

Simulation Of Mimo Antenna Systems In Simulink

This book offers an up-to-date and comprehensive review of modern antenna systems and their applications in the fields of contemporary wireless systems. It constitutes a useful resource of new material, including stochastic versus ray tracing wireless channel modeling for 5G and V2X applications and implantable devices.

Chapters discuss modern metalens antennas in microwaves, terahertz, and optical domain. Moreover, the book presents new material on antenna arrays for 5G massive MIMO beamforming. Finally, it discusses new methods, devices, and technologies to enhance the performance of antenna systems.

This comprehensive new resource guides professionals in the latest methods used when designing active integrated antennas (AIA) for wireless communication devices for various standards. This book provides complete design procedures for the various elements of such active integrated antennas such as the matching network, the amplifier/active element as well as the antenna. This book offers insight into how active integration and co-design between the active components (amplifier, oscillator, mixer, diodes) and the antenna can provide better power transfer, higher gains, increased efficiencies, switched beam patterns and smaller design footprints. It introduces the co-design approach of active integrated antennas and its superior performance over conventional methods. Complete design examples are given of active integrated antenna systems for narrow and wideband applications as well as for multiple-input-multiple-output (MIMO) systems. Readers find the latest design methods for narrow and broadband RF matching networks. This book provides a complete listing of performance metrics for active integrated antennas. The book serves as a complete reference and design guide in the area of AIA.

This book focuses on recent advances in the field of microstrip antenna design and its applications in various fields including space communication, mobile communication, wireless communication, medical implants and wearable applications. Scholars as well as researchers and those in the electronics/ electrical/ instrumentation engineering fields will benefit from this book. The book shall provide the necessary literature and techniques using which to assist students and researchers would design antennas for the above-mentioned applications and will ultimately enable users to take measurements in different environments. It is intended to help scholars and researchers in their studies, by enhancing their knowledge and skills in on the latest applications of microstrip antennas in the world of communications such as world like IoT, D2D, satellites and wearable devices, to name a few. FEATURES Addresses the complete functional framework workflow in printed antenna design systems Explores the basic and high-level concepts, including advanced aspects in planer design issues, thus serving as a manual for those in the industry while also assisting beginners Provides the latest techniques used for antennas in terms of structure, defected ground, MIMO and fractal designs Discusses case studies related to data-intensive technologies in microchip antennas in terms of the most recent applications and similar uses for the Internet of Things and device-to-device communication

This book presents Proceedings of the International Conference on Intelligent Systems and Networks (ICISN 2021), held at Hanoi in Vietnam. It includes peer-reviewed high-quality articles on intelligent system and networks. It brings together professionals and researchers in the area and presents a platform for exchange of ideas and to foster future collaboration. The topics covered in this book include—foundations of computer science; computational intelligence language and speech processing; software engineering software development methods; wireless communications signal processing for communications; electronics track IoT and sensor systems embedded systems; etc.

Wireless Multi-Antenna Channels

Physics of Multiantenna Systems and Broadband Processing

Fundamentals and Applications

MIMO Antennas for Wireless Communication

Software Engineering, Artificial Intelligence, Networking and Parallel/Distributed Computing

7th International Workshop, SAMOS 2007, Samos, Greece, July 16-19, 2007, Proceedings

The objectives of this work were to investigate, design and implement Multiple-Input Multiple-Output (MIMO) antenna arrays for mobile phones. Several MIMO antennas were developed and tested over various wireless-communication frequency bands. The radiation performance and channel capacity of these antennas were computed and measured; the results are discussed in the context of the frequency bands of interest. A comprehensive study of MIMO antenna configurations such as 2×1 , 3×1 , 2×2 and 3×3 , using polarisation diversity as proposed for future mobile handsets, is presented. The channel capacity is investigated and discussed, as applying to Rayleigh fading channels with different power spectrum distributions with respect to azimuth and zenith angles. The channel capacity of 2×2 and 3×3 MIMO systems using spatial polarisation diversity is presented for different antenna designs. The presented results show that the maximum channel capacity for an antenna contained within a small volume can be reached with careful selection of the orthogonal spatial fields. The results are also compared against planar array MIMO antenna systems, in which the antenna size considered was much larger. A 50% antenna size reduction method is explored by applying magnetic wall concept on the symmetry reference of the antenna structure. Using this method, a triple dual-band inverted-F antenna system is presented and considered for MIMO application. Means of achieving minimum coupling between the three antennas are investigated over the 2.45 GHz and 5.2 GHz bands. A new 2 2 MIMO dual-band balanced antenna handset, intended to minimise the coupling with the handset and human body was proposed, developed and tested. The antenna coupling with the handset and human hand is reported in terms the radiation performance and the available channel capacity. In addition, a dual-polarisation dipole antenna is proposed, intended for use as one of three collocated orthogonal antennas in a polarisation-diversity MIMO communication system. The antenna actually consists of two overlaid electric and magnetic dipoles, such that their radiation patterns are nominally identical but they are cross-polarised and hence only interact minimally.

This book constitutes the joint refereed proceedings of the 19th International Conference on Next Generation Teletraffic and Wired/Wireless Advanced Networks and Systems, NEW2AN 2019, and the 12th Conference on Internet of Things and Smart Spaces, ruSMART 2019. The 66 revised full papers presented were carefully reviewed and selected from 192 submissions. The papers of NEW2AN address various aspects of next-generation data networks, with special attention to advanced wireless networking and applications. In particular, they deal with novel and innovative approaches to performance and efficiency analysis of 5G and beyond systems, employed game-theoretical formulations, advanced queuing theory, and stochastic geometry, while also covering the Internet of Things, cyber security, optics, signal processing, as well as business aspects.ruSMART 2019, provides a forum for academic and industrial researchers to discuss new ideas and trends in the emerging areas. The 12th conference on the Internet of Things and Smart Spaces, ruSMART 2019, provides a forum for academic and industrial researchers to discuss new ideas and trends in the emerging areas.

This ultimate one-stop reference is designed to save you a mountain of work. You get hands-on expertise for every type of mobile antenna base station and terminal system, including its theory of operation, application strengths and weaknesses, performance characteristics, design procedures, analysis techniques, and optimization methods, complete with examples and worked-out calculations at every step.

This book combines semi-physical simulation technology with an Internet of Things (IOT) application system based on novel mathematical methods such as the Fisher matrix, artificial neural networks, thermodynamic analysis, support vector machines, and image processing algorithms. The dynamic testing and semi-physical verification of the theory and application were conducted for typical IOT systems such as RFID systems, Internet of Vehicles systems, and two-dimensional barcode recognition systems. The findings presented are of great scientific significance and have wide application potential for solving bottlenecks in the development of RFID technology and IOT engineering. The book is a valuable resource for postgraduate students in fields such as computer science and technology, control science and engineering, and information science. Moreover, it is a useful reference resource for researchers in IOT and RFID-related industries, logistics practitioners, and system integrators.

Open Architecture for Future Wireless Communications

Capacity Enhancement by Pattern-Reconfigurable Multiple Antenna Systems in Vehicular Applications

Fundamental and Supportive Technologies for 5G Mobile Networks

MIMO Communication for Cellular Networks

Internet of Things, Smart Spaces, and Next Generation Networks and Systems

Reconfigurable Antenna Design and Analysis

Mobile Broadband Multimedia Networks: Techniques, Models and Tools for 4G provides the main results of the prestigious and well known European COST 273 research project on the development of next generation mobile and wireless communication systems. Based on the applied research of over 350

participants in academia and industry, this book focuses on the radio aspects of mobile and wireless broadband multimedia communications, by exploring and developing new methods, models, techniques, strategies and tools towards the implementation of 4th generation mobile and wireless communication systems.

This complete reference includes topics ranging from transmission and signal processing techniques to antennas and diversity, ultra wide band, MIMO and reference scenarios for radio network simulation and evaluation. This book will be an ideal source of the latest developments in mobile multimedia broadband technologies for researchers, R&D engineers, graduates and engineers in industry implementing simulation models and conducting measurements. Based on the well known and respected research of the COST 273 project 'Towards Mobile Broadband Multimedia Networks', whose previous models have been adopted

by standardisation bodies such as ITU, ETSI and 3GPP Gives methods, techniques, models and tools for developing 4th generation mobile and wireless communication systems Includes the latest development of key technologies and methods such as MIMO systems, ultra wide-band and OFDM

The demand for mobile communication systems with high data rates has dramatically increased in recent years. New methods are necessary in order to satisfy this huge communications demand, exploiting the limited resources such as bandwidth and power as efficient as possible. MIMO systems with multiple antenna elements at both link ends are an efficient solution for future wireless communications systems as they provide high data rates by exploiting the spatial domain under the constraints of limited bandwidth and transmit power. "Space-Time Block Coding for Multiple Antenna Systems" is devoted to space-time coding, a MIMO transmit strategy which exploits transmit diversity and high reliability systems. The concept of space-time coding is explained in a systematic way including simulation examples. The book includes algorithm design and detailed performance study of space-time codes for multiple-antenna systems with and without channel state information at the transmitter. This valuable resource will appeal to graduate and postgraduate students, researchers and engineers involved in design and implementation of STC for MIMO systems.

This book offers a technical background to the design and optimization of wireless communication systems, covering optimization algorithms for wireless and 5G communication systems design. The book introduces the design and optimization systems which target capacity, latency, and connection density; including

Enhanced Mobile Broadband Communication (eMBB), Ultra-Reliable and Low Latency Communication (URLLC), and Massive Machine Type Communication (mMTC). The book is organized into two distinct parts: Part I, mathematical methods and optimization algorithms for wireless communications are

introduced, providing the reader with the required mathematical background. In Part II, 5G communication systems are designed and optimized using the mathematical methods and optimization algorithms.

This comprehensive resource presents antenna fundamentals balanced with the design of printed antennas. Over 70 antenna projects, along with design dimensions, design flows and antenna performance results are discussed, including antennas for wireless communication, 5G antennas and beamforming. Examples of smartphone antennas, MIMO antennas, aerospace and satellite remote sensing array antennas, automotive antennas and radar systems and many more printed antennas for various applications are also included. These projects include design dimensions and parameters that incorporate the various techniques used

by industries and academia. This book is intended to serve as a practical microstrip and printed antenna design guide to cover various real-world applications. All Antenna projects discussed in this book are designed, analyzed and simulated using full-wave electromagnetic solvers. Based on several years of the author's research in antenna design and development for RF and microwave applications, this book offers an in-depth coverage of practical printed antenna design methodology for modern applications.

Four Elements Compact MIMO Antenna with Reconfigurable Lower Band and Consistent High Band for Tablet Applications

Algorithms and Implementations

Simulation Performance of Multiple-Input Multiple-Output Systems Employing Single-Carrier Modulation and Orthogonal Frequency Division Multiplexing

Algorithm Design and Performance Study

Multiband Integrated Antennas for 4G Terminals

Micro-Electronics and Telecommunication Engineering

Following the success of the First MOBILIGHT 2009 in Athens, Greece, the Second International Conference on Mobile Lightweight Systems (MOBILIGHT) was held in Barcelona, Spain on May 10-12, 2010. It was not an easy decision to carry on organizing a scientific event on wireless communications, where competition is really enormous. This decision was motivated by discussion with many colleagues about the current unprecedented demand for lig- weight, wireless communication devices with high usability and performance able to support added-value services in a highly mobile environment. Such devices follow the users everywhere they go (at work, at home, while travelling, in a classroom, etc.) and result in exciting research, development and business opportunities. Such scenarios clearly demand significant upgrades to the existing communication paradigm in terms of infrastructure, devices and services to support the "anytime, anywhere, any device" philosophy, providing novel and fast-evolving requirements and expectations on - search and development in the field of information and communication technologies. The core issue is to support wireless users' desire for 24/7 network availability and transparent access to "their own" services. In this context, we continue to envision an international forum where practitioners and researchers coming from the many areas involved in lightweight wireless systems' design and deployment would be able to interact and exchange experiences.

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.

Wireless communications has made a huge leap during the past two decades. The multiple-input-multiple-output (MIMO) technology was proposed in the 1990's as a viable solution that can overcome the data rate limit experienced

by single-input-single-output (SISO) systems. This resource is focused on printed MIMO antenna system design. Printed antennas are widely used in mobile and handheld terminals due to their conformity with the device, low cost, good integration within the device elements and mechanical parts, as well as ease of fabrication. A perfect design companion for practicing engineers, this book provides full design examples from literature, along with detailed illustrations for the various antenna geometries. This resource overviews the various applications that currently depend on printed MIMO antennas, and provides design guidelines and remarks throughout the book for guidance.

Fourth-generation (4G) wireless communications systems are on the horizon, promising to deliver integrated voice, data, and multimedia streaming anywhere, anytime. Antennas are a key aspect of these systems. This book offers engineers comprehensive coverage of the antennas that may be integrated in these complex 4G wireless communications systems.

Modeling and Simulation

Wideband, Multiband, and Smart Antenna Systems

Microstrip and Printed Antennas: Applications-Based Designs

Proceedings of 4th ICMETE 2020

Space-Time Block Coding for Multiple Antenna Systems

Up and Downlink, Link and System Level Simulation

Wireless communication systems in the modern world are bonded to everyone's live in many circumstances every day. The number of times that one will encounter wireless devices has grown to be larger than the number of people on the planet. Therefore, the world's demand on mobile systems, wireless devices, and electronics is creating a large market. Based on the raising communication network, more advanced technology is required to support higher data rate, faster speed, and wider coverage. New technologies will have no limit to continue growing and providing greater communication experience for users in the world. This thesis presents a body of work that designed active antenna system to work with the high data throughput wireless networks and reconfigurable resonance response to make this modern communication possible. Four elements antennas were designed as the objective of this thesis. Their development, fabrication, and analysis is presented in the thesis. Antenna design is built off a planar inverted F antenna (PIFA) with a combination of loop and monopole antenna. This antenna design was chosen for its near omnidirectional pattern, high efficiency, ease in tuning the resonances individually, low cost of fabrication, and dual-band nature. The four elements multiple inputs and multiple outputs (MIMO) is intended to cover all 4G/LTE, 3G, 2G operating in the 700–960 MHz and 1710-2690 MHz frequency bands by using four RF switches to make lower frequency band reconfigurable while maintaining the same matching performance for the higher frequency band. MIMO antenna systems use multiple antennas at the transmit and receive modes along with encoding and decoding algorithms in order to achieve high data rate connections while maintaining robust data links in complex urban environments. This thesis includes an introduction to MIMO system, important parameters used to describe MIMO system and shows the design simulation, and experimental measurement of these MIMO antennas. The MATLAB code for computing MIMO performance parameters has been developed. The MIMO parameters are envelope correlation coefficient (ECC), total active reflection coefficient (TARC), capacity loss, and mean effective gain (MEG). Comparison results for the antenna parameters between simulation and experimental measurement are included in the end.

This edited book presents scientific results of the 17th IEEE/ACIS International Conference on Software Engineering, Artificial Intelligence, Networking and Parallel/Distributed Computing (SNPD 2016)

which was held on May 30 - June 1, 2016 in Shanghai, China. The aim of this conference was to bring together researchers and scientists, businessmen and entrepreneurs, teachers, engineers, computer users, and students to discuss the numerous fields of computer science and to share their experiences and exchange new ideas and information in a meaningful way. Research results about all aspects (theory, applications and tools) of computer and information science, and to discuss the practical challenges encountered along the way and the solutions adopted to solve them.

This book addresses the fundamental design and technical challenges for fifth generation (5G) wireless channel models, including multi-frequency bands and multi-scenarios. The book presents a strong vision for 5G wireless communication networks based on current market trends, proven technologies, and future directions. The book helps enable researchers and industry professionals to come up with novel ideas in the area of wireless heterogeneity, to minimize traffic accidents, to improve traffic efficiency, and to foster the development of new applications such as mobile infotainment. The book acts as a comprehensive reference for students, instructors, researchers, engineers, and other professionals, building their understanding of 5G and in designing 5G systems. Addresses fundamental design and technical challenges for 5G wireless channel models; Presents how to create reliable statistical channel models to capture the propagation properties between transmitters and receivers; Pertinent to researchers, engineers, and professionals in 5G.

Researchers and professionals in the appropriate subject areas will find this book an essential update on where research has got to in what is, after all, a hugely important area. It constitutes the

refereed proceedings of the 7th International Workshop on Systems, Architectures, Modeling, and Simulation, held in Samos, Greece, in July 2007. The 44 revised full papers presented together with 2

keynote talks were thoroughly reviewed and selected from 116 submissions

Theory and Design

Nanoelectronics, Circuits and Communication Systems

Multifunctional Antennas and Arrays for Wireless Communication Systems

Wideband, Multiband, and Smart Reconfigurable Antennas for Modern Wireless Communications

Second International ICST Conference, Mobilight 2010, May 10-12, 2010, Barcelona, Spain, Revised Selected Papers

Design and Optimization for 5G Wireless Communications

A comprehensive and invaluable guide to 5G technology, implementation and practice in one single volume. For all things 5G, this book is a must-read. Signal processing techniques have played the most important role in wireless communication generation of cellular systems. It is anticipated that new techniques employed in 5G wireless networks will not only improve peak service rates significantly, but also enhance capacity, coverage, reliability , low-latency, efficiency, flexibility, convergence to meet the increasing demands imposed by applications such as big data, cloud service, machine-to-machine (M2M) and mission-critical communications. This book is a comprehensive and detailed guide to all signal processing techniques for 5G wireless networks. Uniquely organized into four categories, New Modulation and Coding, New Spatial Processing, New Spectrum Opportunities and New System-level Enabling Technologies, it covers everything from network architecture (link and up-link), protocols and air interface, to cell acquisition, scheduling and rate adaption, access procedures and relaying to spectrum allocations. All technology aspects and major roadmaps of global 5G standard development and deployment are covered in the book. Key Features: Offers step-by-step guidance on bringing 5G technology into practice, by applying algorithms and design methodology to real-time circuit implementation, taking into account rapidly growing applications that have massive data rates systems. Addresses spatial signal processing for 5G, in particular massive multiple-input multiple-output (massive-MIMO), FD-MIMO and 3D-MIMO along with orbital angular momentum multiplexing, 3D beamforming and diversity. Provides comparison and implementations, and compares all multicarrier modulation and multiple access schemes that offer superior data transmission performance including FBMC, GFDM, F-OFDM, UFMC, SEFDM, FTN, MUSA, SCMA and NOMA. Demonstrates the latest signal processing theories into practical solutions for new spectrum opportunities in terms of millimeter wave, full-duplex transmission and license assisted access. Presents well-designed implementation examples, from individual function blocks to complete system architectures, for effective and accurate learning. Covers signal processing aspects of emerging system and network architectures, including ultra-dense networks (UDN), software-defined networks (SDN), device-to-device (D2D) communications and cloud radio access networks (C-RAN).

This book presents selected papers from the 4th International Conference on Micro-Electronics and Telecommunication Engineering, held at SRM Institute of Science and Technology, Ghaziabad, India, during 26–27 September 2020. It covers various topics in micro-electronics and telecommunication engineering, including micro-electronic engineering, computational remote sensing, computer science and intelligent systems, signal and image processing, and information and communication technology. Mobile wireless communication systems have affected every aspect of life. By providing seamless connectivity, these systems enable almost all the smart devices in the world to communicate with high speed throughput and extremely low latency. The evolution of cellular mobile communications, 5G, aims to support the tremendous growth of interconnected things/devices (i.e., internet of things [IoT]) using the current technologies and extending them to be used in higher frequencies to cope with the increasing number of devices. In addition, 5G will provide massive capacity, high throughput, lower end-to-end delay, green communication, cost reduction, and extended coverage area. Fundamental and Supportive Technologies for 5G Mobile Networks provides

technologies used in 5G, their benefits, practical designs, and recent challenges and focuses on future applications that could exploit 5G network benefits. The content within this publication examines cellular communication, data transmission, and communication. It is designed for network analysts, IT specialists, industry professionals, software engineers, researchers, academicians, students, and scientists.

If you're involved with the design, installation or maintenance of mobile antenna systems, this thoroughly revised and updated edition of a classic Artech book offers you the most current and comprehensive coverage of all the mandatory requirements and need for your work in the field. This Second Edition presents critical new material in key areas, including radiation efficiency measurement, mobile phone usage position, and MIMO (multiple-input/multiple-output) antennas. This unique resource includes examinations of all relevant mobile antenna measurement theories, along with practical measurement procedures and examples to show you how it's done. Topics include propagation measurement, antenna characteristics measurement, radio channel measurement, human interaction measurement, base station siting and maintenance, and fading and field simulator systems. Supported with over 130 illustrations and more than 135 equations.

19th International Conference, NEW2AN 2019, and 12th Conference, ruSMART 2019, St. Petersburg, Russia, August 26–28, 2019, Proceedings

Multifunctional MIMO Antennas: Fundamentals and Application

Proceeding of NCCS 2019

Signal Processing for 5G

Mobile Antenna Systems Handbook

Channel Modeling in 5G Wireless Communication Systems

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.

This book provides information about wireless systems and WiMAX modeling. The authors provide various techniques for the WiMAX systems such as antenna diversity and Alamouti coding. The performance of these systems is tested using various types of data and the results of systems are presented and discussed. Additional topics include WiMAX simulation using diversity techniques and real time WiMAX system modeling. The book pertains to researchers, academics, students, and professionals. Provides information about wireless system modeling and WiMAX systems; Presents WiMAX system modeling using antenna diversity techniques and the Alamouti coding scheme; Includes real time WiMAX system modeling for speech signal and digital images.

Modern society thrives on communication that is instant and available at all times, a constant exchange of information that encompasses everything from video streaming to GPS navigation. Experts even suggest that in the near future everything from our cars to our kitchen appliances will be connected to the internet, a feat that would not be possible without advanced wireless technology. Wideband, Multiband, and Smart Reconfigurable Antennas for Modern Wireless Communications showcases current trends and novel approaches in the design and analysis of the antennas that make wireless applications possible, while also identifying unique integration opportunities for antennas and wireless applications to work together. By featuring both theoretical and experimental approaches to integration, this book highlights specific design issues to assist a wide-range of readers including students, researchers, academics, and industry practitioners. This publication features chapters on a broad scope of topics including algorithms and antenna optimization, wireless infrastructure development, wireless applications of intelligent algorithms, antenna architecture, and antenna reconfiguration techniques.

This book presents a comprehensive approach to antenna designs for various applications, including 5G communication, the internet of things (IoT), and wearable devices. It discusses models, designs, and developments of MIMO antennas, antenna performance measurement, 5G communication challenges and opportunities, and MIMO antennas for LTE/ISM applications. It covers important topics including mmWave antennas, antenna arrays for MIMO applications, reconfigurable/band-notched MIMO antennas, multiband MIMO antennas, wideband MIMO antennas, and fractal-based compact multiband hybrid antennas. FEATURES Discusses antenna design optimization techniques in detail Covers MIMO antenna performance measurement, multiband MIMO antennas, and wideband MIMO antennas Discusses modeling, simulation, and specific absorption rate (SAR) analysis of antennas Provides applications including radio-frequency identification (RFID), wearable antennas, and antennas for IoT Multifunctional MIMO Antennas: Fundamentals and Application is useful for undergraduate and graduate students and academic researchers in areas including electrical engineering, electronics, and communication engineering.

Signal Processing, Channel Estimation and Link Adaptation in MIMO-OFDM Systems

Techniques, Models and Tools for 4G

Measurement of Mobile Antenna Systems

Antenna Systems

Printed MIMO Antenna Engineering

Semi-physical Verification Technology for Dynamic Performance of Internet of Things System

The rapid growth in mobile communications has led to an increasing demand for wideband high data rate communications services. In recent years, the Distributed Antenna System (DAS) has emerged as a promising candidate beyond 3G and 4G mobile communications. *Distributed Antenna Systems: Open Architecture for Future Wireless Communications* is a comprehensive technical guide that covers the fundamental concepts, recent advances and open issues of the DAS. The topic is explored with various key challenges in diverse scenarios, including architecture, capacity, connectivity, scalability, medium access control, scheduling, dynamic channel assignment and cross-layer optimization. The primary focus of this book is the introduction of concepts, effective protocols, system integration, performance analysis techniques, simulations and experiments, and more importantly, future research directions in the DAS. The first part of the book introduces DAS fundamentals, including channel models and theoretical issues, examining the capacity of the DAS with different structures. Concentrating on the MAC and protocols for the DAS, the second part of the book includes information on distributed signal processing, optimal resource allocation, cooperative MAC protocols, cross layer design, and distributed organization. The third part presents case studies and applications of the DAS, including experiment, RF engineering, and applications.

This exciting new book focuses on the analysis and design of reconfigurable antennas for modern wireless communications, sensing, and radar. It presents the definitions of basic antenna parameters, an overview of RF switches and explains how to characterize their insertion loss, isolation, and power handling issues. Basic reconfigurable antenna building blocks, such as dipoles, monopoles, patches and slots are described, followed by presentations on frequency reconfigurable antennas, pattern reconfigurable antennas, and basic scanning antenna arrays. Switch biasing in an electromagnetic environment is discussed, as well as simulation strategies of reconfigurable antennas, and MIMO (Multiple Input Multiple Output) reconfigurable antennas. Performance characterization of reconfigurable antennas is also presented. The book provides information for the technical professional to design frequency reconfigurable, pattern reconfigurable, and MIMO antennas all relevant for modern wireless communication systems. Readers learn how to select switching devices, bias them properly, and understand their role in the overall reconfigurable antenna design. The book presents practical experimental implementation issues, including losses due to switches, materials, and EMI (Electromagnetic Interference) and shows how to address those.

Gathering the proceedings of the 12th CHAOS2019 International Conference, this book highlights recent developments in nonlinear, dynamical and complex systems. The conference was intended to provide an essential forum for Scientists and Engineers to exchange ideas, methods, and techniques in the field of Nonlinear Dynamics, Chaos, Fractals and their applications in General Science and the Engineering Sciences. The respective chapters address key methods, empirical data and computer techniques, as well as major theoretical advances in the applied nonlinear field. Beyond showcasing the state of the art, the book will help academic and industrial researchers alike apply chaotic theory in their studies.

As the theoretical foundations of multiple-antenna techniques evolve and as these multiple-input multiple-output (MIMO) techniques become essential for providing high data rates in wireless systems, there is a growing need to understand the performance limits of MIMO in practical networks. To address this need, *MIMO Communication for Cellular Networks* presents a systematic description of MIMO technology classes and a framework for MIMO system design that takes into account the essential physical-layer features of practical cellular networks. In contrast to works that focus on the theoretical performance of abstract MIMO channels, *MIMO Communication for Cellular Networks* emphasizes the practical performance of realistic MIMO systems. A unified set of system simulation results highlights relative performance gains of different MIMO techniques and provides insights into how best to use multiple antennas in cellular networks under various conditions. *MIMO Communication for Cellular Networks* describes single-user, multiuser, network MIMO technologies and system-level aspects of cellular networks, including channel modeling, resource scheduling, interference mitigation, and simulation methodologies. The key concepts are presented with sufficient generality to be applied to a wide range of wireless systems, including those based on cellular standards such as LTE, LTE-Advanced, WiMAX, and WiMAX2. The book is intended for use by graduate students, researchers, and practicing engineers interested in the physical-layer design of state-of-the-art wireless systems.

Simulation and Measurement of MIMO Antennas for Mobile Handsets and Investigations of Channel Capacity of the Radiating Elements Using Spatial and Polarisation Diversity Strategies

Mobile Broadband Multimedia Networks

Embedded Computer Systems: Architectures, Modeling, and Simulation

Distributed Antenna Systems

The Vienna LTE-Advanced Simulators

WiMAX Modeling: Techniques and Applications

This book provides current R&D trends and novel approaches in design and analysis of broadband, multiband, and smart antennas for 5G and B5G mobile and wireless applications, as well as the identification of integration techniques of these antennas in a diverse range of devices. The book presents theoretical and experimental approaches to help the reader in understanding the unique design issues and more advanced research. Moreover, the book includes chapters on the fundamentals of antenna theory. The book is pertinent to professionals and researchers working in the field of antenna engineering; it is written for graduate students, researchers, academics, and industry practitioners who want to improve their understanding in the current research trends in design analysis of broadband, multiband, and smart antennas for wireless applications.

This book introduces the Vienna Simulator Suite for 3rd-Generation Partnership Project (3GPP)-compatible Long Term Evolution-Advanced (LTE-A) simulators and presents applications to demonstrate their uses for describing, designing, and optimizing wireless cellular LTE-A networks. Part One addresses LTE and LTE-A link level techniques. As there has been high demand for the downlink (DL) simulator, it constitutes the central focus of the majority of the chapters. This part of the book reports on relevant highlights, including single-user (SU), multi-user (MU) and single-input-single-output (SISO) as well as multiple-input-multiple-output (MIMO) transmissions. Furthermore, it summarizes the optimal pilot pattern for high-speed communications as well as different synchronization issues. One chapter is devoted to experiments that show how the link level simulator can provide input to a testbed. This section also uses measurements to present and validate fundamental results on orthogonal frequency division multiplexing (OFDM) transmissions that are not limited to LTE-A. One chapter exclusively deals with the newest tool, the uplink (UL) link level simulator, and presents cutting-edge results. In turn, Part Two focuses on system-level simulations. From early on, system-level simulations have been in high demand, as people are naturally seeking answers when scenarios with numerous base stations and hundreds of users are investigated. This part not only explains how mathematical abstraction can be employed to speed up simulations by several hundred times without sacrificing precision, but also illustrates new theories on how to abstract large urban heterogeneous networks with indoor small cells. It also reports on advanced applications such as train and car transmissions to demonstrate the tools' capabilities.

This book features selected papers presented at the Fifth International Conference on Nanoelectronics, Circuits and Communication Systems (NCCS 2019). It covers a range of topics, including nanoelectronic devices, microelectronics devices, material science, machine learning, Internet of things, cloud computing, computing systems, wireless communication systems, advances in communication 5G and beyond. Further, it discusses VLSI circuits and systems, MEMS, IC design and testing, electronic system design and manufacturing, speech signal processing, digital signal processing, FPGA-based wireless communication systems and FPGA-based system design, Industry 4.0, e-farming, semiconductor memories, and IC fault detection and correction.

An analysis of the physics of multiantenna systems Multiple-Input Multiple-Output (MIMO) technology is one of the current hot topics in emerging wireless technologies. This book fills the important need for an authoritative reference on the merits of MIMO systems based on physics and provides a sound theoretical basis for its practical implementation. The book also addresses the important issues related to broadband adaptive processing. Written by three internationally known researchers, Physics of Multiantenna Systems and Broadband Processing: Provides a thorough discussion of the physical and mathematical principles involved in MIMO and adaptive systems Examines the electromagnetic framework of wireless communications systems Uses Maxwell's theory to provide a system-based framework for the abstract concept of channel capacity Performs various numerical simulations to observe how a typical system will behave in practice Provides a mathematical formulation for broadband adaptive processing and direction-of-arrival estimation using real antenna arrays Integrates signal processing and electromagnetics to address the performance of realistic multiantenna systems With Physics of Multiantenna Systems and Broadband Processing, communication systems engineers, graduate students, researchers, and developers will gain a thorough, scientific understanding of this important new technology.

Mobile Lightweight Wireless Systems

Design and Applications of Active Integrated Antennas

Microstrip Antenna Design for Wireless Applications

Intelligent Systems and Networks

Selected Articles from ICISN 2021, Vietnam

This thesis investigates the simulation performance of multiple-input multiple-output (MIMO) systems utilizing Alamouti-based space-time block coding (STBC) technique. The MIMO communication systems using STBC technique employing both single-carrier modulation and orthogonal frequency division multiplexing (OFDM) are simulated in Matlab. The physical layer part of the IEEE 802.16a standard is used in constructing the simulated OFDM schemes. Stanford University Interim (SUI) channel models are selected for the wireless channel in the simulation process. The performance results of the simulated MIMO systems are compared to those of conventional single antenna systems.

This book offers a practical guide on how to use and apply channel models for system evaluation In this book, the authors focus on modeling and simulation of multiple antennas channels, including multiple input multiple output (MIMO) communication channels, and the impact of such models on channel estimation and system performance. Both narrowband and wideband models are addressed. Furthermore, the book covers topics related to modeling of MIMO channel, their numerical simulation, estimation and prediction, as well as applications to receive diversity, capacity and space-time coding techniques. Key Features: Contains significant background material, as well as novel research coverage, which make the book suitable for both graduate students and researchers Addresses issues such as key-hole, correlated and non i.i.d. channels in the frame of the Generalized Gaussian approach Provides a unique treatment of generalized Gaussian channels and orthogonal channel representation Reviews different interpretations of scattering environment, including geometrical models Focuses on the analytical techniques which give a good insight into the design of systems on higher levels Describes a number of numerical simulators demonstrating the practical use of this material. Includes an accompanying website containing additional materials and practical examples for self-study This book will be of interest to researchers, engineers, lecturers, and graduate students.

12th Chaotic Modeling and Simulation International Conference

Investigation, Design and Implementation of MIMO Antennas for Mobile Phones