Design And Optimization Of Passive Uhf Rfid Systems 1st Edition

This book presents the study, design, modulation, optimization and implementation of low power, passive DT-??Ms for use in audio applications. The high gain and bandwidth amplifier normally used for integration in ?? modulation, is replaced by passive, switched-capacitor branches working under the Ultra Incomplete Settling (UIS) condition, leading to a reduction of the consumed power. The authors describe a design process that uses high level models and an optimization process based in genetic algorithms to achieve the desired performance.

This book is the first standalone book that combines research into low-noise amplifiers (LNAs) with research into millimeter-wave circuits. In compiling this book, the authors have set two research objectives. The first is to bring together the research context behind millimeter-wave circuit operation and the theory of low-noise amplification. The second is to present new research in this multi-disciplinary field by dividing the common LNA configurations and typical specifications into subsystems, which are then optimized separately to suggest improvements in the current state-of-the-art designs. To achieve the second research objective, the state-of-the-art LNA configurations are discussed and the weaknesses of state-of the art configurations are considered, thus identifying research gaps. Such research gaps, among others, point towards optimization – at a systems and microelectronics level. Optimization topics include the influence of short wavelength, layout and crosstalk on LNA performance. Advanced fabrication technologies used to decrease the parasitics of passive and active devices are also explored, together with packaging technologies such as silicon-on-chip and silicon-on-package, which are proposed as alternatives to traditional IC implementation. This research outcome builds through innovation. Innovative ideas for LNA construction are explored, and alternative design methodologies are deployed, including LNA/antenna co-design or utilization of the electronic design automation in the research flow. The book also offers the authors' proposal for streamlined automated LNA design flow, which focuses on LNA as a collection of highly optimized subsystems.

Culled from the pages of CRC's highly successful, best-selling The Circuits and Filters Handbook, Second Edition, Passive, Active, and Digital Filters presents a sharply focused, comprehensive review of the fundamental theory behind professional applications of these complex filters. It supplies a concise, convenient reference to the key concepts, models, and equations necessary to analyze, design, and predict the behavior of large-scale systems that employ various types of filters, illustrated by frequent examples. Edited by a distinguished authority, this book emphasizes the theoretical concepts underlying the processes, behavior, and operation of these filters. More than 470 figures and tables illustrate the concepts, and where necessary, the theories, principles, and mathematics of some subjects are reviewed. Expert contributors discuss general characteristics of filters, frequency transformations, sensitivity and selectivity, low-gain active filters, higher-order filters, continuous-time integrated filters, FIR and IIR filters, and VLSI implementation of digital filters, among many other topics. Passive, Active, and Digital Filters builds a strong theoretical foundation for the design and analysis of a variety of filters, from passive to active to digital, while serving as a handy

reference for experienced engineers, making it a must-have for both beginners and seasoned experts.
Papers dealing with source program transformations applied by programs in the compiling process.
This book results from a Special Issue published in Energies, entitled “Building Thermal Envelope". Its intent is to identify emerging research areas within the field of building thermal envelope solutions and contribute to the increased use of more energy-efficient solutions in new and refurbished buildings. Its contents are organized in the following sections: Building envelope materials and systems envisaging indoor comfort and energy efficiency; Building thermal and energy modelling and simulation; Lab test procedures and methods of field measurement to assess the performance of materials and building solutions; Smart materials and renewable energy in building envelope; Adaptive and intelligent building envelope; and Integrated building envelope technologies for high performance buildings and cities.
The recent introduction of active and passive structural control methods has given structural designers powerful tools for performance-based design. However, structural engineers often lack the tools for the optimal selection and placement of such systems. In Building Control with Passive Dampers , Takewaki brings together most the reliable, state-of-the-art methods in practice around the world, arming readers with a real sense of how to address optimal selection and placement of passive control systems. The first book on optimal design, sizing, and location selection of passive dampers Combines theory and practical applications Describes step-by-step how to obtain optimal damper size and placement Covers the state-of-the-art in optimal design of passive control Integrates the most reliable techniques in the top literature and used in practice worldwide Written by a recognized expert in the area MATLAB code examples available from the book’s Companion Website This book is essential for post-graduate students, researchers, and design consultants involved in building control. Professional engineers and advanced undergraduates interested in seismic design, as well as mechanical engineers looking for vibration damping techniques, will also find this book a helpful reference. Code examples available at www.wiley.com/go/takewaki
This book introduces readers to various tools and techniques for the design of precision, miniature products, assemblies and associated manufacturing processes. In particular, it focuses on precision mechanisms, robotic devices and their control strategies, together with case studies. In the context of manufacturing process, the book highlights micro/nano machining/forming processes using non-conventional energy sources such as lasers, EDM (electro-discharge machining), ECM (electrochemical machining), etc. Techniques for achieving optimum performance in process modeling, simulation and optimization are presented. The applications of various research tools such as FEM (finite element method), neural networks, genetic algorithms, etc. to product-process design and optimization are illustrated through case studies. The state-of-the-art material presented here provides valuable directions for product development and future research work in this area. The contents of this book will be of use to researchers and industry professionals alike.
This book proposes systemic design methodologies applied toelectrical energy systems, in particular integrated optimal designwith modeling and optimization methods and tools. It is made up of six chapters dedicated to integrated optimaldesign. First, the signal

processing of mission profiles and systemenvironment variables are discussed. Then, optimization-orientedanalytical models, methods and tools (design frameworks) areproposed. A “multi-level optimization” smartly couplingseveral optimization processes is the subject of one chapter.Finally, a technico-economic optimization especially dedicated toelectrical grids completes the book. The aim of this book is to summarize design methodologies basedin particular on a systemic viewpoint, by considering the system asa whole. These methods and tools are proposed by the most importantFrench research laboratories, which have many scientificpartnerships with other European and international researchinstitutions. Scientists and engineers in the field of electricalengineering, especially teachers/researchers because of the focuson methodological issues, will find this book extremely useful, aswill PhD and Masters students in this field.

This book discusses some research results for CMOS-compatible silicon-based optical devices and interconnections. With accurate simulation and experimental demonstration, it provides insights on silicon-based modulation, advanced multiplexing, polarization and efficient coupling controlling technologies, which are widely used in silicon photonics. Researchers, scientists, engineers and especially students in the field of silicon photonics can benefit from the book. This book provides valuable knowledge, useful methods and practical design that can be considered in emerging silicon-based optical interconnections and communications. And it also give some guidance to student how to organize and complete an good dissertation.

"This book addresses the design optimization of active and passive control systems including earthquake engineering and tuned mass damper research topics and their link"--

The need for effective prostheses is prevalent worldwide, and is especially dire in developing countries and low-resource settings. The MIT GEAR Lab is addressing this gap through the ATKnee, a low-cost, passive prosthetic knee that employs the use of spring and damper components to replicate the knee torque of the able-bodied human knee. In this study, we build upon prior work to optimize the components used in the ATKnee by accounting for results from field-testing. We first develop an inverse dynamics model to confirm understanding of previous work. We then use a genetic optimization algorithm to optimize parameters across different walking speeds and various spring-damper configurations. The best fit, as measured by the highest R2 value, is obtained when a viscous damper is active during the first dissipative phase (b*11), a friction damper is active during the second dissipative phase (b*/20), and an additional friction damper is active throughout both phases (b*/0). We make the suggestion that b*/0 = 0.084, b*/11 = 0.008, b*/0 = 0.183, gives the most optimal passive system knee torque with the engagement and disengagement timings teng = 51.3%, tdis1 = 64.2% for the first damper, and teng2 = 86.1%, tdis2 = 95.2% for the second damper. We find that the parameters are robust to subject body mass, but show a positive correlation with walking speed. We conclude that while we are able to suggest an optimized parameter set that includes higher order dampers, it will be important to investigate the effects of cadence, as well as to study the joint torques at the hip, which is further from the foot.

Building energy design is currently going through a period of major changes. One key factor of this is the adoption of net-zero energy as a long term goal for new buildings in most developed countries. To achieve this goal a lot of research is needed to accumulate knowledge and to utilize it in practical applications. In this book, accomplished international experts present advanced modeling techniques as well as in-depth case studies in order to aid designers in optimally using simulation tools for net-zero energy building design. The strategies and technologies discussed in this book are, however, also applicable for the design of energy-plus buildings. This book was facilitated by International Energy Agency's Solar Heating and Cooling (SHC) Programs and the Energy in Buildings and Communities (EBC) Programs through the joint SHC Task 40/EBC Annex 52: Towards Net Zero Energy Solar Buildings R&D collaboration. After presenting the fundamental concepts, design strategies, and technologies required to achieve net-zero energy in buildings, the book discusses different design processes and tools to support the design of net-zero energy buildings (NZEBs). A substantial chapter reports on four diverse NZEBs that have been operating for at least two years. These case studies are extremely high quality because they all have high resolution measured data and the authors were intimately involved in all of them from conception to operating. By comparing the projections made using the respective design tools with the actual performance data, successful (and unsuccessful) design techniques and processes, design and simulation tools, and technologies are identified. Written by both academics and practitioners (building designers) and by North Americans as well as Europeans, this book provides a very broad perspective. It includes a detailed description of design processes and a list of appropriate tools for each design phase, plus methods for parametric analysis and mathematical optimization. It is a guideline for building designers that draws from both the profound theoretical background and the vast practical experience of the authors.

In this guide to sound reinforcement alignment and design, Bob McCarthy shares his expert knowledge and effective methodology from years of teaching audio professionals. Written in a clear and easy-to-read style and illustrated with color diagrams and screenshots throughout, McCarthy's unique guide gives you all the newest techniques to ensure you perfect sound reinforcement and fulfill design needs. Outlining how sound is spread over a listening area, looking at the physics of speaker interaction, methods of alignment including mic placement, equalization, speaker placement and acoustic treatment, and now including case studies offering real world examples to fully explore different principals discussed, thiss book provides the definitive guide to sound reinforcement design and optimization.

A selected set of papers documenting accomplishments and new findings are provided in the appendix. The paper compilation in the appendix is meant to be representative of the overall scope of the work and is not intended to be exhaustive. Complete references are given in the Publications section. Most of the papers listed may be downloaded for

users at ece gatech.edu!lanterma/pcl.

A typical engineering task during the development of any system is, among others, to improve its performance in terms of cost and response. Improvements can be achieved either by simply using design rules based on the experience or in an automated way by using optimization methods that lead to optimum designs. Design Optimization of Active and Passive Structural Control Systems includes Earthquake Engineering and Tuned Mass Damper research topics into a volume taking advantage of the connecting link between them, which is optimization. This is a publication addressing the design optimization of active and passive control systems. This title is perfect for engineers, professionals, professors, and students alike, providing cutting edge research and applications.

Sound Systems: Design and Optimization provides an accessible and unique perspective on the behavior of sound systems in the practical world. The third edition reflects current trends in the audio field thereby providing readers with the newest methodologies and techniques. In this greatly expanded new edition, you'll find clearer explanations, a more streamlined organization, increased coverage of current technologies and comprehensive case studies of the author's award-winning work in the field. As the only book devoted exclusively to modern tools and techniques in this emerging field, Sound Systems: Design and Optimization provides the specialized guidance needed to perfect your design skills. This book helps you: Improve your design and optimization decisions by understanding how audiences perceive reinforced sound Use modern analyzers and prediction programs to select speaker placement, equalization, delay and level settings based on how loudspeakers interact in the space Define speaker array configurations and design strategies that maximize the potential for spatial uniformity Gain a comprehensive understanding of the tools and techniques required to generate a design that will create a successful transmission/reception model

Wearable continuous monitoring systems are necessary in risky environments such as mining and diving and are especially important in the medical monitoring of patients both in medical facilities and at home. All these applications of monitoring with data transmission functions can be achieved by using wearable antennas. Recently, possibilities of connecting completely independent appliances with textiles have emerged. However, full success will be achieved only when antennas and all related components are entirely converted into 100% textile materials. Design and Optimization of Sensors and Antennas for Wearable Devices: Emerging Research and Opportunities provides innovative insights on the development of adaptable materials and textile antennas that can be used in the construction of wearable devices that are biocompatible and offer high conductivity, low cost, simplistic manufacturing, are comfortable for the wearer, and are water/climate safe and condition amicable. The content within this publication examines data transmission, wearable computing, and medical applications. It is designed for engineers, manufacturers, researchers, academicians, and scientists who are interested in the development of wearable technologies.

As a first step, the effects of dielectric materials on an antenna's impedance match and radiation pattern are investigated. The detuning effect is quantified based on the theoretical frequency scaling and effective permittivity of a dielectric material of finite thickness. Using simple formulas, the operational range of a tag can be predicted without intensive full-wave simulations of different materials. Next, a spectral domain Green's function is applied to compute the antenna pattern when the tag is mounted on or inside a layered medium. The optimal

placement of the tag is found based on the focusing effect that the material has on the gain pattern of the antenna. For tires, the steel ply in the sidewall of a tire looks like a periodic wire grating. The performance of an antenna placed close to a wire grating is predicted using Floquet theory. The results indicate that steel plies embedded in the tire can be utilized as a reflector to further focus the gain pattern and increase the read range of a tag. Using these design tools and theoretical analysis, several broadband RFID tag antennas are designed for multi-layered materials. A novel stretchable conductive textile (E-fiber) based tag antenna is also developed for placement in elastic materials. Prototype antennas are fabricated and embedded in a tire during the tire manufacturing process. Experimental results indicate that tags with the new antennas achieve significant improvement compared with commercially available tags.

On the other hand, various interactions between microwave devices and their environment, such as feeding structures and housing, must be taken into account, and this is only possible through full-wave EM analysis. Electromagnetic simulations can be highly accurate, but they tend to be computationally expensive. Therefore, practical design optimization methods have to be computationally efficient, so that the number of CPU-intensive high-fidelity EM simulations is reduced as much as possible during the design process. For the same reasons, techniques for creating fast yet accurate models of microwave structures become crucially important. In this edited book, the authors strive to review the state-of-the-art simulation-driven microwave design optimization and modeling. A group of international experts specialized in various aspects of microwave computer-aided design summarize and review a wide range of the latest developments and real-world applications.

Design and Optimization of Passive UHF RFID SystemsSpringer Science & Business Media

Radio Frequency IDentification (RFID) stores and retrieves data using devices called RFID tags: objects attached to or incorporated into a product, animal or person which communicate with an RFID reader or interrogator. This book proposes a linear two-port model for an N-stage modified-Greinacher full wave rectifier, predicting the overall conversion efficiency at low power levels where the diodes are operating near their threshold voltage. Included is an experimental procedure to measure how impedance modulation in the tag affects the signal at the reader, and a useful tool for choosing the most appropriate impedances.

Antenna arrays are widely used in numerous wireless and communication systems. A commercial software for the analysis of wire antennas, FEKO, has been used in this work to design a dipole antenna array. The Genetic Algorithm toolbox from MATLAB played an important role for the optimization purpose. Different half wave dipole arrays are simulated and optimized for the best directive gain. The dipole antennas are easy to design and fabricate. There are very few constraints in terms of antenna size in such antennas. Using FEKO to solve the integral equations of the currents in the dipole by the method of moments (MoM), we determined the self and mutual impedance of the dipoles. Then, a MATLAB code was used to evaluate the performance of different parasitic elements in the array and their effect on the array pattern. The performance was expressed as a single fitness parameter, which was optimized. Performance parameters such as beam width and side lobe levels may be optimized for different cases but here we have optimized the peak of the radiation pattern as a function of the parasitic loads that are being used for steering of the main beam.

Passive vibration control plays a crucial role in structural engineering. Common solutions include seismic isolation and damping systems with various kinds of devices, such as viscous, viscoelastic, hysteretic, and friction dampers. These strategies have been widely utilized in engineering practice, and their efficacy has been demonstrated in mitigating damage and preventing the collapse of buildings, bridges, and industrial facilities. However, there is a need for more sophisticated analytical and numerical tools to design structures equipped with optimally configured devices. On the other hand, the family of devices and dissipative elements used for structural protection keeps evolving,

because of growing performance demands and new progress achieved in materials science and mechanical engineering. This Special Issue collects 13 contributions related to the development and application of passive vibration control strategies for structures, covering both traditional and innovative devices. In particular, the contributions concern experimental and theoretical investigations of high-efficiency dampers and isolation bearings; optimization of conventional and innovative energy dissipation devices; performance-based and probability-based design of damped structures; application of nonlinear dynamics, random vibration theory, and modern control theory to the design of structures with passive energy dissipation systems; and critical discussion of implemented isolation/damping technologies in significant or emblematic engineering projects.

This volume presents developments and advances in modelling passive and active control systems governed by partial differential equations. It emphasizes shape analysis, optimal shape design, controllability, nonlinear boundary control, and stabilization. The authors include essential data on exact boundary controllability of thermoelastic plates with variable transmission coefficients.

An industrial book that analyses various theoretical problems, optimizes numerical applications and addresses industrial problems such as belt-conveyor bridge, pipeline, wind turbine power, large-span suspended roof and offshore jacket member. Multi-storey frames and pressure vessel-supporting frames are discussed in detail. The book’s emphasis is on economy and cost calculation, making it possible to compare costs and make significant savings in the design stages, by, for example, comparing the costs of stiffened and un-stiffened structural versions of plates and shells. In this respect, this book will be an invaluable aid for designers, students, researchers and manufacturers to find better, optimal, competitive structural solutions. Emphasis is placed on economy and cost calculation, making it possible to compare costs and make significant savings in the design stages of metal structures Optimizes numerical applications and analyses various theoretical and industrial problems, such as belt-conveyor bridge, pipeline, wind turbine power, large-span suspended roof and offshore jacket member An invaluable aid for designers, students, researchers and manufacturers to find better, optimal, competitive structural solutions