wireless charging of electric vehicles (car, bicycles and drones), including compensation topologies, bi-directionality and coil topologies.
- Information on international standards for EV wireless charging.
- Design procedures for EV wireless chargers, including software files to help readers test their own designs.
- Guidelines on the components and materials for EV wireless chargers.
- Review and analysis of the main control algorithms applied to EV wireless chargers.
- Review and analysis of commercial EV wireless charger products coming to the market and the main research projects on this topic being carried out worldwide.

The book provides essential practical guidance on how to design wireless chargers for electric vehicles, and supplies MATLAB files that demonstrate the complexities of WPT technology, and which can help readers design their own chargers.

Software-Defined Radio for Engineers - Alexander M. Wyglinski 2018-04-30

Based on the popular Artech House classic, Digital Communication Systems Engineering with Software-Defined Radio, this book provides a practical approach to quickly learning the software-defined radio (SDR) concepts needed for work in the field. This up-to-date volume guides readers on how to quickly prototype wireless designs using SDR for real-world testing and experimentation. This book explores advanced wireless communication techniques such as OFDM, LTE, WLA, and hardware targeting. Readers will gain an understanding of the core concepts behind wireless hardware, such as the radio frequency front-end, analog-to-digital and digital-to-analog converters, as well as various processing technologies. Moreover, this volume includes chapters on timing estimation, matched filtering, frame synchronization message decoding, and source coding. The orthogonal frequency division multiplexing is explained and details about HDL code generation and deployment are provided. The book concludes with coverage of the WLAN toolbox with OFDM beacon reception and the LTE toolbox with downlink reception. Multiple case studies are provided throughout the book. Both MATLAB and Simulink source code are included to assist readers with their projects in the field.

Nonlinear Distortion in Wireless Systems - Khaled M. Gharaibeh 2011-12-30

This book covers the principles of modeling and simulation of nonlinear distortion in wireless communication systems with MATLAB simulations and techniques In this book, the author describes the principles of modeling and simulation of nonlinear distortion in single and multichannel wireless communication systems using both deterministic and stochastic signals. Models and simulation methods of nonlinear amplifiers explain in detail how to analyze and evaluate the performance of data communication links under nonlinear amplification. The book addresses the analysis of nonlinear systems with stochastic inputs and establishes the performance metrics of communication systems with regard to nonlinearity. In addition, the author also discusses the problem of how to embed models of distortion in system-level

simulators such as MATLAB and MATLAB Simulink and provides practical techniques that professionals can use on their own projects. Finally, the book explores simulation and programming issues and provides a comprehensive reference of simulation tools for nonlinearity in wireless communication systems. Key Features: Covers the theory, models and simulation tools needed for understanding nonlinearity and nonlinear distortion in wireless systems Presents simulation and modeling techniques for nonlinear distortion in wireless channels using MATLAB Uses random process theory to develop simulation tools for predicting nonlinear system performance with real-world wireless communication signals Focuses on simulation examples of real-world communication systems under nonlinearity Includes an accompanying website containing MATLAB code This book will be an invaluable reference for researchers, RF engineers, and communication system engineers working in the field. Graduate students and professors undertaking related courses will also find the book of interest.

Recent Developments in Electronics and Communication Systems - KVS Ramachandra Murthy 2023-01-31

Often, no single field or expert has all the information necessary to solve complex problems, and this is no less true in the fields of electronics and communications systems. Transdisciplinary engineering solutions can address issues arising when a solution is not evident during the initial development stages in the multidisciplinary area. This book presents the proceedings of RDECS-2022, the 1st international conference on Recent Developments in Electronics and Communication Systems, held on 22 and 23 July 2022 at Aditya Engineering College, Surampalem, India. The primary goal of RDECS-2022 was to challenge existing ideas and encourage interaction between academia and industry to promote the sort of collaborative activities involving scientists, engineers, professionals, researchers, and students that play a major role in almost all fields of scientific growth. The conference also aimed to provide an arena for showcasing advancements and research endeavors being undertaken in all parts of the world. A large number of technical papers with rich content, describing ground-breaking research from participants from various institutes, were submitted for presentation at the conference. This book presents 108 of these papers, which cover a wide range of topics ranging from cloud computing to disease forecasting and from weather reporting to the detection of fake news. Offering a fascinating overview of recent research and developments in electronics and communications systems, the book will be of interest to all those working in the field.

Understanding Communications Networks – for Emerging Cybernetics Applications - Kaveh Pahlavan 2022-09-01

Information networking has emerged as a multidisciplinary diversified area of research over the past few decades. From traditional wired telephony to cellular voice telephony and from wired access to wireless access to the Internet, information networks have profoundly impacted our lifestyles as they have undergone enormous growth. To understand this technology, students need to learn several disciplines and develop an intuitive feeling of how they interact with one another. To achieve this goal, the book describes important networking standards, classifying their underlying technologies in a logical manner and gives detailed examples of successful applications. The emergence of wireless access and dominance of the Ethernet in LAN technologies has shifted the innovations in networking towards the physical layer and characteristics of the medium. This book pays attention to the physical layer while we provide fundamentals of information networking technologies which are used in wired and wireless networks designed for local and wide area operations. The book provides a comprehensive treatment of the wired IEEE802.3 Ethernet, and Internet as well as ITU cellular 2G-6G wireless networks, IEEE 802.11 for Wi-Fi, and IEEE 802.15 for Bluetooth, ZigBee and ultra-wideband (UWB) technologies. The novelty of the book is that it places emphasis on physical communications issues related to formation and transmission of packets and characteristics of the medium for transmission in variety of networks. Material presented in the book will be beneficial for students of Electrical and Computer Engineering, Computer Science, Robotics

Engineering, Biomedical Engineering, or other disciplines who are interested in integration of navigation into their multi-disciplinary projects. The book provides examples with supporting MATLAB codes and hands-on projects throughout to improve the ability of the readers to understand and implement variety of algorithms.

Optical and Wireless Technologies - Vijay Janyani 2019-04-09

This volume presents selected papers from the 2nd International Conference on Optical and Wireless Technologies, conducted from 10th to 11th February, 2018. It focuses on extending the limits of currently used systems encompassing optical and wireless domains, and explores novel research on wireless and optical techniques and systems, describing practical implementation activities, results and issues. The book will serve as a valuable reference resource for academics and researchers across the globe.

Energy-Efficient Wireless Sensor Networks - Vidushi Sharma 2017-07-28

The advances in low-power electronic devices integrated with wireless communication capabilities are one of recent areas of research in the field of Wireless Sensor Networks (WSNs). One of the major challenges in WSNs is uniform and least energy dissipation while increasing the lifetime of the network. This is the first book that introduces the energy efficient wireless sensor network techniques and protocols. The text covers the theoretical as well as the practical requirements to conduct and trigger new experiments and project ideas. The advanced techniques will help in industrial problem solving for energy-hungry wireless sensor network applications.

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.

MIMO-OFDM Wireless Communications with MATLAB - Yong Soo Cho 2010-08-20

MIMO-OFDM is a key technology for next-generation cellular communications (3GPP-LTE, Mobile WiMAX, IMT-Advanced) as well as wireless LAN (IEEE 802.11a, IEEE 802.11n), wireless PAN (MB-OFDM), and broadcasting (DAB, DVB, DMB). In MIMO-OFDM Wireless Communications with MATLAB®, the authors provide a comprehensive introduction to the theory and practice of wireless channel modeling, OFDM, and MIMO, using MATLAB® programs to simulate the various techniques on MIMO-OFDM systems. One of the only books in the area dedicated to explaining simulation aspects Covers implementation to help cement the key concepts Uses materials that have been classroom-tested in numerous universities Provides the analytic solutions and practical examples with downloadable MATLAB® codes Simulation examples based on actual industry and research projects Presentation slides with key equations and figures for instructor use MIMO-OFDM Wireless Communications with MATLAB® is a key text for graduate students in wireless communications. Professionals and technicians in wireless communication fields, graduate students in signal processing, as well as senior undergraduates majoring in wireless communications will find this book a practical introduction to the MIMO-OFDM techniques. Instructor materials and MATLAB® code examples available for download at www.wiley.com/go/chomimo

Nonlinear Distortion in Wireless Systems - Khaled M. Gharaibeh 2011-12-07

This book covers the principles of modeling and simulation of nonlinear distortion in wireless communication systems with MATLAB simulations and techniques In this book, the author describes the principles of modeling and simulation of nonlinear distortion in single and multichannel wireless communication systems using both deterministic and stochastic signals. Models and simulation methods of nonlinear amplifiers explain in detail how to analyze and evaluate the performance of data communication links under nonlinear amplification. The book addresses the analysis of nonlinear systems with stochastic inputs and establishes the performance metrics of communication systems with regard to nonlinearity. In addition, the

author also discusses the problem of how to embed models of distortion in system-level simulators such as MATLAB and MATLAB Simulink and provides practical techniques that professionals can use on their own projects. Finally, the book explores simulation and programming issues and provides a comprehensive reference of simulation tools for nonlinearity in wireless communication systems. Key Features: Covers the theory, models and simulation tools needed for understanding nonlinearity and nonlinear distortion in wireless systems Presents simulation and modeling techniques for nonlinear distortion in wireless channels using MATLAB Uses random process theory to develop simulation tools for predicting nonlinear system performance with real-world wireless communication signals Focuses on simulation examples of real-world communication systems under nonlinearity Includes an accompanying website containing MATLAB code This book will be an invaluable reference for researchers, RF engineers, and communication system engineers working in the field. Graduate students and professors undertaking related courses will also find the book of interest.

Modeling of Digital Communication Systems Using SIMULINK - Arthur A. Giordano 2015-03-03
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.

Communication Systems Principles Using MATLAB - John W. Leis 2018-10-16
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.

Communication Systems Modeling and Simulation using MATLAB and Simulink - K. C. Raveendranathan 2011-09-07

This is probably the first book that employs the technique of simulation experiments as a means of reinforcing the basic concepts of communication theory. Undergraduate students are generally exposed to a mathematically rigorous treatment of communications theory but seldom have the benefit of a practical-orientated approach employing modelling and simulation for a thorough assimilation of the subject. This book can supplement any standard textbook to cover this significant lacuna in the existing learning methodology. It uses MATLAB®, the language of the technical computing fraternity, for the purpose. The introductory chapters provide an overview of computer simulation and MATLAB programming concepts. Thereafter, communications concepts are presented in the traditional manner but followed up with appropriate simulations in MATLAB/Simulink®. Relevant MATLAB source code is given whenever it is used to illustrate a point. All the source code given in the text has been tested on MATLAB kernel version 7.10 (Release R2010a) and is provided in the accompanying CD.

Design and Development of Affordable Healthcare Technologies - Bit, Arindam 2018-06-22
Technological advancements in the last few decades have significantly revolutionized the healthcare industry, resulting in life expectancy improvement in human beings. The use of automated machines in healthcare has reduced human errors and has notably improved disease diagnosis efficiency. Design and Development of Affordable Healthcare Technologies provides emerging research on biomedical instrumentation, bio-signal processing, and device development within the healthcare industry. This book provides insight into various subjects including patient monitoring, medical imaging, and disease classification. This book is a vital reference source for medical professionals, biomedical engineers, scientists, researchers, and medical students interested in the comprehensive research on the advancements in healthcare technologies.

Arduino meets MATLAB: Interfacing, Programs and Simulink - Rajesh Singh 2018-09-13

This book provides a single platform for beginners in systems engineering to start Arduino interface projects with MATLAB®. It covers the basics of the programming with Arduino and Arduino interfacing with MATLAB® (with and without the use of I/O packages) in 3 sections, respectively. Key features: -introduces readers to Arduino IDE, Proteus simulation modeling, Arduino interfaces with display devices, sensor interfaces (both digital and analog), actuators, MATLAB® GUIs, digital read/write systems with I/O interfaces and automation systems. - organized layout for a reader friendly experience -provides detailed circuit diagrams -provides relevant simulation modeling instructions This is an ideal book for engineering students and system designers for learning the basic programming and simulation of Arduino and MATLAB® based real time project prototypes.

5G Wireless Technologies - Angeliki Alexiou 2017-06-08

Mobile data traffic is expected to exceed traffic from wired devices in the next couple of years. This book presents a roadmap of 5G, from advanced radio technologies to innovative resource management approaches and novel network architectures and system concepts.

Principles of Wireless Access and Localization - Kaveh Pahlavan 2013-09-03

A comprehensive, encompassing and accessible text examining a wide range of key Wireless Networking and Localization technologies This book provides a unified treatment of issues related to all wireless access and wireless localization techniques. The book reflects principles of design and deployment of infrastructure for wireless access and localization for wide, local, and personal networking. Description of wireless access methods includes design and deployment of traditional TDMA and CDMA technologies and emerging Long Term Evolution (LTE) techniques

for wide area cellular networks, the IEEE 802.11/WiFi wireless local area networks as well as IEEE 802.15 Bluetooth, ZigBee, UltraWideband (UWB), RF Microwave and body area networks used for sensor and ad hoc networks. The principles of wireless localization techniques using time-of-arrival and received-signal-strength of the wireless signal used in military and commercial applications in smart devices operating in urban, indoor and inside the human body localization are explained and compared. Questions, problem sets and hands-on projects enhance the learning experience for students to understand and appreciate the subject. These include analytical and practical examples with software projects to challenge students in practically important simulation problems, and problem sets that use MatLab. Key features: Provides a broad coverage of main wireless technologies including emerging technical developments such as body area networking and cyber physical systems. Written in a tutorial form that can be used by students and researchers in the field. Includes practical examples and software projects to challenge students in practically important simulation problems.

Wireless Communication Systems in Matlab - Mathuranathan Viswanathan 2020-06-08

* A learner-friendly, practical and example driven book, *Wireless Communication Systems in Matlab* gives you a solid background in building simulation models for wireless systems in Matlab. This book, an essential guide for understanding the basic implementation aspects of a wireless system, shows how to simulate and model such a system from scratch. The implemented simulation models shown in this book, provide an opportunity for an engineer to understand the basic implementation aspects of modeling various building blocks of a wireless communication system. It presents the following key topics with the required theoretical background, along with the implementation details in the form of Matlab scripts. * Random variables for simulating probabilistic systems and applications like Jakes filter design and colored noise generation. * Models for Shannon's channel capacity, unconstrained AWGN channel, binary symmetric channel (BSC), binary erasure channel (BEC), constellation constrained capacities and ergodic capacity over fading channel. The theory of linear block codes, decoding techniques using soft-decisions and hard-decisions, and their performance simulations. * Monte Carlo simulation for ascertaining performance of digital modulation techniques in AWGN and fading channels - E_b/N_0 Vs BER curves. Pulse shaping techniques, matched filtering and partial response signaling, Design and implementation of linear equalizers - zero forcing and MMSE equalizers, using them in a communication link and modulation systems with receiver impairments. * Large-scale propagation models like Friis free space model, log distance model, two ray ground reflection model, single knife-edge diffraction model, Hata Okumura model. * Essentials of small-scale propagation models for wireless channels, such as, power delay profile, Doppler power spectrum, Rayleigh and Rice processes. Modeling flat fading and frequency selective channels. * Diversity techniques for multiple antenna systems: Alamouti space-time coding, maximum ratio combining, equal gain combining and selection combining. * Simulation models for direct sequence spread spectrum, frequency hopping spread spectrum and OFDM.

FPGA-based Digital Convolution for Wireless Applications - Lei Guan 2017-01-16

This book presents essential perspectives on digital convolutions in wireless communications systems and illustrates their corresponding efficient real-time field-programmable gate array (FPGA) implementations. FPGAs or generic all programmable devices will soon become widespread, serving as the "brains" of all types of real-time smart signal processing systems, like smart networks, smart homes and smart cities. The book examines digital convolution by bringing together the following main elements: the fundamental theory behind the mathematical formulae together with corresponding physical phenomena; virtualized algorithm simulation together with benchmark real-time FPGA implementations; and detailed, state-of-the-art case studies on wireless applications, including popular linear convolution in digital front ends (DFEs); nonlinear convolution in digital pre-distortion (DPD) enabled high-efficiency wireless RF transceivers; and fast linear convolution in massive multiple-input multiple-output (MIMO) systems. After reading this book, students and professionals will be able to: · Understand digital

convolution with inside-out information: discover what convolution is, why it is important and how it works. · Enhance their FPGA design skills, i.e., enhance their FPGA-related prototyping capability with model-based hands-on examples. · Rapidly expand their digital signal processing (DSP) blocks: to examine how to rapidly and efficiently create (DSP) functional blocks on a programmable FPGA chip as a reusable intellectual property (IP) core. · Upgrade their expertise as both "thinkers" and "doers": minimize/close the gap between mathematical equations and FPGA implementations for existing and emerging wireless applications.

Problem-Based Learning in Communication Systems Using MATLAB and Simulink - Elliott Edling 2017-05-03

This book covers the basic concepts of signals, and analog and digital communications, to more complex simulations in communication systems. *Problem-Based Learning in Communication Systems Using MATLAB and Simulink* begins by introducing MATLAB and Simulink to prepare readers who are unfamiliar with these environments in order to tackle projects and exercises included in this book. Discussions on simulation of signals, filter design, sampling and reconstruction, and analog communications are covered next. The book concludes by covering advanced topics such as Viterbi decoding, OFDM and MIMO. In addition, this book contains examples of how to convert waveforms, constructed in simulation, into electric signals. It also includes problems illustrating how to complete actual wireless communications in the band near ultrasonic frequencies.

Technologies for the Wireless Future - Klaus David 2008-09-15

The third volume of the influential WWRF Book of Visions of research and trends in mobile communications has been fully updated. It includes three new chapters on flexible spectrum use, ultra-broadband convergent home-area networks, and the system concept. Visions from manufacturers, network operators, research institutes and academia from all over world are captured by the WWRF in one comprehensive single point of reference. *Technologies for the Wireless Future, Volume 3* describes the expectations and requirements of a user in the 'future wireless world' between 2010 and 2017. This will enable readers to prioritise research topics based on the provision of cost-effective solutions. This book is ideal for researchers from both academia and industry, as well as engineers, managers, strategists, and regulators. WWRF has become highly influential on the future of wireless communication. You can see the evidence already, as many of the concepts described in the very first Book of Vision have been adopted in today's wireless implementations. The organization brings together the long-range views of academia with the practical constraints and requirements of industry. This is a powerful combination. Mark Pecun, Vice President, Research In Motion Limited The WWRF Book of Vision series of books are an invaluable source of information for key thoughts and technology developments in wireless and mobile communication. The comprehensiveness and diversified nature of its research reports and results can prove to be a very useful tool in planning and developing the next generation network and services. Bill Huang, General Manager, China Mobile Research As mobile broadband becomes part of our daily lives, in the same way that mobile telephony has done, and helps us to support important issues such as health care, education and many other priorities, WWRF is again exploring the options for mobile and wireless systems in its' third edition of the Book of Visions. Earlier versions have helped to reach global consensus on research objectives, reduce investment risk and generate critical mass in research efforts. The third book of visions provides key insights into the international academic and commercial discussion on tomorrow's hot topics in mobile research! Håkan Eriksson, Senior Vice President, CTO, Ericsson

Smart Antennas for Wireless Communications - Frank Gross 2005-10-05

Smart antennas boost the power of a wireless network, saving energy and money and greatly increasing the range of wireless broadband. *Smart Antennas* is a rigorous textbook on smart antenna design and deployment.

5G Physical Layer - Ali Zaidi 2018-09-22

5G Physical Layer: Principles, Models and Technology Components explains fundamental physical layer design principles, models and components for the 5G new radio access technology - 5G New Radio (NR). The physical layer models include radio wave propagation and hardware impairments for the full range of frequencies considered for the 5G NR (up to 100 GHz). The physical layer technologies include flexible multi-carrier waveforms, advanced multi-antenna solutions, and channel coding schemes for a wide range of services, deployments, and frequencies envisioned for 5G and beyond. A MATLAB-based link level simulator is included to explore various design options. 5G Physical Layer is very suitable for wireless system designers and researchers: basic understanding of communication theory and signal processing is assumed, but familiarity with 4G and 5G standards is not required. With this book the reader will learn: The fundamentals of the 5G NR physical layer (waveform, modulation, numerology, channel codes, and multi-antenna schemes). Why certain PHY technologies have been adopted for the 5G NR. The fundamental physical limitations imposed by radio wave propagation and hardware impairments. How the fundamental 5G NR physical layer functionalities (e.g., parameters/methods/schemes) should be realized. The content includes: A global view of 5G development - concept, standardization, spectrum allocation, use cases and requirements, trials, and future commercial deployments. The fundamentals behind the 5G NR physical layer specification in 3GPP. Radio wave propagation and channel modeling for 5G and beyond. Modeling of hardware impairments for future base stations and devices. Flexible multi-carrier

waveforms, multi-antenna solutions, and channel coding schemes for 5G and beyond. A simulator including hardware impairments, radio propagation, and various waveforms. Ali Zaidi is a strategic product manager at Ericsson, Sweden. Fredrik Athley is a senior researcher at Ericsson, Sweden. Jonas Medbo and Ulf Gustavsson are senior specialists at Ericsson, Sweden. Xiaoming Chen is a professor at Xi'an Jiaotong University, China. Giuseppe Durisi is a professor at Chalmers University of Technology, Sweden, and a guest researcher at Ericsson, Sweden.

Problem-Based Learning in Communication Systems Using MATLAB and Simulink -

Jesus Jean 2017-05-16

This book covers the basic concepts of signals, and analog and digital communications, to more complex simulations in communication systems. Problem-Based Learning in Communication Systems Using MATLAB and Simulink begins by introducing MATLAB and Simulink to prepare readers who are unfamiliar with these environments in order to tackle projects and exercises included in this book. Discussions on simulation of signals, filter design, sampling and reconstruction, and analog communications are covered next. The book concludes by covering advanced topics such as Viterbi decoding, OFDM and MIMO. In addition, this book contains examples of how to convert waveforms, constructed in simulation, into electric signals. It also includes problems illustrating how to complete actual wireless communications in the band near ultrasonic frequencies.