Phased Array Antennas Floquet Analysis Synthesis Bfns And Active Array Systems

This book provides a full representation of Inverse SyntheticAperture Radar (ISAR) imagery, which is a popular and importantradar signal processing tool. The book covers all possible aspectsof ISAR imaging. The book offers a fair amount of signal processingtechniques and radar basics before introducing the inverse problemof ISAR and the forward problem of Synthetic Aperture Radar (SAR).Important concepts of SAR such as resolution, pulse compression andimage formation are given together with associated MATLAB codes. After providing the fundamentals for ISAR imaging, the bookgives the detailed imaging procedures for ISAR imaging withassociated MATLAB functions and codes. To enhance the image qualityin ISAR imaging, several imaging tricks and fine-tuning proceduressuch as zero-padding and windowing are also presented. Finally,various real applications of ISAR imagery, like imaging theantenna-platform scattering, are given in a separate chapter. Forall these algorithms, MATLAB codes and figures are included. Thefinal chapter considers advanced concepts and trends in ISARimaging.

A comprehensive tutorial on the design and practical applications of antenna arrays An antenna array is an assembly of antenna elements that maximizes a received or transmitted signal in a desired direction. This practical book covers a wide range of antenna array topics that are becoming increasingly important in wireless applications, with emphasis on array design, applications, and computer modeling. Each chapter in Antenna Arrays builds upon the

previous chapter, progressively addressing more difficult material. Beginning with basic electromagnetics/antennas/antenna systems information, the book then deals with the analysis and synthesis of arrays of point sources and their associated array factors. It presents a sampling of different antenna elements that replace these point sources, then presents element configurations that do not have to lie along a line or in a plane. The complex and difficult-to-predict interactions of elements and electromagnetic waves are introduced, along with computer modeling and experiments that are necessary for predicting the performance of arrays where mutual coupling is important. Then, various approaches to getting signals to and from the array elements to a computer where the signal detection takes place are explored, as are the numerical techniques behind smart antennas. The book emphasizes the computational methods used in the design and analysis of array antennas. Also featured are signal processing and numerical modeling algorithms, as well as pictures of antenna arrays and components provided by industry and government sources, with explanations of how they operate. Fully course-tested, Antenna Arrays serves as a complete text in phased array design and theory for advanced undergraduate- and graduate-level courses in electronics and communications, as well as a reference for practicing engineers and scientists in wireless communications, radar, and remote sensing.

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.

The first edition of "Microstrip Filters for RF/Microwave Applications" was published in 2001. Over the years the book has been well received and is used extensively in both academia and industry by microwave researchers and engineers. From its inception as a manuscript the book is almost 8 years old. While the fundamentals of filter circuits have not changed, further innovations in filter realizations and other applications have occurred with changes in the technology and use of new fabrication processes, such as the recent advances in RF MEMS and ferroelectric films for tunable filters; the use of liquid crystal polymer (LCP) substrates for multilayer circuits, as well as the new filters for dual-band, multi-band and ultra wideband (UWB) applications. Although the microstrip filter remains as the main transmission line medium for these new developments, there has been a new trend of using combined planar transmission line structures such as co-planar waveguide (CPW) and slotted ground structures for novel physical implementations beyond the single layer in order to achieve filter miniaturization and better performance. Also, over the years, practitioners have suggested topics that should be added for completeness, or deleted in some cases, as they were not very useful in practice. In view of the above, the authors are proposing a revised version of the "Microstrip Filters for RF/Microwave Applications" text and a slightly changed book title of "Planar Filters for RF/Microwave Applications" to reflect the aforementioned trends in the revised book.

An essential text for both students and professionals, combining detailed theory with clear practical guidance This outstanding book explores a large spectrum of topics within microwave and radio frequency (RF) engineering, encompassing electromagnetic theory, microwave

circuits and components. It provides thorough descriptions of the most common microwave test instruments and advises on semiconductor device modelling. With examples taken from the authors' own experience, this book also covers: network and signal theory; electronic technology with guided electromagnetic propagation; microwave circuits such as linear and non-linear circuits, resonant circuits and cavities, monolithic microwave circuits (MMICs), wireless architectures and integrated circuits; passive microwave components, control components; microwave filters and matching networks. Simulation files are included in a CD Rom, found inside the book. Microwave and RF Engineering presents up-to-date research and applications at different levels of difficulty, creating a useful tool for a first approach to the subject as well as for subsequent in-depth study. It is therefore indispensable reading for advanced professionals and designers who operate at high frequencies as well as senior students who are first approaching the subject.

Radio-Frequency Integrated-Circuit Engineering addressesthe theory, analysis and design of passive and active RFIC's usingSi-based CMOS and Bi-CMOS technologies, and other non-silicon basedtechnologies. The materials covered are self-contained andpresented in such detail that allows readers with onlyundergraduate electrical engineering knowledge in EM, RF, andcircuits to understand and design RFICs. Organized into sixteenchapters, blending analog and microwave engineering,Radio-Frequency Integrated-Circuit Engineering emphasizesthe microwave engineering approach for RFICs. • Provides essential knowledge in EM and microwaveengineering, passive and active RFICs, RFIC analysis and designtechniques, and RF systems vital for RFIC students andengineers • Blends analog and microwave engineering approaches forRFIC design at high frequencies • Includes problems at the end of each chapter

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 provides engineers with a comprehensive review of the state-of-the-art in reflectarray antenna research and development. The authors describe, in detail, design procedures for a wide range of applications, including broadband, multi-band, multi-beam,

contour-beam, beam-scanning, and conformal reflectarray antennas. They provide sufficient coverage of basic reflectarray theory to fully understand reflectarray antenna design and analysis such that the readers can pursue reflectarray research on their own. Throughout the book numerous illustrative design examples including numerical and experimental results are provided. Featuring in-depth theoretical analysis along with practical design examples, em style="mso-bidi-font-style: normal;"Reflectarray Antennas is an excellent text/reference for engineering graduate students, researchers, and engineers in the field of antennas. It belongs on the bookshelves of university libraries, research institutes, and industrial labs and research facilities.

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.

Offers an up-to-date description of modern multifunctional antenna systems and microwave components Compact multifunctional antennas are of great interest in the field of antennas and wireless communication systems, but there are few, if any, books available that fully explore the multifunctional concept. Divided into six chapters, Compact Multifunctional Antennas for Wireless Systems encompasses both the active and passive multifunctional antennas and components for microwave systems. It provides a systematic, valuable reference for antenna/microwave researchers and designers. Beginning with such novel passive components as antenna filters, antenna packaging covers, and balun filters, the book discusses various miniaturization techniques for the multifunctional antenna systems. In addition to amplifying and oscillating antennas, the book also covers design considerations for frequency- and pattern-reconfigurable antennas. The last chapter is dedicated to the field of solar cell integrated antennas. Inside, readers will find comprehensive chapters on: Compact Multifunctional Antennas in Microwave Wireless Systems Multifunctional Passive Integrated Antennas and Components Reconfigurable Antennas Receiving Amplifying Antennas Oscillating Antennas Solar cell integrated Antennas Aimed at professional engineers and researchers designing compact antennas for wireless applications, Compact Multifunctional Antennas for Wireless Systems will prove to be an invaluable tool.

Discover a graduate-level text for students specializing in electromagnetic wave radiation, scattering, and diffraction for engineering applications In Electromagnetic Radiation, Scattering and Diffraction, distinguished authors Drs. Prabhakar H. Pathak and Robert J. Burkholder deliver a thorough exploration of the behavior of electromagnetic fields in radiation, scattering, and guided wave environments. The book tackles its subject from first principles and includes coverage of low and high frequencies. It stresses physical interpretations of the electromagnetic wave phenomena along with their underlying mathematics. The authors emphasize fundamental principles and provide numerous examples to illustrate the concepts contained within. Students with a limited undergraduate electromagnetic background will rapidly and systematically advance their understanding of electromagnetic wave theory until they can complete useful and important graduate-level work on wave electromagnetic problems. Electromagnetic Radiation, Scattering and Diffraction also serves as a practical companion for students trying to simulate problems with commercial EM software and trying to better interpret their results. Readers will also benefit from: An introduction to Maxwell's equations, constitutive relations, wave equation and polarization, including the Kramers-Kronig relationship, frequency domain fields, and phase and group velocity An exploration of electromagnetic boundary and radiation conditions, including electromagnetic field behavior across a boundary surface A discussion of plane wave propagation in planar layered media, including plane wave reflection from a planar boundary between two different media A treatment of electromagnetic potentials and fields of sources in unbounded regions Perfect for graduate students studying electromagnetic theory, Electromagnetic Radiation, Scattering, and Diffraction is an invaluable resource for professional electromagnetic engineers and

researchers working in this area.

Bridges the gap between FDTD theory and the implementation of practical simulation techniques This is the first publication that guides readers step by step through the implementation of electromagnetic simulation techniques based on FDTD methods. These simulation techniques serve as an essential bridge between FDTD methods and their applications. Moreover, the book helps readers better understand the underlying logic of FDTD methods so that they can design FDTD projects using either commercial electromagnetic software packages or their own codes in order to solve practical engineering problems. The book begins with two chapters that introduce the basic concepts of the 3-D Cartesian FDTD method, followed by discussions of advanced FDTD methods such as conformal techniques, dispersive media, circuit elements, and near-to-far field transformation. Next, the book: Presents basic concepts of parallel processing techniques and systems, including parallel FDTD techniques and systems Explores simulation techniques based on FDTD methods Illustrates practical simulation techniques using engineering applications Introduces advanced simulation techniques Each chapter concludes with references to help readers investigate particular topics in greater depth. Each chapter also includes problem sets that challenge readers to put their new FDTD and simulation skills into practice. By bridging the gap between FDTD theory and practical simulation techniques, this publication is an invaluable guide for students and engineers who need to solve a wide range of design problems in RF, antenna, and microwave engineering.

This completely revised third edition of an Artech House classic, Phased Array Antenna Handbook, Second Edition, offers an up-to-date and comprehensive treatment of array

antennas and systems. This edition provides a wealth of new material, including expanded coverage of phased array and multiple beam antennas. New modern machine learning techniques used for analysis are included. Additional material on wideband antennas and wideband coverage in array antennas are incorporated in this book, including new methods, devices, and technologies that have developed since the second edition. A detailed treatment of antenna system noise, sections on antenna pattern synthesis, developments in subarray technology, and in-depth coverage of array architecture and components are additional new features of this book. The book explores design elements that demonstrate how to size an array system with speed and confidence. Moreover, this resource provides expanded coverage of systems aspects of arrays for radar and communications. Supported with numerous equations and illustrations, this practical book helps evaluate basic antenna parameters such as gain, sidelobe levels, and noise. Readers learn how to compute antenna system noise, design subarray geometries for given bandwidth, scan and sidelobe constraints, and choose array illumination tapers for given sidelobe levels.

Reflecting a growing interest in phased array antenna systems, stemming from radar, radio astronomy, mobile communications and satellite broadcasting, Array and Phased Array Antenna Basics introduces the principles of array and phased array antennas. Packed with first-hand practical experience and worked-out examples, this is a valuable learning tool and reference source for those wishing to improve their understanding of basic array antenna systems without relying heavily on a thorough knowledge of electromagnetics or antenna theory. Features a general introduction to antennas and explains the array antenna principle through discussion of the physical characteristics rather than the theory Explores topics often

not covered in antenna textbooks, such as active element pattern, array feeding, means of phase changing, array antenna characterisation, sequential rotation techniques and reactively loaded arrays Guides the reader through the necessary mathematics, allowing them to move onto specialist books on array and phased array antennas with a greater understanding of the topic Supported by a companion website on which instructors and lecturers can find electronic versions of the figures An ideal introduction for those without a background in antennas, this clear, concise volume will appeal to technicians, researchers and managers working in academia, government, telecommunications and radio astronomy. It will also be a valuable resource for professionals and postgraduates with some antenna knowledge.

Do you want to know how to design high efficiency RF and microwave solid state power amplifiers? Read this book to learn the main concepts that are fundamental for optimum amplifier design. Practical design techniques are set out, stating the pros and cons for each method presented in this text. In addition to novel theoretical discussion and workable guidelines, you will find helpful running examples and case studies that demonstrate the key issues involved in power amplifier (PA) design flow. Highlights include: Clarification of topics which are often misunderstood and misused, such as bias classes and PA nomenclatures. The consideration of both hybrid and monolithic microwave integrated circuits (MMICs). Discussions of switch-mode and current-mode PA design approaches and an explanation of the differences. Coverage of the linearity issue in PA design at circuit level, with advice on low distortion power stages. Analysis of the hot topic of Doherty amplifier design, plus a description of advanced techniques based on multi-way and multi-stage architecture solutions. High Efficiency RF and Microwave Solid State Power Amplifiers is: an ideal tutorial for MSc and

postgraduate students taking courses in microwave electronics and solid state circuit/device design; a useful reference text for practising electronic engineers and researchers in the field of PA design and microwave and RF engineering. With its unique unified vision of solid state amplifiers, you won't find a more comprehensive publication on the topic.

A comprehensive guide to the latest in phased array antennaanalysis and design--the Floquet modal based approach This comprehensive book offers an extensive presentation of a newmethodology for phased array antenna analysis based on Floquetmodal expansion. Engineers, researchers, and advanced graduatestudents involved in phased array antenna technology will find thissystematic presentation an invaluable reference. Elaborating from fundamental principles, the author presents anin-depth treatment of the Floquet modal based approach. Detailedderivations of theorems and concepts are provided, making PhasedArray Antennas a self-contained work. Each chapter is followed byseveral practice problems. In addition, numerous design examplesand guidelines will be found highly useful by those engaged in thepractical application of this new approach to phased arraystructures. Broadly organized into three sections, Phased Array Antennascovers: * The development of the Floquet modal based approach to theanalysis of phased array antennas * Application of the Floquet modal based approach to importantphased array structures * Shaped beam array synthesis, array beam forming networks, activephased array systems, and statistical analysis of phasedarrays Incorporating the most recent developments in phased arraytechnology, Phased Array Antennas is an essential resource forstudents of phased array theory, as well as research professionalsand engineers engaged in the design and construction of phasedarray antennas.

"This thoroughly revised edition of the Artech House classic, Phased Array Antenna Handbook, offers the most up-to-date and broadest view of array antennas and systems. Supported with over 350 equations and more than 270 illustrations, the book offers complete design details that allow practitioners to size an array system with speed and confidence."--BOOK JACKET.Title Summary field provided by Blackwell North America, Inc. All Rights Reserved An in-depth treatment of array phenomena and all aspects of phased array analysis and design Phased Array Antennas, Second Edition is a comprehensive reference on the vastly evolving field of array antennas. The Second Edition continues to provide an in-depth evaluation of array phenomena with a new emphasis on developments that have occurred in the field over the past decade. The book offers the same detailed coverage of all practical and theoretical aspects of phased arrays as the first edition, but it now includes: New chapters on array-fed reflector antennas; connected arrays; and reflect arrays and retrodirective arrays Brand-new coverage of artificial magnetic conductors, and Bode matching limitations A clear explanation of the common misunderstanding of scan element pattern measurement, along with appropriate equations In-depth coverage of finite array Gibbsian models, photonic feeding and time delay, waveguide simulators, and beam orthogonality The book is complemented with a multitude of original curves and tables that illustrate how particular behaviors were derived from the author's hundreds of programs developed over the past forty years. Additionally, numerous computer design algorithms and numerical tips are included throughout the book to help aid in readers' comprehension. Phased Array Antennas, Second Edition is an ideal resource for antenna design engineers, radar engineers, PCS engineers, and communications engineers, or any professional who works to develop radar and telecommunications systems. It

also serves as a valuable textbook for courses in phased array design and theory at the upper-undergraduate and graduate levels.

Offers an overview of state of the art passive macromodeling techniques with an emphasis on black-box approaches This book offers coverage of developments in linear macromodeling, with a focus on effective, proven methods. After starting with a definition of the fundamental properties that must characterize models of physical systems, the authors discuss several prominent passive macromodeling algorithms for lumped and distributed systems and compare them under accuracy, efficiency, and robustness standpoints. The book includes chapters with standard background material (such as linear time-invariant circuits and systems, basic discretization of field equations, state-space systems), as well as appendices collecting basic facts from linear algebra, optimization templates, and signals and transforms. The text also covers more technical and advanced topics, intended for the specialist, which may be skipped at first reading. Provides coverage of black-box passive macromodeling, an approach developed by the authors Elaborates on main concepts and results in a mathematically precise way using easy-to-understand language Illustrates macromodeling concepts through dedicated examples Includes a comprehensive set of end-of-chapter problems and exercises Passive Macromodeling: Theory and Applications serves as a reference for senior or graduate level courses in electrical engineering programs, and to engineers in the fields of numerical modeling, simulation, design, and optimization of electrical/electronic systems. Stefano Grivet-Talocia, PhD, is an Associate Professor of Circuit Theory at the Politecnico di Torino in Turin, Italy, and President of IdemWorks. Dr. Grivet-Talocia is author of over 150 technical papers published in international journals and conference proceedings. He invented several algorithms

in the area of passive macromodeling, making them available through IdemWorks. Bjørn Gustavsen, PhD, is a Chief Research Scientist in Energy Systems at SINTEF Energy Research in Trondheim, Norway. More than ten years ago, Dr. Gustavsen developed the original version of the vector fitting method with Prof. Semlyen at the University of Toronto. The vector fitting method is one of the most widespread approaches for model extraction. Dr. Gustavsen is also an IEEE fellow.

Provides systematic coverage of the theory, physics, functional designs, and engineering applications of advanced electromagnetic surfaces.

Phased arrays, while traditionally used in radar systems, are now being used or proposed for use in internet of things (IoT) networks, high-speed back haul communication, terabit-per-second satellite systems, 5G mobile networks, and mobile phones. This book considers systems engineering of phased arrays and addresses not only radar, but also these modern applications. It presents a system-level perspective and approach that is essential for the successful development of modern phased arrays. Using practical examples, this book helps solve problems often encountered by technical professionals. Thermal management challenges, antenna element design issues, and architectures solutions are explored as well as the benefits and challenges of digital beam forming. This book provides the information required to train engineers to design and develop phased arrays and contains questions at the end of each chapter that professors will find useful for instruction.

Describing an innovative approach to phased-array control in antenna design This book explores in detail phased-array antennas that use coupled-oscillator arrays, an arrangement featuring a remarkably simple beam steering control system and a major reduction in

complexity compared with traditional methods of phased-array control. It brings together in one convenient, self-contained volume the many salient research results obtained over the past ten to fifteen years in laboratories around the world, including the California Institute of Technology's Jet Propulsion Laboratory. The authors examine the underlying theoretical framework of coupled-oscillator systems, clearly explaining the linear and nonlinear formalisms used in the development of coupled-oscillator arrays, while introducing a variety of state-of-the-art methodologies, design solutions, and tools for applying this control scheme. Readers will find: Numerous implementation examples of coupled-oscillator array prototypes A continuum model that permits application of diffusion theory to the analysis of phase dynamics A demonstration of the array behavior through experimental results that validate the linearized theory Examples of how incorporating coupling delay restores causality, including the latest published results Guidance on how to accurately analyze and optimize coupled-oscillator arrays using modern simulation tools A review of current developments, including the design of compact couple-oscillator array antennas Complete with 150 diagrams and photographs, Coupled-Oscillator Based Active-Array Antennas is a highly useful tutorial for antenna designers and a valuable reference for researchers and engineers wishing to learn about this cutting-edge technology.

Describes the configuration and principles of a reflectarray antenna, its advantages over other antennas, the history of its development, analysis techniques, practical design procedures, bandwidth issues and wideband techniques, as well as applications and recent developments. Both authors are well respected practitioners who have build these antennas and developed them for space flight.

A major update of solar cell technology and the solar marketplace Since the first publication of this important volume over a decade ago, dramatic changes have taken place with the solar market growing almost 100-fold and the U.S. moving from first to fourth place in the world market as analyzed in this Second Edition. Three bold new opportunities are identified for any countries wanting to improve market position. The first is combining pin solar cells with 3X concentration to achieve economic competitiveness near term. The second is charging battery-powered cars with solar cell–generated electricity from arrays in surrounding areas—including the car owners' homes—while simultaneously reducing their home electricity bills by over ninety percent. The third is formation of economic "unions" of sufficient combined economic size to be major competitors. In this updated edition, feed-in tariffs are identified as the most effective approach for public policy. Reasons are provided to explain why pin solar cells outperform more traditional pn solar cells. Field test data are reported for nineteen percent pin solar cells and for ~500X concentrating systems with bare cell efficiencies approaching forty percent. Paths to bare cell efficiencies over fifty percent are described, and key missing program elements are identified. Since government support is needed for new technology prototype integration and qualification testing before manufacturing scale up, the key economic measure is identified in this volume as the electricity cost in cents per kilowatt-hour at the complete installed system level, rather than just the up-front solar cell modules' costs in dollars per watt. This Second Edition will benefit technologists in the fields of solar cells and systems; solar cell researchers; power systems designers; academics studying microelectronics, semiconductors, and solar cells; business students and investors with a technical focus; and government and political officials developing public policy.

A comprehensive resource to designing and constructing analog photonic links capable of high RF performance Fundamentals of Microwave Photonics provides a comprehensive description of analog optical links from basic principles to applications. The book is organized into four parts. The first begins with a historical perspective of microwave photonics, listing the advantages of fiber optic links and delineating analog vs. digital links. The second section covers basic principles associated with microwave photonics in both the RF and optical domains. The third focuses on analog modulation formats—starting with a concept, deriving the RF performance metrics from basic physical models, and then analyzing issues specific to each format. The final part examines applications of microwave photonics, including analog receive-mode systems, high-power photodiodes applications, radio astronomy, and arbitrary waveform generation. Covers fundamental concepts including basic treatments of noise, sources of distortion and propagation effects Provides design equations in easy-to-use forms as quick reference Examines analog photonic link architectures along with their application to RF systems A thorough treatment of microwave photonics, Fundamentals of Microwave Photonics will be an essential resource in the laboratory, field, or during design meetings. The authors have more than 55 years of combined professional experience in microwave photonics and have published more than 250 associated works.

The definitive reference on electromagnetic shielding materials, configurations, approaches, and analyses This reference provides a comprehensive survey of options for the reduction of the electromagnetic field levels in prescribed areas. After an introduction and an overview of available materials, it discusses figures of merit for shielding configurations, the shielding effectiveness of stratified media, numerical methods for shielding analyses, apertures in planar

metal screens, enclosures, and cable shielding. Up to date and comprehensive, Electromagnetic Shielding: Explores new and innovative techniques in electromagnetic shielding Presents a critical approach to electromagnetic shielding that highlights the limits of formulations based on plane-wave sources Analyzes aspects not normally considered in electromagnetic shielding, such as the effects of the content of the shielding enclosures Includes references at the end of each chapter to facilitate further study The last three chapters discuss frequency-selective shielding, shielding design procedures, and uncommon ways of shielding—areas ripe for further research. This is an authoritative, hands-on resource for practicing telecommunications and electrical engineers, as well as researchers in industry and academia who are involved in the design and analysis of electromagnetic shielding structures. This book focuses on new techniques, analysis, applications and future trends of microstrip and printed antenna technologies, with particular emphasis to recent advances from the last decade Attention is given to fundamental concepts and techniques, their practical applications and the future scope of developments. Several topics, essayed as individual chapters include reconfigurable antenna, ultra-wideband (UWB) antenna, reflectarrays, antennas for RFID systems and also those for body area networks. Also included are antennas using metamaterials and defected ground structures (DGSs). Essential aspects including advanced design, analysis and optimization techniques based on the recent developments have also been addressed. Key Features: Addresses emerging hot topics of research and applications in microstrip and printed antennas Considers the fundamental concepts, techniques, applications and future scope of such technologies Discusses modern applications such as wireless base station to mobile handset, satellite earth station to airborne communication systems, radio

frequency identification (RFID) to body area networks, etc. Contributions from highly regarded experts and pioneers from the US, Europe and Asia This book provides a reference for R&D researchers, professors, practicing engineers, and scientists working in these fields. Graduate students studying/working on related subjects will find this book as a comprehensive literature for understanding the present and future trends in microstrip and printed antennas.

This is the first truly comprehensive and most up-to-date handbook available on modern reflector antennas and feed sources for diversified space and ground applications. There has never been such an all-encompassing reflector handbook in print, and no currently available title offers coverage of such recent research developments. The Handbook consists of three volumes. Volume II focuses on feed sources. Reflector antennas are extraordinary devices that combine high gain with geometrical simplicity, and can operate in broad frequency bands. Their performance, however, depends on the electrical characteristics of the feed system with which they operate. This comprehensive volume provides you with a solid understanding of feed system theory, design, and analysis. Featuring chapters authored by experts in each aspect of feed systems, this book takes you from fundamental mathematical techniques, electrically small and large dual reflectors, feed geometry and telemetry, tracking and command antennas, and more. Throughout the book numerous examples are provided to guide you in the practical aspects of feed design.

The latest EM techniques for detecting concealed targets, whether explosives, weapons, or people Extensively illustrated from basic principles to system design, the fundamental concepts of RF, microwave, millimeter wave, and terahertz detection systems and techniques to find concealed targets are explained in this publication. These concealed targets may be

explosive devices or weapons, which can be buried in the ground, concealed in building structures, hidden under clothing, or inside luggage. Concealed targets may also be people who are stowaways or victims of an avalanche or earthquake. Although much information is available in conference proceedings and professional society publications, this book brings all the relevant information in a single, expertly written and organized volume. Readers gain an understanding of the physics underlying electromagnetic (EM) detection methods, as well as the factors that affect the performance of EM detection equipment, helping them choose the right type of equipment and techniques to meet the demands of particular tasks. Among the topics covered are: Ultra-wideband radar and ground-penetrating radar Millimeter, sub-millimeter, and terahertz systems Radar systems including Doppler, harmonic, impulse, FMCW, and holographic Radiometric systems Nuclear quadrupole resonance systems Author David Daniels has many years of experience designing and deploying EM systems to detect concealed targets. As a result, this publication is essential for scientists and engineers who are developing or using EM equipment and techniques for a diverse range of purposes, including homeland security, crime prevention, or the detection of persons.

This Second Edition focuses on emerging topics and advances in the field of VLSI interconnections In the decade since High-Speed VLSI Interconnections was first published, several major developments have taken place in the field. Now, updated to reflect these advancements, this Second Edition includes new information on copper interconnections, nanotechnology circuit interconnects, electromigration in the copper interconnections, parasitic inductances, and RLC models for comprehensive analysis of interconnection delays and crosstalk. Each chapter is designed to exist independently or as a part of one coherent unit,

and several appropriate exercises are provided at the end of each chapter, challenging the reader to gain further insight into the contents being discussed. Chapter subjects include: * Preliminary Concepts * Parasitic Resistances, Capacitances, and Inductances * Interconnection Delays * Crosstalk Analysis * Electromigration-Induced Failure Analysis * Future Interconnections High-Speed VLSI Interconnections, Second Edition is an indispensable reference for high-speed VLSI designers, RF circuit designers, and advanced students of electrical engineering.

Introduces timed arrays and design approaches to meet the newhigh performance standards The author concentrates on any aspect of an antenna array thatmust be viewed from a time perspective. The first chapters brieflyintroduce antenna arrays and explain the difference between phasedand timed arrays. Since timed arrays are designed for realistictime-varying signals and scenarios, the book also reviews widebandsignals, baseband and passband RF signals, polarization and signalbandwidth. Other topics covered include time domain, mutualcoupling, wideband elements, and dispersion. The author alsopresents a number of analog and digital beamforming networks forcreating and manipulating beams. The book concludes with anoverview of the methods to integrate time delay into the arraydesign and of several other adaptive arrays that prove useful inmany different systems. Examines RF signal concepts such as polarization and signalbandwidth and their applications to timed antenna arrays Covers arrays of point source, elements in timed antennaarrays, active electronically scanned array technology, and timedelay in corporate fed arrays Includes complete design examples for placing time delay inarrays Timed Arrays: Wideband and Time Varying Antenna Arrays iswritten for practicing engineers and scientists in wirelesscommunication, radar, and

remote sensing as well as graduatestudents and professors interested in advanced antenna topics.

A step-by-step guide to parallelizing cem codes The future of computational electromagnetics is changing drastically as the new generation of computer chips evolves from single-core to multi-core. The burden now falls on software programmers to revamp existing codes and add new functionality to enable computational codes to run efficiently on this new generation of multi-core CPUs. In this book, you'll learn everything you need to know to deal with multi-core advances in chip design by employing highly efficient parallel electromagnetic code. Focusing only on the Method of Moments (MoM), the book covers: In-Core and Out-of-Core LU Factorization for Solving a Matrix Equation A Parallel MoM Code Using RWG Basis Functions and ScaLAPACK-Based In-Core and Out-of-Core Solvers A Parallel MoM Code Using Higher-Order Basis Functions and ScaLAPACK-Based In-Core and Out-of-Core Solvers Turning the Performance of a Parallel Integral Equation Solver Refinement of the Solution Using the Conjugate Gradient Method A Parallel MoM Code Using Higher-Order Basis Functions and Plapack-Based In-Core and Out-of-Core Solvers Applications of the Parallel Frequency Domain Integral Equation Solver Appendices are provided with detailed information on the various computer platforms used for computation; a demo shows you how to compile ScaLAPACK and PLAPACK on the Windows® operating system; and a demo parallel source code is available to solve the 2D electromagnetic scattering problems. Parallel Solution of Integral Equation-Based EM Problems in the Frequency Domain is indispensable reading for computational code designers, computational electromagnetics researchers, graduate students, and anyone working with CEM software.

Most existing books on wavelets are either too mathematical or they focus on too narrow a specialty. This book provides a thorough treatment of the subject from an engineering point of view. It is a one-stop source of theory, algorithms, applications, and computer codes related to wavelets. This second edition has been updated by the addition of: a section on "Other Wavelets" that describes curvelets, ridgelets, lifting wavelets, etc a section on lifting algorithms Sections on Edge Detection and Geophysical Applications Section on Multiresolution Time Domain Method (MRTD) and on Inverse problems

The first book on Localized Waves—a subject of phenomenal worldwide research with important applications from secure communications to medicine Localized waves—also known as non-diffractive waves—are beams and pulses capable of resisting diffraction and dispersion over long distances even in non-guiding media. Predicted to exist in the early 1970s and obtained theoretically and experimentally as solutions to the wave equations starting in 1992, localized waves now garner intense worldwide research with applications in all fields where a role is played by a wave equation, from electromagnetism to acoustics and quantum physics. In the electromagnetics areas, they are paving the way, for instance, to ubiquitous secure communications in the range of millimeter waves, terahertz frequencies, and optics. At last, the localized waves with an envelope at rest are expected to have important applications especially in medicine. Localized Waves brings together the world's most productive researchers in the field to offer a well-balanced presentation of theory and experiments in this new and exciting subject. Composed of thirteen chapters, this dynamic volume: Presents a thorough review of the theoretical foundation and historical aspects of localized waves Explores the interconnections of the subject with other technologies and scientific areas

Analyzes the effect of arbitrary anisotropies on both continuous-wave and pulsed non-diffracting fields Describes the physical nature and experimental implementation of localized waves Provides a general overview of wave localization, for example in photonic crystals, which have received increasing attention in recent years Localized Waves is the first book to cover this emerging topic, making it an indispensable resource in particular for researchers in electromagnetics, acoustics, fundamental physics, and free-space communications, while also serving as a requisite text for graduate students.

This book is a printed edition of the Special Issue "Metasurfaces: Physics and Applications" that was published in Applied Sciences

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.

From basic physics to new products, Silica Optical FiberTechnology for Device and Components examines all aspects ofspecialty optical fibers. Moreover, the inclusion of the latestinternational standards governing optical fibers enables you tomove from research to fabrication to commercialization. • Reviews all the latest specialty optical fibertechnologies, including those developed for high capacity WDMapplications; broadband fiber amplifiers; fiber filleters based onperiodic coupling; fiber branching devices; and fiberterminations • Discusses key differences among single mode fibers,multimode fibers for high speed Ethernet LAN, and dispersioncompensating fibers for long-haul applications • Compares the most recently developed conventionaloptical fibers with the latest photonic crystal fibers still indevelopment A self-contained, menu-driven software program is included foroptical fiber design, simulating waveguide structures for most ofthe fibers discussed in the book.