

Antennas And Propagation For Wireless Communication Systems 2nd Edition

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MIMO Antennas for Wireless Communication - Leeladhar Malviya
2020-12-15

The desired objective of this book is to investigate diversity and mutual coupling effects on MIMO antenna designs for WLAN/WiMAX/LTE applications, controlled with diversity and ground modification techniques including equivalent circuit diagrams. Diversity techniques in MIMO antennas leading to the performance improvement ratings are demonstrated and deliberated. The book contributes towards the development of 2:1 VSWR MIMO antennas with diversity techniques for indoor/outdoor applications for high data rate, QOS, and SNR. The improved MIMO antenna structures are investigated and presented in this book including part of massive MIMO to provide the important aspects of emerging technology. Aimed at researchers, professionals and graduate students in electrical engineering, electromagnetics, communications and signal processing including antenna theory and design, smart antennas, communication systems, this book: Investigates real time MIMO antenna designs for WLAN/WiMAX/LTE applications. Covers effects of ECC, MEG, TARC, and equivalent circuit. Addresses the coupling and diversity aspects of antenna design problem for MIMO

systems. Focus on the MIMO antenna designs for the real time applications. Exclusive chapter on 5G Massive MIMO along with case studies throughout the book.

Planar Antennas for Wireless Communications - Kin-Lu Wong 2003-01-06
The latest text in the Wiley Series in Microwave and Optical Engineering
The first comprehensive resource on planar antenna designs
Planar antennas are the newest generation of antennas, boasting such attractive features as low profile, light weight, low cost, and ease of integration into arrays. These features make them ideal components of modern communications systems, particularly in cellular and WLAN applications. Consequently, many novel designs of planar antennas for related applications have come into being within the last two to three years. Until now these designs were only accessible to current and prospective antenna designers through journal articles, conference papers, and patent descriptions. *Planar Antennas for Wireless Communications* organizes today's most important planar antenna designs into one easy-to-use reference. In this, the latest addition to the Wiley Series in Microwave and Optical Engineering, the author presents more than seventy advanced planar antenna designs, along with detailed design

considerations and experimental results, including: * PIFAs for internal mobile phone antennas * Very-low-profile monopoles for internal mobile phone antennas * Base-station antennas for cellular systems * Planar antennas for WLAN applications * DR antennas for wireless communications * Integration of antennas for different operating bands Each chapter features a multitude of illustrations for the geometries and experimental results of the featured designs, as well as a complete list of related references for further study, making the book an invaluable design resource for antenna scientists and engineers alike.

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.

ANTENNAS AND PROPAGATION FOR WIRELESS COMMUNICATION SYSTEMS, 2ND ED - Alejandro Aragon-Zavala 2008-09

Market_Desc: Students - senior undergraduate and postgraduate
Wireless communications engineers and antenna designers
University lecturers
Special Features: This authoritative second edition features the following updates, enabling this reference to remain a leading text in the area: · New chapter entitled Channel Measurements for Mobile Radio

Systems· Fully revised and expanded exercises in each chapter· Solutions manual for access by course tutors· Presentation slides for revised contents will also be available online
About The Book: Antennas and propagation are the key factors influencing the robustness and quality of the wireless communication channel. This book introduces the basic concepts and specific applications of antennas and propagation to wireless systems, covering terrestrial and satellite radio systems in both mobile and fixed contexts. It is a vital source of information for wireless communication engineers as well as for students at postgraduate or senior undergraduate levels.

Radio Propagation and Adaptive Antennas for Wireless

Communication Networks - Nathan Blaunstein 2014-04-03

Radio Propagation and Adaptive Antennas for Wireless Communication Networks, 2nd Edition, presents a comprehensive overview of wireless communication system design, including the latest updates to considerations of over-the-terrain, atmospheric, and ionospheric communication channels. New features include the latest experimentally-verified stochastic approach, based on several multi-parametric models; all-new chapters on wireless network fundamentals, advanced technologies, and current and modern multiple access networks; and helpful problem sets at the conclusion of each chapter to enhance clarity. The volume's emphasis remains on a thorough examination of the role of obstructions on the corresponding propagation phenomena that influence the transmission of radio signals through line-of-sight (LOS) and non-line-of-sight (NLOS) propagation conditions along the radio path between the transmitter and the receiver antennas—and how adaptive antennas, used at the link terminals, can be used to minimize the deleterious effects of such obstructions. With its focus on 3G, 4G, MIMO, and the latest wireless technologies, Radio Propagation and Adaptive Antennas for Wireless Communication Networks represents an invaluable resource to topics critical to the design of contemporary wireless communication systems. Explores novel wireless networks beyond 3G, and advanced 4G technologies, such as MIMO, via propagation phenomena and the fundamentals of adapted antenna

usage. Explains how adaptive antennas can improve GoS and QoS for any wireless channel, with specific examples and applications in land, aircraft and satellite communications. Introduces new stochastic approach based on several multi-parametric models describing various terrestrial scenarios, which have been experimentally verified in different environmental conditions New chapters on fundamentals of wireless networks, cellular and non-cellular, multiple access networks, new applications of adaptive antennas for positioning, and localization of subscribers Includes the addition of problem sets at the end of chapters describing fundamental aspects of wireless communication and antennas.

Channels, Propagation and Antennas for Mobile Communications - Rodney Vaughan 2003-02-03

This exceptional book introduces the reader to the principles, theory and applications of physical layer wireless/mobile communications, applicators and millimetric antennas.

Millimeter Wave Communication Systems - Kao-Cheng Huang 2011-04-20

The aim of this book is to present the modern design and analysis principles of millimeter-wave communication system for wireless devices and to give postgraduates and system professionals the design insights and challenges when integrating millimeter wave personal communication system. Millimeter wave communication system are going to play key roles in modern gigabit wireless communication area as millimeter-wave industrial standards from IEEE, European Computer Manufacturing Association (ECMA) and Wireless High Definition (Wireless HD) Group, are on their way to the market. The book will review up-to-date research results and utilize numerous design and analysis for the whole system covering from Millimeter wave frontend to digital signal processing in order to address major topics in a high speed wireless system. This book emphasizes the importance and the requirements of high-gain antennas, low power transceiver, adaptive equalizer/modulation, channeling coding and adaptive multi-user detection for gigabit wireless communications. In addition, the book will

include the updated research literature and patents in the topics of transceivers, antennas, MIMO, channel capacity, coding, equalizer, Modem and multi-user detection. Finally the application of these antennas will be discussed in light of different forthcoming wireless standards at V-band and E-band.

Implanted Antennas in Medical Wireless Communications - Yahya Rahmat-Samii 2022-06-01

One of the main objectives of this lecture is to summarize the results of recent research activities of the authors on the subject of implanted antennas for medical wireless communication systems. It is anticipated that ever sophisticated medical devices will be implanted inside the human body for medical telemetry and telemedicine. To establish effective and efficient wireless links with these devices, it is pivotal to give special attention to the antenna designs that are required to be low profile, small, safe and cost effective. In this book, it is demonstrated how advanced electromagnetic numerical techniques can be utilized to design these antennas inside as realistic human body environment as possible. Also it is shown how simplified models can assist the initial designs of these antennas in an efficient manner.

UWB Communication Systems - Maria-Gabriella Di Benedetto 2006
Ultrawideband (UWB) communication systems offer an unprecedented opportunity to impact the future communication world. The enormous available bandwidth, the wide scope of the data rate / range trade-off, as well as the potential for very low-cost operation leading to pervasive usage, all present a unique opportunity for UWB systems to impact the way people and intelligent machines communicate and interact with their environment. The aim of this book is to provide an overview of the state of the art of UWB systems from theory to applications. Due to the rapid progress of multidisciplinary UWB research, such an overview can only be achieved by combining the areas of expertise of several scientists in the field. More than 30 leading UWB researchers and practitioners have contributed to this book covering the major topics relevant to UWB. These topics include UWB signal processing, UWB channel measurement and modeling, higher-layer protocol issues, spatial aspects of UWB

signaling, UWB regulation and standardization, implementation issues, and UWB applications as well as positioning. The book is targeted at advanced academic researchers, wireless designers, and graduate students wishing to greatly enhance their knowledge of all aspects of UWB systems

Radiowave Propagation and Smart Antennas for Wireless

Communications - Ramakrishna Janaswamy 2001

Useful as a text as well as a reference, this is one of the first books of its kind to combine basic and advanced topics of radiowave propagation and smart antennas into a single volume. The book is interdisciplinary in nature and contains material drawn from the electromagnetics and communications areas. Physical phenomena leading to the modeling and prediction of path loss, and characterizing the small-scale and medium-scale fluctuations of the received signal, are treated in detail. Several new path loss models are included. Both narrowband and wideband radio channel characterizations are discussed. Statistical descriptions of geometrically based single bounce scattering models that are useful in developing spatial channel models for smart arrays are presented. Principles of diversity and smart antennas for reducing fading and co-channel interference are presented. Performance evaluation of these arrays in the presence of fading and shadowing is treated. Both TDMA and CDMA systems are considered. Effects of element mutual coupling and correlation in limiting the system performance are elaborated. Finally, principles of multiple-input multiple-output communication systems that are increasingly becoming attractive owing to their enormous bit rate capabilities are covered. Several practical examples are worked out throughout the text. Additional problems that help the reader assimilate the material and advance to higher-level topics are included at the end of each chapter. Radiowave Propagation and Smart Antennas for Wireless Communications has been written for use in a graduate course on communications and represents a comprehensive reference for research scientists and practitioners working in fields related to the topic.

Antennas and Propagation for Body-centric Wireless

Communications - Peter S. Hall 2006

Get ready for the tidal wave of "body centric" electronic systems that will take mobile communications and computing to new heights. This first-of-its-kind book will help engineers pave the way with its definitive treatment of on-body antenna theory, design, and applications.

Antennas and Propagation for 5G and Beyond - Qammer H. Abbasi
2020-09-14

Transforming the way we live, work, and engage with our environment, 5G and beyond technologies will provide much higher bandwidth and connectivity to billions of devices. This brings enormous opportunities but of course the widespread deployment of these technologies faces challenges, including the need for reliable connectivity, a diverse range of bandwidths, dynamic spectrum sharing, channel modelling and wave propagation for ultra-dense wireless networks, as well as price pressures. The choice of an antenna system will also be a critical component of all node end devices and will present several design challenges such as size, purpose, shape and placement. In this edited book, the authors bring new approaches for exploiting challenging propagation channels and the development of efficient, cost-effective, scalable, and reliable antenna systems and solutions, as well as future perspectives. The book is aimed at a wide audience of industry and academic researchers, scientists and engineers as well as advanced students in the field of antennas, ICTs, signal processing and electromagnetics. It will also be useful to network and system designers, developers and manufacturers. Stakeholders, government regulators, policy makers and standards bodies can use the information provided here to better understand the effects of the technology on the market and future developments for 5G and beyond systems and networks.

Introduction to RF Propagation - John S. Seybold 2005-10-03

An introduction to RF propagation that spans all wireless applications. This book provides readers with a solid understanding of the concepts involved in the propagation of electromagnetic waves and of the commonly used modeling techniques. While many books cover RF propagation, most are geared to cellular telephone systems

and, therefore, are limited in scope. This title is comprehensive—it treats the growing number of wireless applications that range well beyond the mobile telecommunications industry, including radar and satellite communications. The author's straightforward, clear style makes it easy for readers to gain the necessary background in electromagnetics, communication theory, and probability, so they can advance to propagation models for near-earth, indoor, and earth-space propagation. Critical topics that readers would otherwise have to search a number of resources to find are included: * RF safety chapter provides a concise presentation of FCC recommendations, including application examples, and prepares readers to work with real-world propagating systems * Antenna chapter provides an introduction to a wide variety of antennas and techniques for antenna analysis, including a detailed treatment of antenna polarization and axial ratio; the chapter contains a set of curves that permit readers to estimate polarization loss due to axial ratio mismatch between transmitting and receiving antennas without performing detailed calculations * Atmospheric effects chapter provides curves of typical atmospheric loss, so that expected loss can be determined easily * Rain attenuation chapter features a summary of how to apply the ITU and Crane rain models * Satellite communication chapter provides the details of earth-space propagation analysis including rain attenuation, atmospheric absorption, path length determination and noise temperature determination. Examples of widely used models provide all the details and information needed to allow readers to apply the models with confidence. References, provided throughout the book, enable readers to explore particular topics in greater depth. Additionally, an accompanying Wiley ftp site provides supporting MathCad files for select figures in the book. With its emphasis on fundamentals, detailed examples, and comprehensive coverage of models and applications, this is an excellent text for upper-level undergraduate or graduate students, or for the practicing engineer who needs to develop an understanding of propagation phenomena.

Handbook of Antennas in Wireless Communications - Lal Chand Godara
2018-10-03

The move toward worldwide wireless communications continues at a remarkable pace, and the antenna element of the technology is crucial to its success. With contributions from more than 30 international experts, the *Handbook of Antennas in Wireless Communications* brings together all of the latest research and results to provide engineering professionals and students with a one-stop reference on the theory, technologies, and applications for indoor, hand-held, mobile, and satellite systems. Beginning with an introduction to wireless communications systems, it offers an in-depth treatment of propagation prediction and fading channels. It then explores antenna technology with discussion of antenna design methods and the various antennas in current use or development for base stations, hand held devices, satellite communications, and shaping beams. The discussions then move to smart antennas and phased array technology, including details on array theory and beamforming techniques. Space diversity, direction-of-arrival estimation, source tracking, and blind source separation methods are addressed, as are the implementation of smart antennas and the results of field trials of systems using smart antennas implemented. Finally, the hot media topic of the safety of mobile phones receives due attention, including details of how the human body interacts with the electromagnetic fields of these devices. Its logical development and extensive range of diagrams, figures, and photographs make this handbook easy to follow and provide a clear understanding of design techniques and the performance of finished products. Its unique, comprehensive coverage written by top experts in their fields promises to make the *Handbook of Antennas in Wireless Communications* the standard reference for the field. [Reconfigurable Active and Passive Planar Antennas for Wireless Communication Systems](#) - SHIBAN KISHEN. K SINGH KOUL (RAJESH.) 2022

This book presents state-of-the-art trends in reconfigurable active and passive planar antennas and their applications in wireless communication systems operating in the frequency band 5-6 GHz. Due to various key features such as multifunction antenna design, compactness, planar nature, and low cost, these technologies are becoming popular for

current and future wireless applications. This book discusses different novel antenna designs and their working principles in detail. The modern and future wireless systems require wideband antennas to accommodate various channels in a single band or in separate bands. The carrier aggregation (CA) has been introduced in the modern wireless systems such as LTE-advanced systems and 5G./6G. In CA, a device can use several channels for transmission and reception. The used channels can exist in the same frequency band (intra-band CA) or in distinct bands (inter-band CA). To accommodate more channels, more bandwidth is required within the operating band. For portable devices, circularly polarized (CP) antennas are more advantageous over linearly polarized antennas since in CP antennas, there is low risk of misalignment and, hence encountering interference. Circularly polarized antenna also provides higher link reliability for the portable devices. To provide high data rates, more bandwidth is needed to accommodate more channels. Various multifunction, compact, and wideband antennas for plethora of applications are addressed in detail in this book. The scope of developing reconfigurable active antennas for application in beam switching, beam steering, wireless charging, security systems, etc., is described. This book concludes by giving glimpses of antenna requirements for future wireless communication systems.

Substrate-Integrated Millimeter-Wave Antennas for Next-Generation Communication and Radar Systems - Zhi Ning Chen 2021-04-29

Substrate-Integrated Millimeter-Wave Antennas for Next-Generation Communication and Radar Systems The first and only comprehensive text on substrate-integrated mmW antenna technology, state-of-the-art antenna design, and emerging wireless applications Substrate-Integrated Millimeter-Wave Antennas for Next-Generation Communication and Radar Systems elaborates the most important topics related to revolutionary millimeter-wave (mmW) technology. Following a clear description of fundamental concepts including substrate-integrated waveguides and loss analysis, the text treats key design methods, prototyping techniques, and experimental setup and testing. The authors also highlight applications of mmW antennas in 5G wireless

communication and next-generation radar systems. Readers are prepared to put techniques into practice through practical discussions of how to set up testing for impedance matching, radiation patterns, gain from 24GHz up to 325 GHz, and more. This book will bring readers state-of-the-art designs and recent progress in substrate-integrated mmW antennas for emerging wireless applications. Substrate-Integrated Millimeter-Wave Antennas for Next-Generation Communication and Radar Systems is the first comprehensive text on the topic, allowing readers to quickly master mmW technology. This book: Introduces basic concepts such as metamaterials Huygens's surface, zero-index structures, and pattern synthesis Describes prototyping in the form of fabrication based on printed-circuit-board, low-temperature-co-fired-ceramic and micromachining Explores applications for next-generation radar and imaging systems such as 24-GHz and 77-GHz vehicular radar systems Elaborates design methods including waveguide-based feeding network, three-dimensional feeding structure, dielectric loaded aperture antenna element, and low-sidelobe synthesis The mmW is one of today's most important emerging technologies. This book provides graduate students, researchers, and engineers with the knowledge they need to deploy mmW systems and develop new antenna designs with low cost, low loss, and low complexity.

MIMO Wireless Communications over Generalized Fading Channels - Brijesh Kumbhani 2017-07-12

MIMO systems have been known to better the quality of service for wireless communication systems. This book discusses emerging techniques in MIMO systems to reduce complexities and keep benefits unaffected at the same time. It discusses about benefits and shortcomings of various MIMO technologies like spatial multiplexing, space time coding, spatial modulation, transmit antenna selection and various power allocation schemes to optimize the performance. Crux of the book is focus on MIMO communication over generalized fading channels as they can model the propagation of signals in a non-homogeneous environment. Relevant MATLAB codes are also included in the appendices. Book is aimed at graduate students and researchers in

electronics and wireless engineering specifically interested in electromagnetic theory, antennas and propagation, future wireless systems, signal processing.

Electromagnetics of Body Area Networks - Douglas H. Werner
2016-07-11

The book is a comprehensive treatment of the field, covering fundamental theoretical principles and new technological advancements, state-of-the-art device design, and reviewing examples encompassing a wide range of related sub-areas. In particular, the first area focuses on the recent development of novel wearable and implantable antenna concepts and designs including metamaterial-based wearable antennas, microwave circuit integrated wearable filtering antennas, and textile and/or fabric material enabled wearable antennas. The second set of topics covers advanced wireless propagation and the associated statistical models for on-body, in-body, and off-body modes. Other sub-areas such as efficient numerical human body modeling techniques, artificial phantom synthesis and fabrication, as well as low-power RF integrated circuits and related sensor technology are also discussed. These topics have been carefully selected for their transformational impact on the next generation of body-area network systems and beyond.

Antennas and Propagation Aspects for Emerging Wireless Communication Technologies - Dimitra I Kaklamani 2022-01-18

The increasing demand for high data rate applications and the delivery of zero-latency multimedia content drives technological evolutions towards the design and implementation of next-generation broadband wireless networks. In this context, various novel technologies have been introduced, such as millimeter wave (mmWave) transmission, massive multiple input multiple output (MIMO) systems, and non-orthogonal multiple access (NOMA) schemes in order to support the vision of fifth generation (5G) wireless cellular networks. The introduction of these technologies, however, is inextricably connected with a holistic redesign of the current transceiver structures, as well as the network architecture reconfiguration. To this end, ultra-dense network deployment along with distributed massive MIMO technologies and intermediate relay nodes

have been proposed, among others, in order to ensure an improved quality of services to all mobile users. In the same framework, the design and evaluation of novel antenna configurations able to support wideband applications is of utmost importance for 5G context support.

Furthermore, in order to design reliable 5G systems, the channel characterization in these frequencies and in the complex propagation environments cannot be ignored because it plays a significant role. In this Special Issue, fourteen papers are published, covering various aspects of novel antenna designs for broadband applications, propagation models at mmWave bands, the deployment of NOMA techniques, radio network planning for 5G networks, and multi-beam antenna technologies for 5G wireless communications.

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.

Millimeter Wave Wireless Communications - Theodore S. Rappaport
2015

The Definitive, Comprehensive Guide to Cutting-Edge Millimeter Wave Wireless Design “This is a great book on mmWave systems that covers many aspects of the technology targeted for beginners all the way to the advanced users. The authors are some of the most credible scholars I know of who are well respected by the industry. I highly recommend studying this book in detail.” —Ali Sadri, Ph.D., Sr. Director, Intel Corporation, MCG mmWave Standards and Advanced Technologies Millimeter wave (mmWave) is today's breakthrough frontier for emerging wireless mobile cellular networks, wireless local area networks, personal area networks, and vehicular communications. In the near future, mmWave products, systems, theories, and devices will come together to deliver mobile data rates thousands of times faster than today's existing cellular and WiFi networks. In Millimeter Wave Wireless Communications, four of the field's pioneers draw on their immense

experience as researchers, entrepreneurs, inventors, and consultants, empowering engineers at all levels to succeed with mmWave. They deliver exceptionally clear and useful guidance for newcomers, as well as the first complete desk reference for design experts. The authors explain mmWave signal propagation, mmWave circuit design, antenna designs, communication theory, and current standards (including IEEE 802.15.3c, Wireless HD, and ECMA/WiMedia). They cover comprehensive mmWave wireless design issues, for 60 GHz and other mmWave bands, from channel to antenna to receiver, introducing emerging design techniques that will be invaluable for research engineers in both industry and academia. Topics include Fundamentals: communication theory, channel propagation, circuits, antennas, architectures, capabilities, and applications Digital communication: baseband signal/channel models, modulation, equalization, error control coding, multiple input multiple output (MIMO) principles, and hardware architectures Radio wave propagation characteristics: indoor and outdoor applications Antennas/antenna arrays, including on-chip and in-package antennas, fabrication, and packaging Analog circuit design: mmWave transistors, fabrication, and transceiver design approaches Baseband circuit design: multi-gigabit-per-second, high-fidelity DAC and ADC converters Physical layer: algorithmic choices, design considerations, and impairment solutions; and how to overcome clipping, quantization, and nonlinearity Higher-layer design: beam adaptation protocols, relaying, multimedia transmission, and multiband considerations 60 GHz standardization: IEEE 802.15.3c for WPAN, Wireless HD, ECMA-387, IEEE 802.11ad, Wireless Gigabit Alliance (WiGig)

Millimetre Wave Antennas for Gigabit Wireless Communications - Kao-Cheng Huang 2008-10-13

Complete and comprehensive application-focused reference on millimetre wave antennas Millimetre Wave Antennas for Gigabit Wireless Communications covers a vast wealth of material with a strong focus on the current design and analysis principles of millimetre wave antennas for wireless devices. It provides practising engineers with the design rules and considerations required in designing antennas for the terminal.

The authors include coverage of new configurations with advanced angular and frequency filtering characteristics, new design and analysis techniques, and methods for filter miniaturization. The book reviews up-to-date research results and utilizes numerous design examples to emphasize computer analysis and synthesis whilst also discussing the applications of commercially available software. Key Features: Advanced and up-to-date treatment of one of the fastest growing fields of wireless communications Covers topics such as Gigabit wireless communications and its required antennas, passive and active antenna design and analysis techniques, multibeam antennas and MIMO, IEEE 802.15.3c, WiMedia®, and advanced materials and technologies Offers a practical guide to integrated antennas for specific configurations requirements Addresses a number of complex, real-world problems that system and antenna engineers are going to face in millimetre-wave communications industry and provides solutions Contains detailed design examples, drawings and predicted performance This book is an invaluable tool for antenna professionals (engineers, designers, and developers), microwave professionals, wireless communication system professionals, and industries with microwave and millimetre wave research projects. Advanced students and researchers working in the field of millimetre wave engineering will also find this book very useful.

Wireless Communications Systems - Randy L. Haupt 2019-12-17

A comprehensive introduction to the fundamentals of design and applications of wireless communications Wireless Communications Systems starts by explaining the fundamentals needed to understand, design, and deploy wireless communications systems. The author, a noted expert on the topic, explores the basic concepts of signals, modulation, antennas, and propagation with a MATLAB emphasis. The book emphasizes practical applications and concepts needed by wireless engineers. The author introduces applications of wireless communications and includes information on satellite communications, radio frequency identification, and offers an overview with practical insights into the topic of multiple input multiple output (MIMO). The book also explains the security and health effects of wireless systems

concerns on users and designers. Designed as a practical resource, the text contains a range of examples and pictures that illustrate many different aspects of wireless technology. The book relies on MATLAB for most of the computations and graphics. This important text: Reviews the basic information needed to understand and design wireless communications systems Covers topics such as MIMO systems, adaptive antennas, direction finding, wireless security, internet of things (IoT), radio frequency identification (RFID), and software defined radio (SDR) Provides examples with a MATLAB emphasis to aid comprehension Includes an online solutions manual and video lectures on selected topics Written for students of engineering and physics and practicing engineers and scientists, *Wireless Communications Systems* covers the fundamentals of wireless engineering in a clear and concise manner and contains many illustrative examples.

RF Engineering for Wireless Networks - Daniel M. Dobkin 2011-03-31 Finally, here is a single volume containing all of the engineering information needed to successfully design and implement any type of wireless network! Author Dan Dobkin covers every aspect of RF engineering necessary for wireless networks. He begins with a review of essential math and electromagnetic theory followed by thorough discussions of multiplexing, modulation types, bandwidth, link budgets, network concepts, radio system architectures, RF amplifiers, mixers and frequency conversion, filters, single-chip radio systems, antenna theory and designs, signal propagation, as well as planning and implementing wireless networks for both indoor and outdoor environments. The appendices contain such vital data as U.S., European, and Japanese technical and regulatory standards for wireless networks, measurements in wireless networks, reflection and matching of transmission lines, determining power density, and much more. No matter what type of wireless network you design—Bluetooth, UWB, or even metropolitan area network (MAN)—this book is the one reference you can't do without! The A-to-Z guide to wireless network engineering—covers everything from basic electromagnetic theory to modulation techniques to network planning and implementation! Engineering and design

principles covered are applicable to any type of wireless network, including 802.11, 802.16, 802.20, and Bluetooth. Discusses state-of-the-art modulation techniques such as ultra wideband (UWB) and orthogonal frequency-division multiplexing (OFDM).

Antennas and Propagation for Body-Centric Wireless Communications, Second Edition - Peter S. Hall 2012

Now in a newly updated and revised edition, this timely resource provides you with complete and current details on the theory, design, and applications of wireless antennas for on-body electronic systems. The Second Edition offers readers brand new material on advances in physical phantom design and production, recent developments in simulation methods and numerical phantoms, descriptions of methods for simulation of moving bodies, and the use of the body as a transmission channel. You also find a completely revised chapter on channel characterization and antenna design at microwave frequencies. This cutting-edge volume brings you the state-of-the-art in existing applications like Bluetooth headsets together with detailed treatment of techniques, tools, and challenges in developing on-body antennas for an array of medical, emergency response, law enforcement, personal entertainment, and military applications on the horizon. The book briefs you on energy propagation around and into the body and how to estimate performance of on-body wireless links, and then dives into the nuts-and-bolts of designing antenna systems that deliver the goods. It covers on-body communication channels at microwave frequency bands and at low frequency bands, as well as ultra wideband systems for WPANs and WBANs. You get details on body-centric UWB antennas and channels, as well as advances in wearable mobile, EBG, and "smart fabric" antennas for cellular and WLAN communications. Chapters on telemedicine applications, such as remote diagnoses, and implantable medical devices cover crucial propagation issues and other obstacles that need to be addressed. Rounding out the coverage is a section on antenna design for body-sensor networks and their emerging military and space applications. Packed with hands-on guidance from noted experts, this volume will be indispensable for your efforts in designing and improving

body-centric communication systems.

Wearable Antennas and Body Centric Communication - Shiban

Kishen Koul 2021-10-20

This book presents state-of-the-art technologies, trends and applications with a focus on the healthcare domain for ultra-wideband (3.1–10.6 GHz) and 60 GHz (57–66 GHz) wireless communication systems. Due to various key features such as miniaturized antenna design, low power, high data rate, less effects on the human body, relatively less crowded spectrum, these technologies are becoming popular in various fields of biomedical applications and day-to-day life. The book highlights various aspects of these technologies related to body-centric communication, including antenna design requirements, channel modeling and characterization for WBANs, current fabrication and antenna design strategies for textile, flexible and implanted antennas. Apart from the general requirements and study related to these frequency bands, various application specific topics such as localization and tracking, physical activity recognition and assessment, vital sign monitoring and medical imaging are covered in detail. The book concludes with the glimpses of future aspects of the UWB and 60 GHz technology which includes IoT for healthcare and smart living, novel antenna materials and application of machine learning algorithms for overall performance enhancement.

Radio Propagation and Adaptive Antennas for Wireless Communication

Links - Nathan Blaunstein 2007-02-26

Antennas and Propagation for Wireless Communication covers the basics of wireless communication system design with emphasis on antennas and propagation. It contains information on antenna fundamentals and the latest developments in smart antennas, as well as the radiation effects of hand-held devices. Antennas and Propagation for Wireless Communication provides a complete discussion of all the topics important to the design of wireless communication systems. Written by acknowledged authorities in their respective fields, the book deals with practical applications and presents real world examples. A solutions manual for college adopters accompanies the text. Ideal for engineers

working in communication, antennas, and propagation for telecomm, military, and aerospace applications, as well as students of electrical engineering, this book covers all topics needed for a complete system design.

Phased Arrays for Radio Astronomy, Remote Sensing, and Satellite Communications - Karl F. Warnick 2018-07-26

Discover a modern approach to the analysis, modeling and design of high sensitivity phased arrays. Network theory, numerical methods and computational electromagnetic simulation techniques are uniquely combined to enable full system analysis and design optimization. Beamforming and array signal processing theory are integrated into the treatment from the start. Digital signal processing methods such as polyphase filtering and RFI mitigation are described, along with technologies for real-time hardware implementation. Key concepts from interferometric imaging used in radio telescopes are also considered. A basic development of theory and modeling techniques is accompanied by problem sets that guide readers in developing modeling codes that retain the simplicity of the classical array factor method while incorporating mutual coupling effects and interactions between elements. Combining current research trends with pedagogical material suitable for a first-year graduate course, this is an invaluable resource for students, teachers, researchers, and practicing RF/microwave and antenna design engineers.

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.

Printed Antennas for Wireless Communications - Rod Waterhouse
2008-03-11

Printed antennas, also known as microstrip antennas, have a variety of beneficial properties including mechanical durability, conformability, compactness and cheap manufacturing costs. As such, they have a range of applications in both the military and commercial sectors, and are often mounted on the exterior of aircraft and spacecraft as well as incorporated into mobile radio communication devices. Printed Antennas for Wireless Communications offers a practical guide to state-of-the-art printed antenna technology used for wireless systems. Contributions from renowned global experts within both academia and industry enable the reader to design printed antennas and associated technologies, and offer valuable insights into important breakthroughs in these areas.

Divided into 3 sections covering fundamental wideband printed radiating elements for wireless systems, small printed antennas for wireless systems, and advanced concepts and applications in wireless systems. Provides experimental data and applies theoretical models to present design performance trends and to give the reader an in-depth coverage of the area. Presents summaries of different approaches used in solving wireless systems such as WPAN (wireless personal area network) and MIMO (multi-input/ multi-output), offering the reader an overall perspective of the pros and cons of each. Focuses on practical design, examples and 'real world' solutions. Printed Antennas for Wireless Communications offers an excellent insight on printed antennas from the theoretical to the practical; hence it will appeal to practicing design engineers within commercial and governmental/ military organizations, as well as postgraduate students and researchers in communications

technology

Indoor Wireless Communications - Alejandro Aragón-Zavala 2017-09-05

Indoor Wireless Communications: From Theory to Implementation provides an in-depth reference for design engineers, system planners and post graduate students interested in the vastly popular field of indoor wireless communications. It contains wireless applications and services for in-building scenarios and knowledge of key elements in the design and implementation of these systems. Technologies such as Wireless Local Area Networks, Bluetooth, ZigBee, Indoor Optical Communications, WiMAX, UMTS and GSM for indoor environments are fully explained and illustrated with examples. Antennas and propagation issues for in-building scenarios are also discussed, emphasizing models and antenna types specifically developed for indoor communications. An exhaustive survey on indoor wireless communication equipment is also presented, covering all available technologies including antennas, distribution systems, transceivers and base stations.

Advanced Radio Frequency Antennas for Modern Communication and Medical Systems - Albert Sabban 2020-09-23

The main objective of this book is to present novel radio frequency (RF) antennas for 5G, IOT, and medical applications. The book is divided into four sections that present the main topics of radio frequency antennas. The rapid growth in development of cellular wireless communication systems over the last twenty years has resulted in most of world population owning smartphones, smart watches, I-pads, and other RF communication devices. Efficient compact wideband antennas are crucial in RF communication devices. This book presents information on planar antennas, cavity antennas, Vivaldi antennas, phased arrays, MIMO antennas, beamforming phased array reconfigurable Fabry-Perot cavity antennas, and time modulated linear array.

Propagation Channel Characterization, Parameter Estimation, and Modeling for Wireless Communications - Xuefeng Yin 2016-09-13

A comprehensive reference giving a thorough explanation of propagation mechanisms, channel characteristics results, measurement approaches and the modelling of channels Thoroughly covering channel

characteristics and parameters, this book provides the knowledge needed to design various wireless systems, such as cellular communication systems, RFID and ad hoc wireless communication systems. It gives a detailed introduction to aspects of channels before presenting the novel estimation and modelling techniques which can be used to achieve accurate models. To systematically guide readers through the topic, the book is organized in three distinct parts. The first part covers the fundamentals of the characterization of propagation channels, including the conventional single-input single-output (SISO) propagation channel characterization as well as its extension to multiple-input multiple-output (MIMO) cases. Part two focuses on channel measurements and channel data post-processing. Wideband channel measurements are introduced, including the equipment, technology and advantages and disadvantages of different data acquisition schemes. The channel parameter estimation methods are then presented, which include conventional spectral-based estimation, the specular-path-model based high-resolution method, and the newly derived power spectrum estimation methods. Measurement results are used to compare the performance of the different estimation methods. The third part gives a complete introduction to different modelling approaches. Among them, both scattering theoretical channel modelling and measurement-based channel modelling approaches are detailed. This part also approaches how to utilize these two modelling approaches to investigate wireless channels for conventional cellular systems and some new emerging communication systems. This three-part approach means the book caters for the requirements of the audiences at different levels, including readers needing introductory knowledge, engineers who are looking for more advanced understanding, and expert researchers in wireless system design as a reference. Presents technical explanations, illustrated with examples of the theory in practice. Discusses results applied to 4G communication systems and other emerging communication systems, such as relay, CoMP, and vehicle-to-vehicle rapid time-variant channels. Can be used as comprehensive tutorial for students or a complete reference for engineers in industry.

Includes selected illustrations in color. Program downloads available for readers. Companion website with program downloads for readers and presentation slides and solution manual for instructors. Essential reading for Graduate students and researchers interested in the characteristics of propagation channel, or who work in areas related to physical layer architectures, air interfaces, navigation, and wireless sensing.

[Antennas for Base Stations in Wireless Communications](#) - Zhi Ning Chen
2009-07-01

Design Antennas for Modern Wireless Communications Systems. Written by a global team of expert contributors, this book offers complete details on the wide range of antennas used in today's wireless communication networks. Coverage includes the most popular applications in WWAN (GSM, CDMA, and WCDMA), WLAN (Bluetooth and WiFi), WMAN (WiMAX), and WPAN (UWB and RFID). *Antennas for Base Stations in Wireless Communications* presents a full picture of modern base station antenna technology--from fundamentals and parameters to engineering and advanced solutions--and highlights new technologies in antenna design with enhanced performance. Real-world case studies provide you with practical examples that can be applied to your own system designs. Apply measurement techniques for various parameters. Enable frequency re-use and channel capacity optimization in mobile radio networks. Design antennas for mobile communications--CDMA, GSM, and WCDMA. Implement advanced antenna technologies for GSM base stations. Facilitate enhanced system capacity. Design unidirectional antennas, including directed dipole, wideband patch, and complementary antennas. Optimize antenna designs for WLAN (WiFi) applications. Design antennas for Wireless Personal Area Network (WPAN) applications, including RFID and UWB.

Radiowave Propagation and Smart Antennas for Wireless Communications - Ramakrishna Janaswamy
2006-04-18

This book emerged from teaching a graduate level course in propagation and smart antennas at the Naval Postgraduate School. In its present form, it is suitable not only as a graduate level text, but also as a

reference book for industry and research use. The area of radiowave propagation and smart antennas is highly interdisciplinary, extracting material from electromagnetics, communications, and signal processing. This book is useful to workers in electromagnetics who would like to supplement their background with relevant communicational aspects and to workers in communications who would like to supplement their background with relevant electromagnetic aspects. Anyone with a basic understanding of probability, wave propagation, digital communications, and elementary signal processing should be able to appreciate the contents of the book. The book consists of nine chapters with several worked out examples dispersed throughout. Chapter 1 covers the basics of cellular communications. Chapter 2 covers the basic principles of electromagnetic wave propagation relevant to path loss predictions in wireless communications. Students with little prior background in electromagnetics should find the first few sections of Chapter 2 self-sufficient. Empirical path loss models that are used in system design are treated in Chapter 3. The chapter includes the traditional models as well as some of the newer models. Chapter 4 has a thorough discussion on the causes and characterization of small scale fading. The topic of spatial correlation that is very important for antenna arrays is discussed there in detail.

[Advanced Antenna Array Engineering for 6G and Beyond Wireless Communications](#) - Yingjie Jay Guo 2021-10-26

Advanced Antenna Array Engineering for 6G and Beyond Wireless Communications Reviews advances in the design and deployment of antenna arrays for future generations of wireless communication systems, offering new solutions for the telecommunications industry. Advanced Antenna Array Engineering for 6G and Beyond Wireless Communications addresses the challenges in designing and deploying antennas and antenna arrays which deliver 6G and beyond performance with high energy efficiency and possess the capability of being immune to interference caused by different systems mounted on the same platforms. This timely and authoritative volume presents innovative solutions for developing integrated communications networks of high-

gain, individually-scannable, multi-beam antennas that are reconfigurable and conformable to all platforms, thus enabling the evolving integrated land, air and space communications networks. The text begins with an up-to-date discussion of the engineering issues facing future wireless communications systems, followed by a detailed discussion of different beamforming networks for multi-beam antennas. Subsequent chapters address problems of 4G/5G antenna collocation, discuss differentially-fed antenna arrays, explore conformal transmit arrays for airborne platforms, and present latest results on fixed frequency beam scanning leaky wave antennas as well as various analogue beam synthesizing strategies. Based primarily on the authors' extensive work in the field, including original research never before published, this important new volume: Reviews multi-beam feed networks, array decoupling and de-scattering methods. Provides a systematic study on differentially fed antenna arrays that are resistant to interference caused by future multifunctional/multi-generation systems. Features previously unpublished material on conformal transmit arrays based on Huygen's metasurfaces and reconfigurable leaky wave antennas. Includes novel algorithms for synthesizing and optimizing thinned massive arrays, conformal arrays, frequency invariant arrays, and other future arrays. Advanced Antenna Array Engineering for 6G and Beyond Wireless Communications is an invaluable resource for antenna engineers and researchers, as well as graduate and senior undergraduate students in the field.

Multifunctional Antennas and Arrays for Wireless Communication Systems - Satish K. Sharma 2021-04-13

MULTIFUNCTIONAL ANTENNAS AND ARRAYS FOR WIRELESS COMMUNICATION SYSTEMS Offers an up-to-date discussion of multifunctional antennas and arrays for wireless communication systems. Multifunctional Antennas and Arrays for Wireless Communication Systems is a comprehensive reference on state-of-the-art reconfigurable antennas and 4G/5G communication antennas. The book gives a unique perspective while giving a comprehensive overview of the following topics: Frequency reconfigurable antennas. Pattern reconfigurable

antennas Polarization reconfigurable antennas Reconfigurable antennas using Liquid Metal, Piezoelectric, and RF MEMS MIMO and 4G/5G wireless communication antennas Metamaterials and metasurfaces in reconfigurable antennas Multifunctional antennas for user equipments (UEs) Defense related antennas and applications Flat panel phased array antennas The book is a valuable resource for the practicing engineer as well as for those within the research field. As wireless communications continuously evolves, more and more functionally will be required, and thus multifunctional antennas and RF systems will be necessary. These multifunctional antennas will require a degree of reconfigurability, and this book discusses various methods which enable this. The main topics of frequency, pattern, and polarization reconfigurability is first discussed. Methods utilizing unique materials and devices, both real and artificial are discussed. The book also delves into 4G/5G antennas as it relates to MIMO, and millimeter-wave phased arrays. Finally, there is a section on defense related multifunctional RF antenna systems.

Antennas and Propagation for Wireless Communication Systems - Simon R. Saunders 2007-05-07

Antennas and propagation are of fundamental importance to the coverage, capacity and quality of all wireless communication systems. This book provides a solid grounding in antennas and propagation, covering terrestrial and satellite radio systems in both mobile and fixed contexts. Building on the highly successful first edition, this fully updated text features significant new material and brand new exercises and supplementary materials to support course tutors. A vital source of information for practising and aspiring wireless communication engineers as well as for students at postgraduate and senior undergraduate levels, this book provides a fundamental grounding in the principles of antennas and propagation without excessive recourse to mathematics. It also equips the reader with practical prediction techniques for the design and analysis of a very wide range of common wireless communication systems. Including: Overview of the fundamental electromagnetic principles underlying propagation and antennas. Basic concepts of antennas and their application to specific wireless systems.

Propagation measurement, modelling and prediction for fixed links, macrocells, microcells, picocells and megacells Narrowband and wideband channel modelling and the effect of the channel on communication system performance. Methods that overcome and transform channel impairments to enhance performance using diversity, adaptive antennas and equalisers. Key second edition updates: New chapters on Antennas for Mobile Systems and Channel Measurements for Mobile Radio Systems. Coverage of new technologies, including MIMO antenna systems, Ultra Wideband (UWB) and the OFDM technology used in Wi-Fi and WiMax systems. Many new propagation models for macrocells, microcells and picocells. Fully revised and expanded end-of-chapter exercises. The Solutions Manual can be requested from http://www.wiley.com/go/saunders_antennas_2e Signal Processing for Telecommunications and Multimedia - Tadeusz A. Wysocki 2004-10-01

The unprecedented growth in the range of multimedia services offered these days by modern telecommunication systems has been made possible only because of the advancements in signal processing technologies and algorithms. In the area of telecommunications, application of signal processing allows for new generations of systems to achieve performance close to theoretical limits, while in the area of multimedia, signal processing the underlying technology making possible realization of such applications that not so long ago were considered just a science fiction or were not even dreamed about. We all learnt to adopt those achievements very quickly, but often the research enabling their introduction takes many years and a lot of efforts. This book presents a group of invited contributions, some of which have been based on the papers presented at the International Symposium on DSP for Communication Systems held in Coolangatta on the Gold Coast, Australia, in December 2003. Part 1 of the book deals with applications of signal processing to transform what we hear or see to the form that is most suitable for transmission or storage for a future retrieval. The first three chapters in this part are devoted to processing of speech and other audio signals. The next two chapters consider image coding and

compression, while the last chapter of this part describes classification of video sequences in the MPEG domain.

Wireless Communication Systems - Ke-Lin Du 2010-04-15

This practically-oriented, all-inclusive guide covers all the major enabling techniques for current and next-generation cellular communications and wireless networking systems. Technologies covered include CDMA, OFDM, UWB, turbo and LDPC coding, smart antennas, wireless ad hoc and sensor networks, MIMO, and cognitive radios, providing readers with everything they need to master wireless systems design in a single

volume. Uniquely, a detailed introduction to the properties, design, and selection of RF subsystems and antennas is provided, giving readers a clear overview of the whole wireless system. It is also the first textbook to include a complete introduction to speech coders and video coders used in wireless systems. Richly illustrated with over 400 figures, and with a unique emphasis on practical and state-of-the-art techniques in system design, rather than on the mathematical foundations, this book is ideal for graduate students and researchers in wireless communications, as well as for wireless and telecom engineers.