

Cst Microwave Studio

This book mainly focuses on the experimental research of rf breakdown and field emission with novel methods, including triggering rf breakdown with high intensity laser and pin-shaped cathodes as well as locating field emitters with a high resolution in-situ imaging system. With these methods, this book has analyzed the power flow between cells during rf breakdown, observed the evolution of field emission during rf conditioning and the dependence of field emission on stored energy, and studied the field emitter distribution and origination. The research findings greatly expand the understanding of rf breakdown and field emission, which will in turn benefit future study into electron sources, particle accelerators, and high gradient rf devices in general.

This book is useful to people working or planning to work in the field of linear accelerators. It is a good reference, presenting the most recent advances in the field. The intended audience are researchers, practitioners, academics and graduate students. The proceedings have been selected for coverage in: . OCo Index to Scientific & Technical Proceedings (ISTP CDROM version / ISI Proceedings). OCo CC Proceedings OCo Engineering & Physical Sciences."

Ultra Wideband Antennas: Design, Methodologies, and Performance presents the current state of the art of ultra wideband (UWB) antennas, from theory specific for these radiators to guidelines for the design of omnidirectional and directional UWB antennas. Offering a comprehensive overview of the latest UWB antenna research and development, this book: Discusses the developed theory for UWB antennas in frequency and time domains Delivers a brief exposition of numerical methods for electromagnetics oriented to antennas Describes solid-planar equivalence, which allows flat structures to be implemented instead of volumetric antennas Examines the impedance matching, phase linearity, and radiation patterns as design objectives for omnidirectional and directional antennas Addresses the time domain signal analysis for UWB antennas, from which the distortion phenomenon can be modeled Includes illustrative examples, design equations, CST MICROWAVE STUDIO® simulations, and MATLAB® plot generations Compares the performance of different UWB antennas, supplying useful insight into particular tendencies and unresolved problems Ultra Wideband Antennas: Design, Methodologies, and Performance provides a valuable reference for the scientific community, as UWB antennas have a variety of applications in body area networks, radar, imaging, spectrum monitoring, electronic warfare, wireless sensor networks, and more.

Focused on efficient simulation-driven multi-fidelity optimization techniques, this monograph on simulation-driven optimization covers simulations utilizing physics-based low-fidelity models, often based on coarse-discretization simulations or other types of simplified physics representations, such as analytical models. The methods presented in the book exploit as much as possible any knowledge about the system or device of interest embedded in the low-fidelity model with the purpose of reducing the computational overhead of the design process. Most of the techniques described in the book are of response correction type and can be split into parametric (usually based on analytical formulas) and non-parametric, i.e., not based on analytical formulas. The latter, while more complex in implementation, tend to be more efficient. The book presents a general formulation of response

correction techniques as well as a number of specific methods, including those based on correcting the low-fidelity model response (output space mapping, manifold mapping, adaptive response correction and shape-preserving response prediction), as well as on suitable modification of design specifications. Detailed formulations, application examples and the discussion of advantages and disadvantages of these techniques are also included. The book demonstrates the use of the discussed techniques for solving real-world engineering design problems, including applications in microwave engineering, antenna design, and aero/hydrodynamics.

This book presents an innovative concept for the realization of sensors based on a planar metamaterial microwave array and shows their application in biomedical analysis and treatment. The sensors are able to transduce the dielectric properties of materials in their direct vicinity into an electric signal. The specific array organization permits a simultaneous analysis of several materials using a single readout signal or a relative characterization of one material where information about its spatial distribution can be extracted. Two applications of the designed sensors are described here: the first is a cytological screening using micro fluidic technology, which shows that the sensors may be integrated into lab-on-chip technologies; the second application regards the use of the sensor in both the analysis and treatment of organic tissues. The developed sensor is able not only to screen the tissues for abnormalities, but also, by changing the applied signals, to perform thermal ablation and treat the abnormalities in a highly focused way. Thus, the research described in this book represents a considerable advancement in the field of biomedical microwave sensing.

This book describes various methods to enhance the directivity of planar antennas, enabling the next generation of high frequency, wireless communication. The authors discuss various applications to the terahertz regime of the electromagnetic spectrum, with an emphasis on gain enhancement mechanisms. The numerical models of these antennas are presented and the analytical results are supported, using commercial simulators. The multilayer substrate microstrip transmission line at terahertz frequency is also explored and a method to obtain the various parameters of this interconnect at high frequency is described. This book will be a valuable resource for anyone needing to explore the terahertz band gap for future wireless communication, in an effort to solve the bandwidth (spectrum scarcity) problem.

[ANGLÈS] This work describes the study of coil for Magnetic Resonance Imaging (MRI) application. Concretely, the principal objective is the design of a birdcage coil (RF coil) to use in a 7 Tesla scanner. More strength field has a better SNR and increased chemical shift effects, improving spectral fat suppression and spectroscopy. Moreover, a better SNR increases the spatial resolution or reduces the imaging time. For this reason, it is interesting research with high fields. The birdcage coil achieves circular polarization and generates a high homogeneous radio frequency magnetic field under many conditions. In this project is designed a Birdcage coil for a 7T to obtain images from small animals (like a mouse). It opens the door to design and construct a Birdcage coil for a 7T to obtain human brain images. In this project thesis, for obtain the design, a study is carried out firstly using the computer program BirdcageBuilder. Secondly, the results obtained with this simulator are introduced to the CST Microwave

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Studio, creating a 3D model and generating a simulation. In this step, finally the parameters are readjusted to obtain our desired Larmor frequency (298,2MHz) for a correct operation in 7T. These simulations demonstrate the theoretical results from our design and it shows the designed antenna behaviour.

The finite-difference time-domain (FDTD) method has revolutionized antenna design and electromagnetics engineering. Here OCOs a cutting-edge book that focuses on the performance optimization and engineering applications of FDTD simulation systems. Covering the latest developments in this area, this unique resource offer you expert advice on the FDTD method, hardware platforms, and network systems. Moreover the book offers guidance in distinguishing between the many different electromagnetics software packages on the market today. You also find a complete chapter dedicated to large multi-scale problem solving. This practical reference is supported with 250 illustrations, 128 equations, and 11 appendixes filled with helpful data processing techniques related to the FDTD method.

Introduces CEM methods, applying the codes that implement them to real-world engineering problems.

Modelling and computations in electromagnetics is a quite fast-growing research area. The recent interest in this field is caused by the increased demand for designing complex microwave components, modeling electromagnetic materials, and rapid increase in computational power for calculation of complex electromagnetic problems. The first part of this book is devoted to the advances in the analysis techniques such as method of moments, finite-difference time- domain method, boundary perturbation theory, Fourier analysis, mode-matching method, and analysis based on circuit theory. These techniques are considered with regard to several challenging technological applications such as those related to electrically large devices, scattering in layered structures, photonic crystals, and artificial materials. The second part of the book deals with waveguides, transmission lines and transitions. This includes microstrip lines (MSL), slot waveguides, substrate integrated waveguides (SIW), vertical transmission lines in multilayer media as well as MSL to SIW and MSL to slot line transitions.

A 3-D MicroWave Studio model for the RF drive in the LANSCE DTL tank 4 has been built. Both eigensolver and time-domain modeling are used to evaluate maximal fields in the drive module and RF coupling. The LANSCE DTL tank 4 has recently been experiencing RF problems, which may or may not be related to its replaced RF coupler. This situation stimulated a request by Dan Rees to provide EM modeling of the RF drive in the DTL tank 4 (T4). Jim O'Hara provided a CAD model that was imported into the CST Microwave Studio (MWS) and after some modifications became a part of a simplified MWS model of the T4 RF drive. This technical note describes the model and presents simulation results.

Good antenna-mode coupling is needed for determining the amount of propellant in a tank through the method of radio frequency mass gauging (RFMG). The antenna configuration and position in a tank are important factors in coupling the antenna to the natural electromagnetic modes. In this study, different monopole and dipole antenna mounting configurations and positions were modeled and responses simulated in a full-scale tank model with the transient solver of CST Microwave Studio (CST Computer Simulation Technology of America, Inc.). The study was undertaken to qualitatively understand the effect of antenna design and placement within a tank on the resulting radio frequency (RF) tank spectrum.

The purpose of the Ultra-Wideband Short-Pulse Electromagnetics Conference series is to focus on advanced technologies for the generation, radiation and detection of ultra-wideband short pulse signals, taking into account their propagation and scattering from and coupling to targets

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of interest. This Conference series reports on developments in supporting mathematical and numerical methods and presents current and potential future applications of the technology. Ultra-Wideband Short-Pulse Electromagnetics 8 is based on the American Electromagnetics 2006 conference held from June 3-7 in Albuquerque, New Mexico. Topical areas covered in this volume include pulse radiation and measurement, scattering theory, target detection and identification, antennas, signal processing, and communications.

Development of Packaging and Products for Use in Microwave Ovens, Second Edition, supports the efficient design of microwaveable food products and packaging materials, explaining all essential aspects in a detailed and systematic way. This new edition reviews recent developments and the latest cutting-edge technology, including new materials and package formats, new ideas for product development, and new information on developments in microwave technology. Sections cover the effect of food dielectric properties and heating uniformity, microwave packaging materials, product development, food, packaging, oven safety, and the computer modelling of microwave products and active packaging. Written by a distinguished team of international contributors, this book is not only a valuable resource for engineers, manufacturers and product developers in the food and packaging industries, but also a great research tool for industrial R&D and academia. Enables the reader to understand product and packaging materials for microwave ovens down to a highly technical and detailed level Offers systematic coverage on all aspects involved, including principles, materials, design, product development and modelling Includes the very latest developments in products and packaging, including smart packaging and solid state technology

The electromagnetic field simulation software package CST MICROWAVE STUDIO (MWS) was used to compute the cold-test parameters - frequency-phase dispersion, on-axis impedance, and attenuation - for a traveling-wave tube (TWT) slow-wave circuit. The results were compared to experimental data, as well as to results from MAFIA, another three-dimensional simulation code from CST currently used at the NASA Glenn Research Center (GRC). The strong agreement between cold-test parameters simulated with MWS and those measured experimentally demonstrates the potential of this code to reduce the time and cost of TWT development. Chevalier, Christine T. and Herrmann, Kimberly A. and Kory, Carol L. and Wilson, Jeffrey D. and Cross, Andrew W. and Santana, Samuel Glenn Research Center NASA/TM-2003-212486, NAS 1.15:212486, E-14028...

With the development of mobile 4G communication system, people's requirements for the speed of wireless communication are rapidly increasing. In order to meet this need, the research and development of the fifth generation (5G) wireless systems has been carried out. Compared with previous generation (1G~4G), 5G will have significant improvements in transmission rate, latency, mobility and so on. The book "Microwave/RF Components for 5G Front-End Systems" is outlines the simulation, design, and fabrication of microwave components including Antennas, Filters, and Power Amplifiers for 5G wireless communications. In addition, exhaustive reviews have been presented, classifying the various types and applications of reconfigurable antennas, Filters and amplifiers for current and future wireless networks. This book provides a detailed overview on the use of global optimization and parallel computing in microwave tomography techniques. The book focuses on techniques that are based on global optimization and electromagnetic numerical methods. The authors provide parallelization techniques on homogeneous and heterogeneous computing architectures on high performance and general purpose futuristic computers. The book also discusses the multi-level optimization technique, hybrid genetic algorithm and its application in breast cancer imaging.

This book introduces the powerful Finite-Difference Time-Domain method to students and interested researchers and

readers. An effective introduction is accomplished using a step-by-step process that builds competence and confidence in developing complete working codes for the design and analysis of various antennas and microwave devices. This book will serve graduate students, researchers, and those in industry and government who are using other electromagnetics tools and methods for the sake of performing independent numerical confirmation. No previous experience with finite-difference methods is assumed of readers.

The Method of Moments in Electromagnetics, Third Edition details the numerical solution of electromagnetic integral equations via the Method of Moments (MoM). Previous editions focused on the solution of radiation and scattering problems involving conducting, dielectric, and composite objects. This new edition adds a significant amount of material on new, state-of-the-art compressive techniques. Included are new chapters on the Adaptive Cross Approximation (ACA) and Multi-Level Adaptive Cross Approximation (MLACA), advanced algorithms that permit a direct solution of the MoM linear system via LU decomposition in compressed form. Significant attention is paid to parallel software implementation of these methods on traditional central processing units (CPUs) as well as new, high performance graphics processing units (GPUs). Existing material on the Fast Multipole Method (FMM) and Multi-Level Fast Multipole Algorithm (MLFMA) is also updated, blending in elements of the ACA algorithm to further reduce their memory demands. The Method of Moments in Electromagnetics is intended for students, researchers, and industry experts working in the area of computational electromagnetics (CEM) and the MoM. Providing a bridge between theory and software implementation, the book incorporates significant background material, while presenting practical, nuts-and-bolts implementation details. It first derives a generalized set of surface integral equations used to treat electromagnetic radiation and scattering problems, for objects comprising conducting and dielectric regions. Subsequent chapters apply these integral equations for progressively more difficult problems such as thin wires, bodies of revolution, and two- and three-dimensional bodies. Radiation and scattering problems of many different types are considered, with numerical results compared against analytical theory as well as measurements.

This comprehensive resource covers both antenna fundamentals and practical implementation strategies, presenting antenna design with optimum performance in actual products and systems. The book helps readers bridge the gap between electromagnetic theory and its application in the design of practical antennas in real products. Practical implementation strategies in products and systems will be addressed in order to design antennas in the context of actual product environments, including PCB layout, component placement and casing design. Practical design examples on wearable electronic products are presented with a systematic approach to designing antennas for actual products. The book introduces antenna fundamentals to provide the basic concepts and necessary mathematics on electromagnetic

analysis, followed by advanced antenna elements. The concept of electromagnetic simulation is presented. The advantages and disadvantages of different numerical methods in antenna modeling are also discussed. Several commercial antenna design and simulation tools are introduced, allowing hands-on practice of antenna modeling and simulation.

This Brief reviews a number of techniques exploiting the surrogate-based optimization concept and variable-fidelity EM simulations for efficient optimization of antenna structures. The introduction of each method is illustrated with examples of antenna design. The authors demonstrate the ways in which practitioners can obtain an optimized antenna design at the computational cost corresponding to a few high-fidelity EM simulations of the antenna structure. There is also a discussion of the selection of antenna model fidelity and its influence on performance of the surrogate-based design process. This volume is suitable for electrical engineers in academia as well as industry, antenna designers and engineers dealing with computationally-expensive design problems.

ICMMT2018 is intended to provide a broad international forum and nice opportunity for the scientists and engineers to present their new ideas and exchange information on research

Accurate predications of RF coupling between an RF cavity and ports attached to it have been an important study subject for years for RF coupler and higher order modes (HOM) damping design. We report recent progress and a method on the RF coupling simulations between waveguide ports and RF cavities using CST Microwave Studio in time domain (Transit Solver). Comparisons of the measured and calculated couplings are presented. The simulated couplings and frequencies agree within $\{approx\}$ 10% and $\{approx\}$ 0.1% with the measurements, respectively. We have simulated couplings with external Qs ranging from $\{approx\}$ 100 to $\{approx\}$ 100,000, and confirmed with measurements. The method should also work well for higher Qs, and can be easily applied in RF power coupler designs and HOM damping for normal-conducting and superconducting cavities.

The field of electromagnetics has seen considerable advances in recent years, based on the wide applications of numerical methods for investigating electromagnetic fields, microwaves, and other devices. Wide-Band Slow-Wave Systems: Simulation and Applications presents new technical solutions and research results for the analysis, synthesis, and design of slow-wave structures for modern electronic devices with super-wide pass-bands. It makes available, for the first time in English, significant research from the past 20 years that was previously published only in Russian and Lithuanian. The authors examine electrostatics, multiconductor lines, and numerical methods for the modeling, simulation, analysis, and design of various super-wide-band slow-wave structures, including helical, meander, and gutter-type systems. The book features: The electrodynamic method for analysis of helical structures containing periodical

inhomogeneities The multiconductor line method for analysis of complex helical, meander, and gutter-type wide-band slow-wave structures The method of moments for modeling and analysis of multiconductor lines containing a limited number of lines and meander structures with limited length Use of powerful software systems Microwave Office®, MICROWAVE STUDIO®, and MATLAB® for modeling, analysis, and design A synergy of various methods for investigating and designing wide-band slow-wave structures Solution of specific problems related to the design of wide-band and super-wide-band electrodynamic delay and deflection systems Principles of computer-aided design of slow-wave structures Presenting the theory, principles, properties, and applications of wide-band and super-wide-band slow-wave structures, this book will be of interest to students, engineers, researchers, and designers in the fields of electronic and microwave engineering.

Highlighting the challenges RF and microwave circuit designers face in their day-to-day tasks, RF and Microwave Circuits, Measurements, and Modeling explores RF and microwave circuit designs in terms of performance and critical design specifications. The book discusses transmitters and receivers first in terms of functional circuit block and then examines each block individually. Separate articles consider fundamental amplifier issues, low noise amplifiers, power amplifiers for handset applications and high power, power amplifiers. Additional chapters cover other circuit functions including oscillators, mixers, modulators, phase locked loops, filters and multiplexers. New chapters discuss high-power PAs, bit error rate testing, and nonlinear modeling of heterojunction bipolar transistors, while other chapters feature new and updated material that reflects recent progress in such areas as high-volume testing, transmitters and receivers, and CAD tools. The unique behavior and requirements associated with RF and microwave systems establishes a need for unique and complex models and simulation tools. The required toolset for a microwave circuit designer includes unique device models, both 2D and 3D electromagnetic simulators, as well as frequency domain based small signal and large signal circuit and system simulators. This unique suite of tools requires a design procedure that is also distinctive. This book examines not only the distinct design tools of the microwave circuit designer, but also the design procedures that must be followed to use them effectively.

Survey of Gambro Lundia Evaluations Three-Dimensional Simulation of Traveling-Wave Tube Cold-Test Characteristics Using CST Microwave Studio Independently Published

Experimental results have shown that the high harmonic fast wave (HHFW) at 30 MHz can provide substantial plasma heating and current drive for the NSTX spherical tokamak operation. However, the present antenna strap design rarely achieves the design goal of delivering the full transmitter capability of 6 MW to the plasma. In order to deliver more power to the plasma, a new antenna strap design and the associated coaxial line feeds are being constructed. This new antenna strap design features two feedthroughs to replace the old single feed-through design. In the design process, CST Microwave Studio has been used to simulate the entire new antenna strap structure including the enclosure and the Faraday shield. In this paper, the antenna strap model and the simulation results will be discussed in detail. The test results from the new antenna straps with their associated resonant loops will be presented as well.

Full-wave electromagnetic (EM) simulations were carried out using CST Microwave Studio to optimize and specify the required dimensions for the demonstrated filters. AS a result, the simulated and measured frequency characteristics for the filters were in good agreement.

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Shelving Guide: Electrical Engineering Revised, updated, and expanded, Electromagnetic Compatibility: Methods, Analysis, Circuits, and Measurement, Third Edition provides comprehensive practical coverage of the design, problem solving, and testing of electromagnetic compatibility (EMC) in electrical and electronic equipment and systems. This new edition provides novel information on theory, applications, evaluations, electromagnetic computational programs, and prediction techniques available. With sixty-nine schematics providing examples for circuit level electromagnetic interference (EMI) hardening and cost effective EMI problem solving, this book also includes 1130 illustrations and tables. Including extensive data on components and their correct implementation, the myths, misapplication, misconceptions, and fallacies that are common when discussing EMC/EMI will also be addressed and corrected.

This six volume set LNCS 11063 – 11068 constitutes the thoroughly refereed conference proceedings of the 4th International Conference on Cloud Computing and Security, ICCCS 2018, held in Haikou, China, in June 2018. The 386 full papers of these six volumes were carefully reviewed and selected from 1743 submissions. The papers cover ideas and achievements in the theory and practice of all areas of inventive systems which includes control, artificial intelligence, automation systems, computing systems, electrical and informative systems. The six volumes are arranged according to the subject areas as follows: cloud computing, cloud security, encryption, information hiding, IoT security, multimedia forensics

Provides systematic coverage of the theory, physics, functional designs, and engineering applications of advanced electromagnetic surfaces. Continuing advancements in electronics creates the possibility of communicating with more people at greater distances. Such an evolution calls for more efficient techniques and designs in radio communications. Emerging Innovations in Microwave and Antenna Engineering provides innovative insights into theoretical studies on propagation and microwave design of passive and active devices. The content within this publication is separated into three sections: the design of antennas, the design of the antennas for the RFID system, and the design of a new structure of microwave amplifier. Highlighting topics including additive manufacturing technology, design application, and performance characteristics, it is designed for engineers, electricians, researchers, students, and professionals, and covers topics centered on modern antenna and microwave circuits design and theory.

Achieve optimal microwave system performance by mastering the principles and methods underlying today's powerful computational tools and commercial software in electromagnetics. This authoritative resource offers you clear and complete explanation of this essential electromagnetics knowledge, providing you with the analytical background you need to understand such key approaches as MoM (method of moments), FDTD (Finite Difference Time Domain) and FEM (Finite Element Method), and Green's functions. This comprehensive book includes all math necessary to master the material. Moreover, it features numerous solved problems that help ensure your understanding of key concepts throughout the book.

Wireless Sensor Network (WSN) consists of numerous physically distributed autonomous devices used for sensing and monitoring the physical and/or environmental conditions. A WSN uses a gateway that provides wireless connectivity to the wired world as well as distributed networks. There are many open problems related to Ad-Hoc networks and its applications. Looking at the expansion of the cellular infrastructure, Ad-Hoc network may be acting as the basis of the 4th generation wireless technology with the new paradigm of 'anytime, anywhere communications'. To realize this, the real challenge would be the security, authorization and management issues of the large scale WSNs. This book is an edited volume in the broad area of WSNs. The book covers various chapters like Multi-Channel Wireless Sensor Networks, its Coverage, Connectivity as well as Deployment. It covers comparison of various communication protocols and algorithms such

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as MANNET, ODMRP and ADMR Protocols for Ad hoc Multicasting, Location Based Coordinated Routing Protocol and other Token based group local mutual exclusion Algorithms. The book also covers a chapter on Extended Ad hoc On-Demand Distance Vector (EAODV) routing protocol based on Distributed Minimum Transmission Multicast Routing (DMTMR). One chapter is dedicated to OCDMA and its future application and another chapter covers development of Home Automation System using SWN.

Over the past 20 years UWB has been used for radar, sensing, military communications and niche applications. However, since the FCC ruling in 2002, which allowed the commercial operation of UWB for data communications, UWB has changed dramatically. Implementation oriented, this volume explores the fundamentals of UWB technology with particular emphasis on impulse radio (IR) techniques. It explains the key physical layer aspects of UWB technology, especially in communications and in control applications, and examines the multiple access (MAC) issues which are emerging as a hot area for practical UWB systems. Offers practical information about implementation Addresses issues of modulation possibilities, appropriate circuits for UWB, an example circuit design, MAC protocol issues and use of UWB for positioning applications Includes a literature survey examining books, articles and conference papers presenting the basic features of UWB technology and current systems Features a patent database search providing a historical perspective to the state-of-the-art technology UWB Theory and Applications will be indispensable to researchers interested in the practical issues of UWB technology and realistic assumptions of UWB, as well as engineers interested in implementing UWB devices.

This book "Advanced Engineering for Processes and Technologies II" provides a good platform for participating researchers and academicians to share their latest innovation, technology and research findings in the areas of marine engineering technology and applications, sea management as well as engineering education. It offers an opportunity for academicians of the Universiti Kuala Lumpur, Malaysian Institute of Marine Engineering Technology (UniKL MIMET) to exchange ideas and establish a professional network. There are more than 30 papers covering a wide range of topics related to technologies and education including simulation, intellectual discussion, environmental awareness, enhancement of knowledge and skills. The aim of this book focuses more on the numerous technological methods used for the establishment of engineering innovation and productivity through their competitive research findings and the exposure of their relative merits and limitations. The papers shared in this issue will enable other researchers to generate interest and novel ideas that can lead to the discovery of new engineering knowledge.

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.

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