Matlab Conformal Array System

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Microelectronics, Electromagnetics and Telecommunications Suresh Chandra Satapathy 2015-12-24 This volume contains 73 papers presented at ICMEET 2015: International Conference on Microelectronics, Electromagnetics and Telecommunications. The conference was held during 18 – 19 December, 2015 at Department of Electronics and Communication Engineering, GITAM Institute of Technology, GITAM University, Visakhapatnam, INDIA. This volume contains papers mainly focused on Antennas, Electromagnetics, Telecommunication Engineering and Low Power VLSI Design.

Electronically Scanned Arrays MATLAB® Modeling and Simulation Arik D. Brown 2017-12-19 "[Contains] more lengthy mathematical derivations than most {comparable books] ... for arrays, provides for a unique, stand-alone mathematical description that can be adopted by anyone trying to communicate the theoretical foundation for their array design...has insights from a practitioner that are unique. The MATLAB® scripts alone are worth the price." —Daniel C. Ross, Ph. D, Northrop Grumman Corporation Electronically Scanned Arrays: MATLAB® Modeling and Simulation is considered the first book to provide comprehensive modeling/simulation programs used to design and analyze Electronically Scanned Arrays (ESA), a key technology internationally in the scientific and engineering communities. Several books have been written about ESAs, but most cover only fundamental theory. Few, if any, provide the insightful, easy-to-use simulation tools found in this book. Obviously, MATLAB® is one of the greatest tools available for exploring and understanding science and engineering concepts, and we use MATLAB functions to easily and instantly calculate ESA patterns. However, to achieve a truly insightful and in-depth analysis of subarray architectures, conformal arrays, etc., it is imperative that users first develop a firm grasp of ESA fundamentals. Covers largely unexplored topics, such as reliability aspects and the application of ESAs in space This volume helps readers build that elemental understanding of how ESAs work. It also provides code to run as an aid, so that readers don't have to start from scratch. The book expands on ESA principles and provides a modeling framework, using MATLAB to model applications of ESAs (i.e. pattern optimization, space-based applications, and reliability analysis). Presented code serves as an excellent vehicle to help readers master the analysis and simulation of ESAs. Exploring how difficult problems can be simplified with short, elegant solutions, this is an invaluable

resource for students and others new to ESAs, as well as experienced practicing engineers who model ESAs at the systems level.

The Micro-Doppler Effect in Radar Victor Chen 2011 This highly practical resource provides you with thorough working knowledge of the micro-Doppler effect in radar, including its principles, applications and implementation with MATLAB codes. The book presents code for simulating radar backscattering from targets with various motions, generating micro-Doppler signatures, and analyzing the characteristics of targets. You find detailed descriptions of the physics and mathematics of the Doppler and micro-Doppler effect. Moreover, you learn how to derive rigid and non-rigid body motion induced micro-Doppler effect in radar scattering. The book provides a wide range of clear examples, including an oscillating pendulum, a spinning and precession heavy top, rotating rotor blades of a helicopter, rotating wind-turbine blades, a person walking with swinging arms and legs, a flying bird, and movements of quadruped animals.

MATLAB 5 for Engineers Adrian Biran 1999 An introduction to MATLAB 5 within the context of solving engineering problems. The features new to MATLAB 5 include powerful program-development tools, new data types and structures, more graphic and visualization features and major improvements to MATLAB application toolboxes.

Electronically Scanned Arrays MATLAB® Modeling and Simulation Arik D. Brown 2017-12-19 "[Contains] more lengthy mathematical derivations than most {comparable books] ... for arrays, provides for a unique, stand-alone mathematical description that can be adopted by anyone trying to communicate the theoretical foundation for their array design...has insights from a practitioner that are unique. The MATLAB® scripts alone are worth the price." —Daniel C. Ross, Ph. D, Northrop Grumman Corporation Electronically Scanned Arrays: MATLAB® Modeling and Simulation is considered the first book to provide comprehensive modeling/simulation programs used to design and analyze Electronically Scanned Arrays (ESA), a key technology internationally in the scientific and engineering communities. Several books have been written about ESAs, but most cover only fundamental theory. Few, if any, provide the insightful, easy-to-use simulation tools found in this book. Obviously, MATLAB® is one of the greatest tools available for exploring and understanding science and engineering concepts, and we use MATLAB functions to easily and instantly calculate ESA patterns. However, to achieve a truly insightful and in-depth analysis of subarray architectures, conformal arrays, etc., it is imperative that users first develop a firm grasp of ESA fundamentals. Covers largely unexplored topics, such as reliability aspects and the application of ESAs in space This volume helps readers build that elemental understanding of how ESAs work. It also provides code to run as an aid, so that readers don't have to start from scratch. The book expands on ESA principles and provides a modeling framework, using MATLAB to model applications of ESAs (i.e. pattern optimization, space-based applications, and reliability analysis). Presented code serves as an excellent vehicle to help readers master the analysis and simulation of ESAs. Exploring how difficult problems can be simplified with short, elegant solutions, this is an invaluable resource for students and others new to ESAs, as well as experienced practicing engineers who model ESAs at the systems level.

Signals and Systems Analysis In Biomedical Engineering Robert B. Northrop 2016-04-19 The first edition of this text, based on the author's 30 years of teaching and research on neurosensory systems, helped biomedical engineering students and professionals strengthen their skills in the common network of applied mathematics that ties together the diverse disciplines that comprise this field. Updated and revised to include new materia

Millimeter Wave Antennas for 5G Mobile Terminals and Base Stations Shiban Kishen Koul 2020-11-24 This book discusses antenna designs for handheld devices as well as base stations. The book serves as a reference and a handy guide for graduate students and PhD students involved in the field of millimeter wave antenna design. It also gives insights to designers and practicing engineers who are actively engaged in design of antennas for future 5G devices. It offers an in-depth study, performance analysis and extensive characterization of novel antennas for 5G applications. The reader will learn about basic design methodology and techniques to develop antennas for 5G applications including concepts of path loss compensation, co-design of commercial 4G antennas with millimeter wave 5G antennas and antennas used in phase array and pattern diversity modules. Practical examples included in the book will help readers to build high performance antennas for 5G subsystems/systems using low cost technology. Key Features Provides simple design methodology of different antennas for handheld devices as well as base stations for 5G applications. Concept of path loss compensation introduced. Co-design of commercial 4G antennas with millimetre wave 5G antennas presented. Comparison of phased array versus pattern diversity modules discussed in detail. Fabrication and Measurement challenges at mmWaves and Research Avenues in antenna designs for 5G and beyond presented. Shiban Kishen Koul is an emeritus professor at the Centre for Applied Research in Electronics at the Indian Institute of Technology Delhi. He served as the chairman of Astra Microwave Products Limited, Hyderabad from 2009-2018. He is a Life Fellow of the Institution of Electrical and Electronics Engineering (IEEE), USA, a Fellow of the Indian National Academy of Engineering (INAE), and a Fellow of the Institution of Electronics and Telecommunication Engineers (IETE). Karthikeya G S worked as an assistant professor in Visvesvaraya technological university from 2013 to 2016 and completed his PhD from the Centre for Applied Research in Electronics at the Indian Institute of Technology Delhi in Dec.2019. He is a member of IEEE-Antenna Propagation Society and Antenna Test and Measurement society.

Trends and Advances in Information Systems and Technologies Álvaro Rocha 2018-03-24 This book includes a selection of papers from the 2018 World Conference on Information Systems and Technologies (WorldCIST'18), held in Naples, Italy on March27-29, 2018. WorldCIST is a global forum for researchers and practitioners to present and discuss recent results and innovations, current trends, professional experiences and the challenges of modern information systems and technologies research together with their technological development and applications. The main topics covered are: A) Information and Knowledge Management; B) Organizational Models and Information Systems; C) Software and Systems Modeling; D) Software Systems, Architectures, Applications and Tools; E) Multimedia Systems and Applications; F) Computer Networks, Mobility and Pervasive Systems; G) Intelligent and Decision Support Systems; H) Big Data Analytics and Applications; I) Human–Computer Interaction; J) Ethics, Computers & Security; K) Health Informatics; L) Information Technologies in Education; M) Information Technologies in Radiocommunications; N) Technologies for Biomedical Applications.

Analysis and Design of Transmitarray Antennas Ahmed H. Abdelrahman 2017-01-18 In recent years, transmitarray antennas have attracted growing interest with many antenna researchers. Transmitarrays combines both optical and antenna array theory, leading to a low profile design with high gain, high radiation efficiency, and versatile radiation performance for many wireless communication systems. In this book, comprehensive analysis, new methodologies, and novel designs of transmitarray antennas are presented. Detailed analysis for the design of planar space-fed array antennas is presented. The basics of aperture field distribution and the analysis of the array elements are described. The radiation performances (directivity and gain) are discussed using array theory approach, and the impacts of element phase errors are demonstrated. The performance of transmitarray design using multilayer frequency selective surfaces (M-FSS) approach is carefully studied, and the transmission phase limit which are generally independent from the selection of a specific element shape is revealed. The maximum transmission phase range is determined based on the number of layers, substrate permittivity, and the separations between layers. In order to reduce the transmitarray design complexity and cost, three different methods have been investigated. As a result, one design is performed using quad-layer cross-slot elements with no dielectric material and another using triple-layer spiral dipole elements. Both designs were fabricated and tested at X-Band for deep space communications. Furthermore, the radiation pattern characteristics were studied under different feed polarization conditions and oblique angles of incident field from the feed. New design methodologies are proposed to improve the bandwidth of transmitarray antennas through the control of the transmission phase range of the elements. These design techniques are validated through the fabrication and testing of two quad-layer transmitarray antennas at Ku-band. A single-feed quad-beam transmitarray antenna with 50 degrees elevation separation between the beams is investigated, designed, fabricated, and tested at Ku-band. In summary, various challenges in the analysis and design of transmitarray antennas are addressed in this book. New methodologies to improve the bandwidth of transmitarray antennas have been demonstrated. Several prototypes have been fabricated and tested, demonstrating the desirable features and potential new applications of transmitarray antennas.

Fourier Ptychographic Imaging Guoan Zheng 2016-06-30 This book demonstrates the concept of Fourier ptychography, a new imaging technique that bypasses the resolution limit of the employed optics. In particular, it transforms the general challenge of high-throughput, high-resolution imaging from one that is coupled to the physical limitations of the optics to one that is solvable through computation. Demonstrated in a tutorial form and providing many MATLAB® simulation examples for the reader, it also discusses the experimental implementation and recent developments of Fourier ptychography. This book will be of interest to researchers and engineers learning simulation techniques for Fourier optics and the Fourier ptychography concept.

Optimization of Multilayered Radar Absorbing Structures (RAS) using Nature Inspired Algorithm Vineetha Joy 2021-07-19 Stealth technology is a crucial pre-requisite in the combat zone, where swiftness, surprise and initiative are the decisive elements for survivability. The supreme goal here is to reduce the visibility of military vehicles by shaping, application of radar absorbing materials, passive cancellation, active cancellation etc. With respect to multilayered radar absorbing structures (RAS), this book presents an efficient algorithm based on particle swarm optimization (PSO), for the material selection as well as optimization of thickness of

multilayered RAS models considering both normal as well as oblique incidence cases. It includes a thorough overview of the theoretical background required for the analysis of multilayered RAS as well as the step-by-step procedure for the implementation of PSO-based algorithm. The accuracy and computational efficiency of the indigenously developed code is also clearly established using relevant validations and case studies. FEATURES Provides step-by-step procedure for the implementation of particle swarm optimization (PSO) based algorithm in the context of multilayered radar absorbing structures (RAS) design Helps to understand the EM design, analysis and optimization of multilayered RAS Describes the theoretical background required for the analysis of multilayered RAS Illustrates in detail the theoretical formulation supported by intuitive ray diagrams and comprehensive flowcharts to implement the algorithm with ease Includes elaborate validations and case studies This book will serve as a valuable resource for students, researchers, scientists, and engineers involved in the electromagnetic design and development of multi-layered radar absorbing structures.

Advanced Mathematics and Mechanics Applications Using MATLAB, Third Edition David Halpern 2002-09-17 Since its introduction in 1984, MATLAB's ever-growing popularity and functionality have secured its position as an industry-standard software package. The user-friendly, interactive environment of MATLAB 6.x, which includes a high-level programming language, versatile graphics capabilities, and abundance of intrinsic functions, helps users focus on their applications rather than on programming errors. MATLAB has now leapt far ahead of FORTRAN as the software of choice for engineering applications.

Genetic Algorithms in Electromagnetics Randy L. Haupt 2007-04-27 A thorough and insightful introduction to using genetic algorithms to optimize electromagnetic systems Genetic Algorithms in Electromagnetics focuses on optimizing the objective function when a computer algorithm, analytical model, or experimental result describes the performance of an electromagnetic system. It offers expert guidance to optimizing electromagnetic systems using genetic algorithms (GA), which have proven to be tenacious in finding optimal results where traditional techniques fail. Genetic Algorithms in Electromagnetics begins with an introduction to optimization and several commonly used numerical optimization routines, and goes on to feature: Introductions to GA in both binary and continuous variable forms, complete with examples of MATLAB(r) commands Two step-by-step examples of optimizing antenna arrays as well as a comprehensive overview of applications of GA to antenna array design problems Coverage of GA as an adaptive algorithm, including adaptive and smart arrays as well as adaptive reflectors and crossed dipoles Explanations of the optimization of several different wire antennas, starting with the famous "crooked monopole" How to optimize horn, reflector, and microstrip patch antennas, which require significantly more computing power than wire antennas Coverage of GA optimization of scattering, including scattering from frequency selective surfaces and electromagnetic band gap materials Ideas on operator and parameter selection for a GA Detailed explanations of particle swarm optimization and multiple objective optimization An appendix of MATLAB code for experimentation

Matlab for Control Engineers Katsuhiko Ogata 2007 Notable author Katsuhiko Ogata presents the only new book available to discuss, in sufficient detail, the details of MATLAB® materials needed to solve many analysis and design problems associated with control systems. Complements a large number of examples with in-depth

explanations, encouraging complete understanding of the MATLAB approach to solving problems. Distills the large volume of MATLAB information available to focus on those materials needed to study analysis and design problems of deterministic, continuous-time control systems. Covers conventional control systems such as transient response, root locus, frequency response analyses and designs; analysis and design problems associated with state space formulation of control systems; and useful MATLAB approaches to solve optimization problems. A useful self-study guide for practicing control engineers.

Phased Array Antenna Handbook, Third Edition Robert J. Mailloux 2017-11-30 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.

Essential MATLAB for Scientists and Engineers Brian D. Hahn 2002 Based on a teach-yourself approach, the fundamentals of MATLAB are illustrated throughout with many examples from a number of different scientific and engineering areas, such as simulation, population modelling, and numerical methods, as well as from business and everyday life. Some of the examples draw on first-year university level maths, but these are self-contained so that their omission will not detract from learning the principles of using MATLAB. This completely revised new edition is based on the latest version of MATLAB. New chapters cover handle graphics, graphical user interfaces (GUIs), structures and cell arrays, and importing/exporting data. The chapter on numerical methods now includes a general GUI-driver ODE solver. * Maintains the easy informal style of the first edition * Teaches the basic principles of scientific programming with MATLAB as the vehicle * Covers the latest version of MATLAB

Antennas Yi Huang 2021-09-02 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.

A Software-Defined GPS and Galileo Receiver Kai Borre 2007-08-03 This book explore the use of new technologies in the area of satellite navigation receivers. In order to construct a reconfigurable receiver with a wide range of applications, the authors discuss receiver architecture based on software-defined radio techniques. The presentation unfolds in a user-friendly style and goes from the basics to cutting-edge research. The book is aimed at applied mathematicians, electrical engineers, geodesists, and graduate students. It may be used as a textbook in various GPS technology and signal processing courses, or as a self-study reference for anyone working with satellite navigation receivers.

Applied Numerical Methods Using MATLAB Won Y. Yang 2005-06-03 In recent years, with the introduction of new media products, therehas been a shift in the use of programming languages from FORTRANor C to MATLAB for implementing numerical methods. This book makesuse of the powerful MATLAB software to avoid complex derivations,and to teach the fundamental concepts using the software to solvepractical problems. Over the years, many textbooks have beenwritten on the subject of numerical methods. Based on their courseexperience, the authors use a more practical approach and linkevery method to real engineering and/or science problems. The mainbenefit is that engineers don't have to know the mathematicaltheory in order to apply the numerical methods for solving theirreal-life problems. An Instructor's Manual presenting detailed solutions to all theproblems in the book is available online.

Antenna Arrays Randy L. Haupt 2010-09-09 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.

Reflectarray Antennas Payam Nayeri 2018-02-23 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.

Adaptive Array Systems Ben Allen 2006-02-03 In the last fifty years, extensive studies have been carried out worldwide in the field of adaptive array systems. However, far from being a mature technology with little research left to tackle, there is seemingly unlimited scope to develop the fundamental characteristics and applications of adaptive antennas for future 3G and 4G mobile communications systems, ultra wideband wireless and satellite and navigation systems, and this informative text shows you how! Provides an accessible resource on adaptive array fundamentals as well as coverage of adaptive algorithms and advanced topics Analyses the performance of various wideband beamforming techniques in wideband array processing Comprehensively covers implementation issues related to such elements as circular arrays, channel modelling and transmit beam forming, highlighting the challenges facing a designer during the development phase Supports practical implementation considerations with detailed case studies on wideband arrays, radar, sonar and biomedical imaging, terrestrial wireless systems and satellite communication systems Includes examples and problems throughout to aid understanding Companion website features Solutions Manual, Matlab Programs and Electronic versions of some figures Adaptive Array Systems is essential reading for senior undergraduate and postgraduate students and researchers in the field of adaptive array systems. It will also have instant appeal

to engineers and designers in industry engaged in developing and deploying the technology. This volume will also be invaluable to those working in radar, sonar and bio-medical applications.

Wireless Communications Systems Randy L. Haupt 2019-12-02 A comprehensive introduction to the fundamentals of design and applications of wireless communications Wireless Communications Systems starts by explaining the fundamentals needed to understand, design, and deploy wireless communications systems. The author, a noted expert on the topic, explores the basic concepts of signals, modulation, antennas, and propagation with a MATLAB emphasis. The book emphasizes practical applications and concepts needed by wireless engineers. The author introduces applications of wireless communications and includes information on satellite communications, radio frequency identification, and offers an overview with practical insights into the topic of multiple input multiple output (MIMO). The book also explains the security and health effects of wireless systems concerns on users and designers. Designed as a practical resource, the text contains a range of examples and pictures that illustrate many different aspects of wireless technology. The book relies on MATLAB for most of the computations and graphics. This important text: Reviews the basic information needed to understand and design wireless communications systems Covers topics such as MIMO systems, adaptive antennas, direction finding, wireless security, internet of things (IoT), radio frequency identification (RFID), and software defined radio (SDR) Provides examples with a MATLAB emphasis to aid comprehension Includes an online solutions manual and video lectures on selected topics Written for students of engineering and physics and practicing engineers and scientists, Wireless Communications Systems covers the fundamentals of wireless engineering in a clear and concise manner and contains many illustrative examples.

FY .. Annual ILIR Report Naval Undersea Warfare Center (U.S.). In-House Laboratory Independent Research Program 1997

Conformal Array Antenna Theory and Design Lars Josefsson 2006-02-10 This is the first comprehensive treatment of conformal antenna arrays from an engineering perspective. While providing a thorough foundation in theory, the authors of this publication provide a wealth of hands-on instruction for practical analysis and design of conformal antenna arrays. Thus, you get the knowledge you need, alongside the practical know-how to design antennas that are integrated into such structures aircrafts or skyscrapers.

Advances in Cybernetics, Cognition, and Machine Learning for Communication Technologies Vinit Kumar Gunjan 2020-04-28 This book highlights recent advances in Cybernetics, Machine Learning and Cognitive Science applied to Communications Engineering and Technologies, and presents high-quality research conducted by experts in this area. It provides a valuable reference guide for students, researchers and industry practitioners who want to keep abreast of the latest developments in this dynamic, exciting and interesting research field of communication engineering, driven by next-generation IT-enabled techniques. The book will also benefit practitioners whose work involves the development of communication systems using advanced cybernetics, data processing, swarm intelligence and cyber-physical systems; applied mathematicians; and developers of embedded and real-time systems. Moreover, it shares insights into applying concepts from Machine Learning, Cognitive Science, Cybernetics and other areas of artificial intelligence to wireless and

mobile systems, control systems and biomedical engineering.

Modern Control Engineering Katsuhiko Ogata 1990 Text for a first course in control systems, revised (1st ed. was 1970) to include new subjects such as the pole placement approach to the design of control systems, design of observers, and computer simulation of control systems. For senior engineering students. Annotation copyright Book News, Inc.

Advances in Array Optimization Ertugrul Aksoy 2020-03-04 The need to develop technology and communication necessitates the design of flexible and high-capacity radiating systems in today's communication infrastructure. In this context, antenna arrays are the ideal solution and have been one of the priority research subjects of the science community dealing with electromagnetics from past to present. Optimization of an array may be performed in various ways such as the optimization of excitation, reflector structure, feed network, etc. depending on the array structure. This book is a collection of seven research studies focused on the optimization of array structures in classical phased array or time modulation, including radiator, reflector, feed network, and radiating element optimizations.

Compact Magnetic Resonance-guided High-intensity Focused Ultrasound Phased Array System Andre Lafreniere 2021 Phased array ultrasound transducers (Txs) can induce electronically controllable localized hyperthermia to tissue deep within the human body. This localized heating can be applied to tumours as an adjunct therapy in multimodal oncology treatments. Magnetic resonance-guided high-intensity focused ultrasound (MRgHIFU) systems utilize imaging techniques to monitor tissue temperature during sonication, providing feedback for control of the Tx's beam-forming. The electromagnetic environment within and near the magnetic resonance (MR) bore restricts the design of driving solutions. The arrays are normally driven by linear amplifiers and matching networks placed at a distance from the MR bore. As clinical arrays can contain over 2000 Txs, this method of driving can result in significant costs and heating. This thesis proposes a novel MRgHIFU phased array system integration, and an associated rapid design and production processes. The system's array is designed for conformal use in 3T MR head and neck hyperthermia applications. The array is powered using a high-efficiency quasi class-DE (qDE) driving method to yield equal acoustic output from all Txs without use of inductors. This allows the drivers to be placed directly within the MR bore. The driver gating signals are controlled by a field-programmable gate array (FPGA) also placed inside the MR bore. A rapid design and production process is proposed to facilitate case-by-case target oriented arrays, which yield smaller arrays that can be used as conformal devices. These conformal transducers can help facilitate treatment of targets in challenging locations, and help compensate for patient movement. A Tx casing design was developed for individual ceramics to facilitate repeated removal from various array shells. These removable Txs can be re-used in multiple arrays as they are tuned for qDE driving independent of the array geometry A series of MATLAB functions were created to find sparse array designs by running thousands 3D k-space pseudospectral heterogeneous acoustic simulations, varying the pseudo-random Tx positions, array geometry, or steering position between each simulation. The designed functions are used to sweep array geometry and randomized element positions to find a configuration that yields sufficient performance. Once an acoustically correct solution is found, it is verified by executing k-Wave thermal diffusion simulations based on the acoustic

simulation's resultant pressure waves. Heating was applied for 30 minutes using a discrete PID controller based on temperature feedback. The array geometry can be exported from MATLAB for use in Autodesk Inventor to 3D print the array exactly as represented in simulation. Multiple groups of Txs were electrically characterized then binned until an appropriate qDE driving solution was achievable.

Multi-objective Design Of Antennas Using Surrogate Models Slawomir Koziel 2016-11-18 This book addresses computationally-efficient multi-objective optimization of antenna structures using variable-fidelity electromagnetic simulations, surrogate modeling techniques, and design space reduction methods. Based on contemporary research, it formulates multi-objective design tasks, highlights related challenges in the context of antenna design, and discusses solution approaches. Specific focus is on providing methodologies for handling computationally expensive simulation models of antenna structures in the sense of their multi-objective optimization. Also given is a summary of recent developments in antenna design optimization using variable-fidelity simulation models. Numerous examples of real-world antenna design problems are provided along with discussions and recommendations for the readers interested in applying the considered methods in their design work. Written with researchers and students in mind, topics covered can also be applied across a broad spectrum of aeronautical, mechanical, electrical, biomedical and civil engineering. It is of particular interest to those dealing with optimization, computationally expensive design tasks and simulation-driven design.

Antenna Theory and Design Warren L. Stutzman 2012-05-22 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.

Antenna Pattern Synthesis Donald R. Rhodes 1972 An investigation was made toward evolving a method of two-dimensional antenna pattern synthesis such that antenna specifications involving dimensionality, shape, and the constituent relations can be lated to the frequency characteristics. (Author).

Nature-Inspired Computing and Optimization Srikanta Patnaik 2017-03-07 The book provides readers with a snapshot of the state of the art in the field of nature-inspired computing and its application in optimization. The approach is mainly practice-oriented: each bio-inspired technique or algorithm is introduced together with one of its possible applications. Applications cover a wide range of real-world optimization problems: from feature selection and image enhancement to scheduling and dynamic resource management, from wireless sensor networks and wiring network diagnosis to sports training planning and gene expression, from topology control and morphological filters to nutritional meal design and antenna array design. There are a few theoretical chapters comparing different existing techniques, exploring the advantages of nature-inspired computing over other methods, and investigating the mixing time of genetic algorithms. The book also introduces a wide range of algorithms, including the ant colony optimization, the bat algorithm, genetic algorithms, the collision-based optimization algorithm, the flower pollination algorithm, multi-agent systems and particle swarm optimization.

This timely book is intended as a practice-oriented reference guide for students, researchers and professionals.

Introduction to Microwave Imaging Natalia K. Nikolova 2017-07-13 With this self-contained, introductory text, readers will easily understand the fundamentals of microwave and radar image generation. Written with the complete novice in mind, and including an easy-to-follow introduction to electromagnetic scattering theory, it covers key topics such as forward models of scattering for interpreting S-parameter and time-dependent voltage data, S-parameters and their analytical sensitivity formulae, basic methods for real-time image reconstruction using frequency-sweep and pulsed-radar signals, and metrics for evaluating system performance. Numerous application examples and practical tutorial exercises provided throughout allow quick understanding of key concepts, and sample MATLAB codes implementing key reconstruction algorithms accompany the book online. This one-stop resource is ideal for graduate students taking introductory courses in microwave imaging, as well as researchers and industry professionals wanting to learn the fundamentals of the field.

Handbook of Noise and Vibration Control Malcolm J. Crocker 2007-10-05 Two of the most acclaimed reference works in the area of acoustics in recent years have been our Encyclopedia of Acoustics, 4 Volume set and the Handbook of Acoustics spin-off. These works, edited by Malcolm Crocker, positioned Wiley as a major player in the acoustics reference market. With our recently published revision of Beranek & Ver's Noise and Vibration Control Engineering, Wiley is a highly respected name in the acoustics business. Crocker's new handbook covers an area of great importance to engineers and designers. Noise and vibration control is one largest areas of application of the acoustics topics covered in the successful encyclopedia and handbook. It is also an area that has been under-published in recent years. Crocker has positioned this reference to cover the gamut of topics while focusing more on the applications to industrial needs. In this way the book will become the best single source of need-to-know information for the professional markets.

Introduction to Flight Testing James W. Gregory 2021-05-07 Introduction to Flight Testing Introduction to Flight Testing Provides an introduction to the basic flight testing methods employed on general aviation aircraft and unmanned aerial vehicles Introduction to Flight Testing provides a concise introduction to the basic flight testing methods employed on general aviation aircraft and unmanned aerial vehicles for courses in aeronautical engineering. There is particular emphasis on the use of modern on-board instruments and inexpensive, off-the-shelf portable devices that make flight testing accessible to nearly any student. This text presents a clear articulation of standard methods for measuring aircraft performance characteristics. Topics covered include aircraft and instruments, digital data acquisition techniques, flight test planning, the standard atmosphere, uncertainty analysis, level flight performance, airspeed calibration, stall, climb and glide, take-off and landing, level turn, static and dynamic longitudinal stability, lateral-directional stability, and flight testing of unmanned aircraft systems. Unique to this book is a detailed discussion of digital data acquisition (DAQ) techniques, which are an integral part of modern flight test programs. This treatment includes discussion of the analog-to-digital conversion, sample rate, aliasing, and filtering. These critical details provide the flight test engineer with the insight needed to understand the capabilities and limitations of digital DAQ. Key features: Provides an introduction to the basic flight testing methods and instrumentation employed on general aviation

aircraft and unmanned aerial vehicles. Includes examples of flight testing on general aviation aircraft such as Cirrus, Diamond, and Cessna aircraft, along with unmanned aircraft vehicles. Suitable for courses on Aircraft Flight Test Engineering. Introduction to Flight Testing provides resources and guidance for practitioners in the rapidly-developing field of drone performance flight test and the general aviation flight test community.

Information Systems and Design Victor Taratukhin

Python Data Science Handbook Jake VanderPlas 2016-11-21 For many researchers, Python is a first-class tool mainly because of its libraries for storing, manipulating, and gaining insight from data. Several resources exist for individual pieces of this data science stack, but only with the Python Data Science Handbook do you get them all—IPython, NumPy, Pandas, Matplotlib, Scikit-Learn, and other related tools. Working scientists and data crunchers familiar with reading and writing Python code will find this comprehensive desk reference ideal for tackling day-to-day issues: manipulating, transforming, and cleaning data; visualizing different types of data; and using data to build statistical or machine learning models. Quite simply, this is the must-have reference for scientific computing in Python. With this handbook, you'll learn how to use: IPython and Jupyter: provide computational environments for data scientists using Python NumPy: includes the ndarray for efficient storage and manipulation of dense data arrays in Python Pandas: features the DataFrame for efficient storage and manipulation of labeled/columnar data in Python Matplotlib: includes capabilities for a flexible range of data visualizations in Python Scikit-Learn: for efficient and clean Python implementations of the most important and established machine learning algorithms

Fundamental Principles of Radar Habibur Rahman 2019-05-15 The important and fascinating topics of radar enjoy an extensive audience in industry and government but deserve more attention in undergraduate education to better prepare graduating engineers to meet the demands of modern mankind. Radar is not only one of the major applications of electronics and electromagnetic communications, but it is also a mature scientific discipline with significant theoretical and mathematical foundations that warrant an intellectual and educational challenge. Fundamental Principles of Radar is a textbook providing a first exposure to radar principles. It provides a broad concept underlying the basic principle of operations of most existing radar systems and maintains a good balance of mathematical rigor to convince readers without losing interest. The book provides an extensive exposition of the techniques currently being used for radar system design, analysis, and evaluation. It presents a comprehensive set of radar principles, including all features of modern radar applications, with their underlying derivations using simple mathematics. Coverage is limited to the main concepts of radar in order to present them in a systematic and organized fashion. Topics are treated not as abstruse and esoteric to the point of incomprehensibility, but the very complex and rich technology of radar is distilled into its fundamentals. The author's emphasis is on clarity without sacrificing rigor and completeness, thus making the book broad enough to satisfy a variety of backgrounds and interests. Thorough documentation provides an unusual degree of completeness for a textbook at this level, with interesting and sometimes thought-provoking content to make the subject even more appealing. Key Features: Covers a wide range of topics in radar systems Includes examples and exercises to reinforce the concepts presented and explain their applications Provides self-contained chapters useful for readers seeking selective topics Provides broad concepts

underlying the basic principles of operations of most types of radars in use today Includes documentation to lead to further reading of interesting concepts and applications

Phased Array Antenna Handbook Robert J. Mailloux 2005-01-01 "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