

Antenna Design For Le Devices

Design of Ultra Wideband Antenna Matching Networks: via Simplified Real Frequency Technique (SRFT) will open up a new horizon for design engineers, researchers, undergraduate and graduate students to construct multi-band and ultra wideband antenna matching networks for antennas which in turn will push the edge of technology to manufacture new generation of complex communication systems beyond microwave frequencies both in commercial and military line. In Design of Ultra Wideband Antenna Matching Networks, many real life examples are presented to design antenna matching networks over HF and cellular commercial multi-band frequencies. For each example, open MatLab source codes are provided so that the reader can easily generate and verify the results of the examples included in the book. 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.

This Book Has Been Designed For Both The Undergraduate And Postgraduate In Electronic Engineering, Electrical Communication Engineering And Electrical Engineering, And For The Postgraduate In Physics Specialising In Electronics. It Is A Compact And Comprehensive Text And It Stresses The Basic Principles Of Antenna Theory And Practice. Starting With Electromagnetics And The Theory Of Radiation Which Forms The Basis Of Antenna Theory, It Treats In Detail Different Types Of Antennas Like The Linear Antenna, The Cylindrical Antenna, The Biconical Antenna, The Loop Antenna, The Helical Antenna, Slot And Microstrip Antennas, Horn Antennas, Reflector Antennas, Lens Antennas, Leaky Wave And Surface-Wave Antennas Including Dielectric And Dielectric Loaded Antennas, Wide Band Antennas And Some Modern Special Types Of Antennas. There Are Also Chapters On Antenna Synthesis, Antenna Practice, Antenna Measurements And Electromagnetic Wave Propagation. The Detailed Coverage Of Electromagnetic Theory Enables The Student To Understand The Theoretical Aspects With Comparative Ease. The Chapters On Antenna Synthesis, Antenna Practice And Antenna Measurements Are Useful For The Practical Antenna Engineer. The Problems At The End Of Chapters, Tables And Numerous Illustrations Add To The Value Of The Text. In This Second Edition A New Chapter On Antenna Impedance And Some Solved Problems Have Been Added. The Book Presupposes Only The Knowledge Of Mathematics Which A Student Of Undergraduate Engineering Or Undergraduate Physics Has Required.

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 textures for specific designs. This book will bring readers current, addressing 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 detection radar systems Elaborates design methods including waveguide-based feeding network, three-dimensional feeding structure, dielectric loaded aperture antenna element, and low-sidelobe synthesis The millimeter wave 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.

Presents an overview of CubeSat antennas designed at the Jet Propulsion Laboratory (JPL) CubeSats—nanosatellites built to standard dimensions of 10cm x 10 cm x cm—are making space-based Earth science observation and interplanetary space science affordable, accessible, and rapidly deployable for institutions such as universities and smaller space agencies around the world. CubeSat Antenna Design is an up-to-date overview of CubeSat antennas designed at NASA's Jet Propulsion Laboratory (JPL), covering the systems engineering knowledge required to design these antennas from a radio frequency and mechanical perspective. This authoritative volume features contributions by leading experts in the field, providing insights on mission-critical design requirements for state-of-the-art CubeSat antennas and discussing their development, capabilities, and applications. The text begins with a brief introduction to

CubeSats, followed by a detailed survey of low-gain, medium-gain, and high-gain antennas. Subsequent chapters cover topics including the telecommunication subsystem of Mars Cube One (MarCO), the enabling technology of Radar in a CubeSat (RainCube), the development of a one-meter mesh reflector for telecommunication at X- and Ka-band for deep space missions, and the design of multiple metasurface antennas. Written to help antenna engineers to enable new CubeSat NASA missions, this volume: Describes the selection of high-gain CubeSat antennas to address specific mission requirements and constraints for instruments or telecommunication Helps readers learn how to develop antennas for future CubeSat missions Provides key information on the effect of space environment on antennas to inform design steps Covers patch and patch array antennas, deployable reflectarray antennas, deployable mesh reflector, inflatable antennas, and metasurface antennas CubeSat Antenna Design is an important resource for antenna/microwave engineers, aerospace systems engineers, and advanced graduate and postdoctoral students wanting to learn how to design and fabricate their own antennas to address clear mission requirements.

Using a systems framework, this textbook provides a clear and comprehensive introduction to the performance, analysis and design of radio systems for students and practising engineers. Presented within a consistent framework, the first part of the book describes the fundamentals of the subject: propagation, noise, antennas and modulation. The analysis and design of radios, including RF circuit design and signal processing, is covered in the second half of the book. The former is presented with minimal involvement of Smith charts, enabling students to grasp the fundamentals more readily. Both traditional and software-defined/direct sampling technology are described, with pros and cons of each strategy explained. Numerous examples within the text involve realistic analysis and design activities, and emphasize how practical experiences may differ from theory or taught procedures. End-of-chapter problems are provided, as are a password-protected solutions manual and lecture slides to complete the teaching package for instructors.

This book presents the fundamental background theory and analytical techniques of antenna design. It deals with a very wide range of antenna types, operating from very low frequencies to millimetre waves.

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.

Concurrent Engineering (CE) is based on the premise that different phases of a product's lifecycle should be conducted concurrently and initiated as early as possible within the Product Creation Process (PCP). It has become the substantive basic methodology in many industries, including automotive, aerospace, machinery, shipbuilding, consumer goods, process industry and environmental engineering. CE aims to increase the efficiency of the PCP and reduce errors in later phases while incorporating considerations for full lifecycle and through-life operations. This book presents the proceedings of the 22nd ISPE Inc. (International Society for Productivity Enhancement) International Conference on Concurrent Engineering (CE2015) entitled 'Transdisciplinary Lifecycle Analysis of Systems', and held in Delft, the Netherlands, in July 2015. It is the second in the series 'Advances in Transdisciplinary Engineering'. The book includes 63 peer reviewed papers and 2 keynote speeches arranged in 10 sections: keynote speeches; systems engineering; customization and variability management; production oriented design, maintenance and repair; design methods and knowledge-based engineering; multidisciplinary product management; sustainable product development; service oriented design; product lifecycle management; and trends in CE. Containing papers ranging from the theoretical and conceptual to the highly pragmatic, this book will be of interest to all engineering professionals and practitioners; researchers, designers and educators.

This book presents selected papers from the Sixteenth International Conference on Intelligent Information Hiding and Multimedia Signal Processing, in conjunction with the Thirteenth International Conference on Frontiers of Information Technology, Applications and Tools, held on November 5-7, 2020, in Ho Chi Minh City, Vietnam. It is divided into two volumes and discusses the latest research outcomes in the field of Information Technology (IT) including information hiding, multimedia signal processing, big data, data mining, bioinformatics, database, industrial and Internet of things, and their applications.

This book focuses on elementary concepts of both radio frequency energy harvesting (RFEH) and wireless power transfer (WPT), and highlights their fundamental requirements followed by recent advancements. It provides a systematic overview of the key components required for RFEH and WPT applications and also comprehensively introduces the pioneering research advancements achieved to date. The state-of-the-art circuit design topologies for the two different applications are presented mainly in terms of antenna operating frequencies, polarization characteristics, efficient matching network circuits, rectifier topologies, and overall rectenna systems. The book serves as a single point of reference for practicing engineers and researchers searching for potential sources and elements involved in the RFEH system as well as in the WPT system, and need rapid training and design guidelines in the following areas: • Different sensing elements used in RFEH and WPT • Inclusions of mathematical expressions and design problems • Illustration of some design examples and performance enhancement techniques

This book highlights technology trends and challenges that trace the evolution of antenna design, starting from 3rd generation phones and moving towards the latest release of LTE-A. The authors explore how the simple monopole and whip antenna from the GSM years have evolved towards what we have today, an antenna design that is compact, multi-band in nature and caters to multiple elements on the same patch to provide high throughput connectivity. The scope of the book targets a broad range of subjects, including the microstrip antenna, PIFA antenna, and the monopole antenna to be used for different applications over three different mobile generations. Beyond that, the authors take a step into the future and look at antenna requirements for 5G communications, which already has the 5G drive in place with prominent scenarios and use-cases emerging. They examine these, and put in place the challenges that lie ahead for antenna design, particularly in mm-Wave design. The book provides a reference for practicing engineers and under/post graduate students working in this field.

Providing up-to-date material for UWB antennas and propagation as used in a wide variety of applications, "Ultra-wideband Antennas and Propagation for Communications, Radar and Imaging" includes fundamental theory, practical design information and extensive discussion of UWB applications from biomedical imaging, through to radar and wireless communications. An in-depth treatment of ultra-wideband signals in practical environments is given, including interference, coexistence and diversity considerations. The text includes antennas and propagation in biological media in addition to more conventional environments. The topics covered are approached with the aim of helping practising engineers to view the subject from a different angle, and to consider items as variables that were treated as constants in narrowband and wideband systems. Features tables of propagation data, photographs of antenna systems and graphs of results (e.g. radiation patterns, propagation characteristics) Covers the fundamentals of antennas and propagation, as well as offering an in-depth treatment of antenna elements and arrays for UWB systems, and UWB propagation models Provides a description of the underlying concepts for the design of antennas and arrays for conventional as well as ultra-wideband systems Draws together UWB theory by using case-studies to show applications of antennas and propagation in communication, radar and imaging systems The book highlights the unique design issues of using ultra-wideband and will serve both as an introductory text and a reference guide for designers and students alike.

Radio Frequency Identification (RFID) is a modern wireless data transmission and reception technique for applications including automatic identification, asset tracking and security surveillance. This book focuses on the advances in RFID tag antenna and ASIC design, novel chipless RFID tag design, security protocol enhancements along with some novel applications of RFID.

Written by one of the world's leading experts in the field, this book is intended as an advanced text for courses in antennas, with a focus on the mature but vital background field of aperture antennas. It is aimed at final year, MSc, PhD and post-doctoral students, as well as readers who are moving from academia into industry, beginning careers as wireless engineers, system designers, in R&D, or for practising engineers. It assumes the reader has undertaken an earlier course of study on Maxwell's equations, fields and waves. Some of these topics are summarized in the early few chapters in order to provide continuity and background for the remaining chapters. The aperture antennas covered include the main types of horns, reflectors and arrays as well as microstrip patches, reflectarrays and lenses. To provide more than a superficial treatment of arrays, the topic of mutual coupling is covered in greater detail compared to most similar books in this area. Also included is an introduction to arrays on non-planar surfaces, which are important in applications that involve curved surfaces such as in aerodynamics or for making aperture antennas unobtrusive. A chapter is included on some modern aperture antennas to illustrate design techniques beyond the most common types of aperture antennas described in the early chapters. This is to show where advances have recently been made and where they could be improved in the future. Also included are selective topics that are practical in nature for aperture antennas, namely fabrication and measurement.

Ultrawideband (UWB) technology, positioned as the cutting edge of research and development, paves the way to meet the emerging demands set by broadband wireless applications, such as high-speed data transmission, medical imaging, short-range radars, electromagnetic testing, etc. This breathtaking resource builds upon the basics of UWB technology to provide a complete compilation of figures of merit along with a vital state-of-the-art of the different antenna alternatives that are to be employed according to the specific application. Without excessive recourse to mathematics, this volume emphasizes on the UWB antenna design and equips readers with practical prediction techniques based on simple formulas and models. The big picture of UWB antenna technology would not be complete without addressing its applications, and this will serve to provide consultants with key clues for market gap analysis. Containing over 150 supporting illustrations and figures, this comprehensive overview of UWB technology, antenna design and applications is a vital source of information and reference for R&D organizations, researchers, practitioners, consultants, RF professionals and communication engineers. Contents: Introduction to Ultrawideband Systems (C Ling) Figures of Merit for UWB Antennas (D Puente & D Valderas) Classification of UWB Antennas (D Puente & D Valderas) UWB Monopole Antenna Analysis (D Valderas & J I Sancho) UWB Monopole Antenna Bandwidth Synthesis (D Valderas & J I Sancho) UWB Monopole Antenna Bandwidth Maximisation (D Valderas & J I Sancho) UWB Folded Monopole Antennas (D Valderas & J I Sancho) Revolution Monopole Antennas (D Valderas & J I Sancho) Printed Circuit Monopoles (D Valderas & J I Sancho) Applications of UWB Antennas (X-D Chen) Readership: R&D organizations, researchers, practitioners, consultants, RF professionals and communication engineers. Keywords: Ultrawideband Antennas; Broadband Antennas; Monopole Antennas; UWB; Wireless Communications; Medical Imaging; EM Testing; Short-Range Communications; Radar Key Features: Provides a complete compilation of design alternatives and figures of merit for UWB antennas Includes a comprehensive model for UWB antennas Gives a coverage on the tips and tricks for UWB antenna design (3D and printed). Contains over 150 illustrations and figures Offers an overview of UWB wireless technology and applications for research planning Reviews: "This applications-oriented book is very well written, with good technical depth, limited mathematical theory, and a wealth of practical information for UWB antenna design, and it should be a welcome addition to your library. Any of our readers who either design antennas for ultrabroadband wireless applications or want to learn about this in-demand technology will find this book essential to their work." IEEE Electrical Insulation Magazine "This is an excellent book for those designing UWB antennas and for understanding the operation of these antennas. It is loaded with up-to-date useful information regarding UWB and would make a great addition to the UWB researcher's library." IEEE Electrical Insulation Magazine

A practical book written for engineers who design and use antennas The author has many years of hands on experience designing antennas that were used in such applications as the Venus and Mars missions of NASA The book covers all important topics of modern antenna design for communications Numerical methods will be included but only as much as are needed for practical applications

The concepts presented in this book are some of the new advancements in the design of structural health monitoring systems. It is envisaged that such advancements will lead to smart structural health monitoring that will result in sustainable engineering systems. Sustainability is considered an important objective in today's engineering design due to the current state of climate change and global warming, both of which are hugely aggravated by industrial and construction activities. This book presents demonstrations of and applications for new advancements such as infrared thermography, ultrasonic guided waves, and strain sensors, among others. The information presented will encourage further research and implementation of these advanced techniques and technologies in structural health monitoring.

This book presents the technology of millimetre waves and Terahertz (THz) antennas. It highlights the importance of moderate and high-gain aperture antennas as key devices for establishing point-to-point and point-to-multipoint radio links for far-field and near-field applications, such as high data-rate communications, intelligent transport, security imaging, exploration and surveillance systems. The book provides a comprehensive overview of the key antenna technologies developed for the mm wave and THz domains, including established ones – such as integrated lens antennas, advanced 2D and 3D horn antennas, transmit and reflect arrays, and Fabry-Perot antennas – as well as emerging metasurface antennas for near-field and far-field applications. It describes the pros and cons of each antenna technology in comparison with other available solutions, a discussion supplemented by practical examples illustrating the step-by-step implementation procedures for each antenna type. The measurement techniques available at these frequency ranges are also presented to close the loop of the antenna development cycle. In closing, the book

outlines future trends in various antenna technologies, paving the way for further developments. Presenting content originating from the five-year ESF research networking program 'Newfocus' and co-authored by the most active and highly cited research groups in the domain of mm- and sub-mm-wave antenna technologies, the book offers a valuable guide for researchers and engineers in both industry and academia.

The book presents an engineering approach for the development of metamaterials and metasurfaces with emphasis on application in antennas. It offers an in-depth study, performance analysis and extensive characterization on different types of metamaterials and metasurfaces. Practical examples included in the book will help readers to enhance performance of antennas and also develop metamaterial-based absorbers for a variety of applications. Key Features Provides background for design and development of metamaterial structures using novel unit cells Gives in-depth performance study of miniaturization of microstrip antennas Discusses design and development of both transmission and reflection types, metasurfaces and their practical applications. Verifies a variety of Metamaterial structures and Metasurfaces experimentally The target audience of this book is postgraduate students and researchers involved in antenna designs. Researchers and engineers interested in enhancing the performance of the antennas using metamaterials will find this book extremely useful. The book will also serve as a good reference for developing artificial materials using metamaterials and their practical applications. Amit K. Singh is Assistant Professor in the Department of Electrical Engineering at the Indian Institute of Technology Jammu, India. He is a Member of the IEEE, USA. Mahesh P. Abegaonkar is Associate Professor at the Centre for Applied Research in Electronics at the Indian Institute of Technology Delhi. He is a Senior Member of the IEEE, USA. Shibani Kishen Koul is Emeritus Professor at the Centre for Applied Research in Electronics at the Indian Institute of Technology Delhi. He is a Life Fellow of the Institution of Electrical and Electronics Engineers (IEEE), USA, a Fellow of the Indian National Academy of Engineering (INAE), and a Fellow of the Institution of Electronics and Telecommunication Engineers (IETE).

Based on Bahl and Bhartia's popular 1980 classic, *Microstrip Antennas*, this all new book provides the detail antenna engineers and designers need to design any type of microstrip antenna. After addressing essential microchip antenna theory, the authors highlight current design and engineering practices, emphasizing the most pressing issues in this area, including broadbanding, circular polarization, and active microstrip antennas in particular. Special design challenges, ranging from dual polarization, high bandwidth, and surface wave mitigation, to choosing the proper substrate, and shaping an antenna to achieve desired results are all covered.

Antennas From Theory to Practice Comprehensive coverage of the fundamentals and latest developments in antennas and antenna design In the newly revised Second Edition of *Antennas: From Theory to Practice*, renowned researcher, engineer, and author Professor Yi Huang delivers comprehensive and timely coverage of issues in modern antenna design and theory. Practical and accessible, the book is written for engineers, researchers, and students who work with radio frequency/microwave engineering, radar, and radio communications. The book details the basics of transmission lines, radiowaves and propagation, antenna theory, antenna analysis and design using industrial standard design software tools and the theory of characteristic modes, antenna measurement equipment, facilities, and techniques. It also covers the latest developments in special topics, like small and mobile antennas, wide- and multi-band antennas, automotive antennas, RFID, UWB, metamaterials, reconfigurable and MIMO antennas, and more. The new edition includes up to date information on a wide variety of newly relevant topics and trends, like adaptive impedance matching, the theory of characteristic modes, antenna materials and fabrication processes, and over-the-air (OTA) antenna system measurements. Many questions and examples are provided which enhances the learning experience. The book covers: An introduction to circuit concepts and transmission lines, including lumped and distributed element systems, transmission line theory, and the Smith Chart An exploration of field concepts and radiowaves, including wave equations and solutions and radiowave propagation mechanisms, characteristics, and models Discussions of antenna basics and popular antennas, including wire-type antennas, aperture-type antennas, and antenna arrays Information about antenna manufacturing and measurements, including antenna measurement facilities and methods The use of industrial standard simulation tools for antenna design and analysis Perfect for engineers and researchers who work in RF engineering or radar and radio communications, *Antennas: From Theory to Practice, Second Edition* will also earn a place on the bookshelves of university students seeking a concise and practical introduction to the basics of antennas and antenna design.

This one-of-a-kind new resource presents cognitive radio from an antenna design perspective and introduces the concept of cognitive radio as a protocol that benefits from under-utilized regions of the spectrum. This book covers topics that govern the operation of a cognitive radio and discusses the use of reconfigurable antennas, reconfigurable filters, and MIMO antennas for cognitive radio. The analysis and design of different antenna systems are presented, compared and evaluated. New approaches to improve spectrum efficiency are explored by demonstrating how to design software controlled cognitive radio antenna systems. This new resource shows how to communicate using either interweave or underlay cognitive radio and demonstrates the benefits of designing appropriate sensing and communicating antennas. The first part of the book introduces the basic concept of cognitive radio and discusses the difference between cognitive radio and software defined radio from the RF system's perspective. The second part of the book discusses the main antenna design requirements, procedures and challenges for cognitive radio. The third part of the book introduces new trends in cognitive radio implementation such as the implementation of MIMO antennas on cognitive radio, the use of machine learning techniques to optimize the performance of a cognitive radio environment, and the implementation of cognitive radar and cognitive radio in space.

Stutzman's 3rd edition of *Antenna Theory and Design* provides a more pedagogical approach with a greater emphasis on computational methods. New features include additional modern material to make the text more exciting and relevant to practicing engineers; new chapters on systems, low-profile elements and base station antennas; organizational changes to improve understanding; more details to selected important topics such as microstrip antennas and arrays; and expanded measurements topic.

Foreword from Arogyaswami Paulraj, Professor (Emeritus), Stanford University (USA) The first book to show how MIMO principles can be implemented in today's mobile broadband networks and components Explains and solves some of the practical difficulties that arise in designing and implementing MIMO systems Both theory and implementation sections are written in the context of the most recent standards: IEEE 802.11n (WiFi); IEEE 802.16 (WiMAX); 4G networks (3GPP/3GPP2, LTE)

Wireless applications are now an integral part of everyday life. On the one hand, these applications are being praised for making lives better by facilitating efficient communication and effectively treating disease. On the other hand, they are criticised for

invading privacy and representing a potential health hazard. In any case, we are aware of them everywhere in sound, image and data carrying systems, but they are also intrinsic to weather and traffic monitoring systems and in defence and security technology. In recognition of the need for continuous and sustained effort in the field of antenna engineering, the WiSE project (Wide Band Sparse Element Array Antennas) was initiated in 2004 to assemble a catalogue of wide-band radiators and explore the functional possibilities of a shared aperture concept. This book is a collection of papers which offers a retrospective of the WiSE project's main achievements, whilst also assessing their relevance within a wider antenna engineering perspective. There is a constant demand from wireless systems to provide increased performance; higher channel transmission capacity for multimedia and the pattern shaping and beam agility required for high-end radar and space-borne telecommunications. Addressing innovative concepts and state-of-the-art aspects in array antenna design, manufacturing and measurement, this volume provides an overview of the increasingly complex functionalities demanded by evolving radio services. IOS Press is an international science, technical and medical publisher of high-quality books for academics, scientists, and professionals in all fields. Some of the areas we publish in: -Biomedicine -Oncology -Artificial intelligence -Databases and information systems -Maritime engineering -Nanotechnology -Geoengineering -All aspects of physics -E-governance -E-commerce -The knowledge economy -Urban studies -Arms control -Understanding and responding to terrorism -Medical informatics -Computer Sciences

An authoritative guide to the latest developments for the design of low-cost smart antennas Traditional smart antenna systems are costly, consume great amounts of power and are bulky size. Low-cost Smart Antennas offers a guide to designing smart antenna systems that are low cost, low power, and compact in size and can be applied to satellite communications, radar and mobile communications. The authors — noted experts on the topic — provide introductions to the fundamental concepts of antennas, array antennas and smart antennas. The book fills a gap in the literature by presenting the design techniques of low-cost radio frequency (RF) smart antennas as well as approaches for implementing the hardware of the antenna and the beamforming network (BFN). A comprehensive and accessible book, Low-cost Smart Antennas not only presents an up-to-date review of the topic but includes illustrative case studies that contain in-depth explorations of the theory and technology of smart antennas. While other resources highlight the software (signal processing algorithms), this book is unique by focusing on the antenna hardware. This important book: Offers an introduction to the most recent developments of the design of low-cost smart antennas and their applications Presents a unique book that puts the focus on antenna hardware Includes a variety of case studies that clearly demonstrate the implementation of current design techniques Introduces both fundamental theories as well as more advanced topics Written for students and researchers and antenna engineers, Low-cost Smart Antennas explores the most recent advances in the field with an emphasis on antenna hardware.

This book comprehensively reviews the state of the art in millimeter-wave antennas, traces important recent developments and provides information on a wide range of antenna configurations and applications. While fundamental theoretical aspects are discussed whenever necessary, the book primarily focuses on design principles and concepts, manufacture, measurement techniques, and practical results. Each of the various antenna types scalable to millimeter-wave dimensions is considered individually, with coverage of leaky-wave and surface-wave antennas, printed antennas, integrated antennas, and reflector and lens systems. The final two chapters address the subject from a systems perspective, providing an overview of supporting circuitry and examining in detail diverse millimeter-wave applications, including high-speed wireless communications, radio astronomy, and radar. The vast amount of information now available on millimeter-wave systems can be daunting for researchers and designers entering the field. This book offers readers essential guidance, helping them to gain a thorough understanding based on the most recent research findings and serving as a sound basis for informed decision-making.

Updated with color and gray scale illustrations, a companion website housing supplementary material, and new sections covering recent developments in antenna analysis and design This book introduces the fundamental principles of antenna theory and explains how to apply them to the analysis, design, and measurements of antennas. Due to the variety of methods of analysis and design, and the different antenna structures available, the applications covered in this book are made to some of the most basic and practical antenna configurations. Among these antenna configurations are linear dipoles; loops; arrays; broadband antennas; aperture antennas; horns; microstrip antennas; and reflector antennas. The text contains sufficient mathematical detail to enable undergraduate and beginning graduate students in electrical engineering and physics to follow the flow of analysis and design. Readers should have a basic knowledge of undergraduate electromagnetic theory, including Maxwell's equations and the wave equation, introductory physics, and differential and integral calculus. Presents new sections on flexible and conformal bowtie, Vivaldi antenna, antenna miniaturization, antennas for mobile communications, dielectric resonator antennas, and scale modeling Provides color and gray scale figures and illustrations to better depict antenna radiation characteristics Includes access to a companion website housing MATLAB programs, Java-based applets and animations, Power Point notes, Java-based interactive questionnaires and a solutions manual for instructors Introduces over 100 additional end-of-chapter problems Antenna Theory: Analysis and Design, Fourth Edition is designed to meet the needs of senior undergraduate and beginning graduate level students in electrical engineering and physics, as well as practicing engineers and antenna designers. Constantine A. Balanis received his BSEE degree from the Virginia Tech in 1964, his MEE degree from the University of Virginia in 1966, his PhD in Electrical Engineering from The Ohio State University in 1969, and an Honorary Doctorate from the Aristotle University of Thessaloniki in 2004. From 1964 to 1970, he was with the NASA Langley Research Center in Hampton, VA, and from 1970 to 1983, he was with the Department of Electrical Engineering of West Virginia University. In 1983 he joined Arizona State University and is now Regents' Professor of Electrical Engineering. Dr. Balanis is also a life fellow of the IEEE.

Compact antennas are a subject of growing interest from industry and scientific community to equip wireless communicating objects. The need for high performance small antennas and RF front ends is the challenge for future and next generation mobile devices. This book brings the body of knowledge on compact antennas into a single comprehensive volume. It is designed to meet the needs of electrical engineering and physics students to the senior undergraduate and beginning graduate levels, and those of practicing engineers.

Expanded and updated, this practical guide is a one-stop design reference containing all an engineer needs when designing antennas Integrates state-of-the-art technologies with a special section for step-by-step antenna design Features up-to-date bio-safety and electromagnetic compatibility regulation compliance and latest standards Newly updated with MIMO antenna design, measurements and requirements Accessible to readers of many levels, from introductory to specialist Written by a practicing expert who has hired and trained numerous engineers

In the last 40 years, the microstrip antenna has been developed for many communication systems such as radars, sensors, wireless, satellite, broadcasting, ultra-wideband, radio frequency identifications (RFIDs), reader devices etc. The progress in modern wireless communication systems has dramatically increased the demand for microstrip antennas. In this book some recent advances in microstrip antennas are presented.

Sustaining current increases in wireless data rates has driven engineers of all related backgrounds to seek fresh and innovative approaches in wireless system design. With the advancement of RF switching technology, transceiver architectures, and digital signal processing capabilities, the pressure now falls on the antenna designs for future broadband and adaptive wireless services. The first part of the work focuses on enhancing the bandwidth of low-profile patch antennas for circularly-polarized (CP) wireless systems. We start with an in-depth examination of the CP patch antenna cavity model and reveal that traditional circularly polarized (CP) patch antennas are not being utilized to their full potential for bandwidth. Some new modifications to enable broader bandwidths are proposed. A high-performance antenna for future Mars Rover missions is also discussed, and a novel CP Half E-shaped patch antenna subarray was developed and prototyped to demonstrate its use. Another concept uses composite right/left-handed (CRLH) transmission lines towards creating wideband CP arrays. Our resulting array prototype using a CRLH transmission line feed network showed an overall bandwidth of 60%, which is a formidable increase compared to designs using conventional quarter-wavelength transmission lines. In the second part of this work, reconfigurable antenna functionalities for software and cognitive radios are pursued. With the development of practical reconfigurable antenna simulation models in conjunction with nature-inspired optimization techniques, two reconfigurable E-shaped patch antenna implementations are evaluated for potential use as frequency or polarization reconfigurable antennas. This is particularly useful for systems wanting to achieve unidirectional patterns with a low-profile antenna. Both the frequency and polarization reconfigurable designs were optimized, fabricated, and characterized through measurement. Our frequency reconfigurable E-shaped patch antenna design is able to support an overall bandwidth of 50% by incorporating MEMS switches. The CP reconfigurable version design provided CP bandwidths of 17% and 20% for an element and array concept, respectively. Lastly, a rejection reconfigurable array element is developed. The design uses a reconfigurable frequency rejection slot within a wideband monopole antenna, and some simulation and experimental measurement studies are undertaken. By integrating another reconfigurable filter, a higher-order filter capability is achieved, leading to stronger rejection levels from strong blockers.

Printed antennas have become an integral part of next-generation wireless communications and have been found to be commonly used to improve system capacity, data rate, reliability, etc. This book covers theory, design techniques, and the chronological regression of the printed antennas for various applications. This book will provide readers with the basic conceptual knowledge about antennas along with advanced techniques for antenna design. It covers a variety of analytical techniques and their CAD applications and discusses new applications of printed antenna technology such as sensing. The authors also present special reconfigurable antennas such as ME dipole, polarization, feeding, and DGS. The book will be useful to students as an introduction to design and applications of antennas. Additionally, experienced researchers in this field will find this book a ready reference and benefit from the techniques of research in printed antennas included in this book. Following are some of the salient features of this book: Covers a variety of analytical techniques and their CAD applications Discusses new applications of printed antenna technology such as sensing Examines the state of design techniques of printed antenna Presents special reconfigurable antennas such as ME dipole, polarization, feeding, and DGS

Antenna Design for Mobile Devices John Wiley & Sons

This authoritative resource provides you with a detailed description of ideal array element characteristics that help you estimate the quality of development of real-world phased array antennas. You find several approaches to optimum phased array design, allowing you to provide specified array gain in a specific region of scan, using a minimum number of expensive, controlled devices. Moreover, this practical book presents important numerical methods that you can use to model and optimize phased array structure to obtain the best array characteristics that the chosen structure can provide. From arrays with beam-forming networks, arrays of coupled dual-mode waveguides, and arrays with reactively loaded radiators, to waveguide arrays with protruding dielectric elements, and arrays with strip, disk, and wire structures, this comprehensive reference explains a wide range of essential topics to help you with work in this challenging area. The book is supported with over 165 illustrations and more than 566 equations.

[Copyright: a5a2533e8405dac18e0059eb0d0d028e](#)