



River Publishers

River Publishers Book Catalogue

Series in Electronic Materials, Circuits
and Devices

River Publishers Series in Electronic Materials, Circuits and Devices

Advances in Highly Correlated Systems

Editors:

Parvathy Nancy, Mahatma Gandhi University, India

Wilfrid Prellier, French National Centre for Scientific Research, France

Sabu Thomas, Mahatma Gandhi University, India

Nandakumar Kalarikkal, Mahatma Gandhi University, India

ISBN: 9788770224116

e-ISBN: 9788770224109

Available From: September 2022

Price: € 95.00



Description:

Advances in Highly Correlated Systems explores the fundamentals, recent advances, and applications of the physics of highly correlated materials. This book serves as a handbook/reference for advanced graduate students.

- Provides fascinating insights into the major developments and applications of strongly correlated materials.
- Integrates various numerical/theoretical models, such as dynamic mean-field theory, Hubbard model, Ab-Initio Calculation etc.
- Encompasses a useful experimental and theoretical basis for students, researchers, and scientists.

Keywords: Dynamical mean field theory (DMFT), Quantum Magnetism and Frustration, Topological aspects; Multiferroics, Electronic and spintronic devices.

Radiation Hardening by Design (RHBD) Analog Integrated Circuits

Authors:

Umberto Gatti, RedCat Devices, Italy

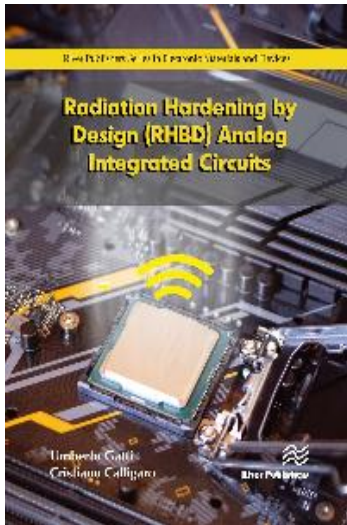
Cristiano Calligaro, RedCat Devices, Italy

ISBN: 9788770224192

e-ISBN: 9788770224185

Available From: September 2022

Price: € 98.50



Description:

The book is intended for researchers and professionals interested in understanding how to design and make a preliminary characterization of Radiation Hardened (rad-hard) analog and mixed-signal circuits, exploiting standard CMOS manufacturing processes available from different silicon foundries and using different technology nodes.

It starts with an introductory overview of the effects of radiation in space and harsh environments with a specific focus on analog circuits to enable the reader to understand why specific design solutions are adopted to mitigate hard/soft errors. The following four Chapters are devoted to RHBD (Radiation Hardening by Design) techniques for semiconductor components applied to Operational Amplifiers, Voltage References, Analog-to-Digital (ADC) and Digital-to-Analog (DAC) converters. Each Chapter is organized with a first part which recalls the basic working principles of such circuit and a second part which describes the main RHBD techniques proposed in the literature to make them resilient to radiation. The approach follows a top-down scheme starting from RHBD at circuit level (how to mitigate radiation effects by handling transistors in the proper way) and finishing at layout level (how to shape a layout to mitigate radiation effects).

The last-but-one Chapter is devoted to a special class of analog circuit, the dosimeters, which are gaining importance in space, health and nuclear applications. By leveraging the characteristic of a Flash-memory cell, a re-usable dosimeter is described which includes the sensitive element itself, the analog interface and the process of characterization.

The last part is an overview of the strategies adopted for the testing of analog and mixed-signal circuits. In particular, it will focus also on the measurement campaigns performed by the Authors aiming for the characterization of developed rad-hard components under total dose (TID) and single-events (SEE).

Technical topics discussed in the book include:

- Radiation effects on semiconductor components (TID, SEE)
- Radiation Hardening by Design (RHBD) Techniques
- Rad-hard Operational Amplifiers
- Rad-hard Voltage References
- Rad-hard ADC
- Rad-hard DAC
- Rad-hard Special Circuits
- Testing Strategies

Keywords: Rad-Hard Integrated Circuits Design, Radiation-Hardened by Design Techniques, Microelectronics for Harsh Environments, Analog and

Structured Accelerator Design: Patterns for High-Level Synthesis

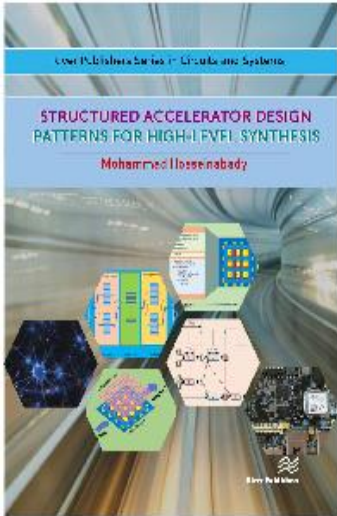
Author: Mohammad Hosseinabady, PhD, Computing Consultant, Bristol, UK

ISBN: 9788770223959

e-ISBN: 9788770223942

Available From: September 2022

Price: € 95.00



Description:

Accelerators now play a crucial role in computing systems. With the emergence of a new wave of academic and industrial high-level synthesis (HLS) tools, FPGA-based accelerators now are more accessible to software programmers. However, there are several burdens placed upon the programmers to design a high-performance accelerator when using FPGA, such as different memory and parallel programming models. Therefore, a high-level structured design approach targeting accelerator is essential. This approach advances software programming techniques to utilise FPGAs efficiently.

This book explains the concept of accelerator design using current high-level synthesis tools and techniques. It describes different types of regular and irregular accelerator patterns as a structured building block for FPGA implementation. The cutting-edge programming models based on C/C++ and OpenCL are used to explain standard computation and memory patterns through many examples and case studies. In short, this book

- offers theory and practice of HLS parallel programming techniques for FPGA
- describes parallel patterns for regular and irregular algorithms
- contains detailed examples in C/C++ and OpenCL for HLS
- represents the efficiency of FPGA accelerators through several case studies in scientific computation and machine learning areas

Keywords: High-Level Synthesis; FPGA; Parallel Programming Patterns; Hardware Accelerators; Embedded Systems

Smart Embedded Systems and Applications

Editor: Saad Motahhir, École Nationale des Sciences Appliquées, Sidi Mohamed Ben Abdellah University, Morocco

ISBN: 9788770227728

e-ISBN: 9788770227711

Available From: August 2022

Price: € 121.00



Description:

This book covers a wide range of challenges, technologies and state-of-the-art for the design, development and realization of smart and complex embedded systems and their applications; i.e., software and hardware development, with the use of digital technologies, and quality assurance for critical applications.

This book starts with automotive safety systems which is one of the major functional domains. It discusses the importance of software in automotive systems followed by an insight into Automotive Software Standards, ISO26262, and Autosar. The book further discusses the use of Processor in the loop test for an adaptive trajectory tracking control for quadrotor UAVs. It also illustrates the role of embedded systems in medical engineering. Various innovative applications involving the concept of image processing and Internet of Things are also presented in this book. The SoC Power Estimation is also investigated. Finally, a Review of the Hardware/Software Partitioning Algorithms with some future works have been presented. this book is intended for academicians, researchers, and industrialists.

Keywords: ISO26262, Autosar, V cycle, UAV, SOC, Co-Design, Labview, IOT, Image processing, Raspberry Pi

River Publishers Series in Electronic Materials, Circuits and Devices

Electronic Devices and Circuit Fundamentals

Editors:

Dale R. Patrick, USA

Stephen W. Fardo, Eastern Kentucky University, USA

Ray E. Richardson, Eastern Kentucky University, USA

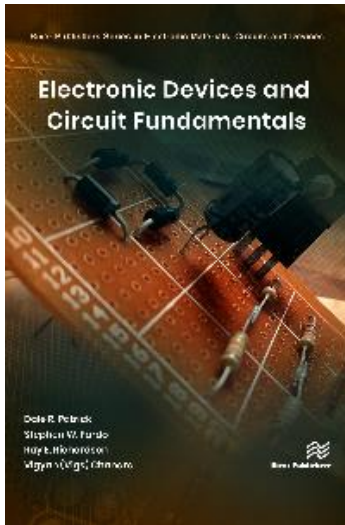
Vigyan (Vigs) Chandra, Eastern Kentucky University, USA

ISBN: 9788770227414

e-ISBN: 9788770227360

Available From: August 2022

Price: € 121.00



Description:

This book explores many fundamental topics in a basic and easy-to-understand manner. It, and the accompanying DC-AC Electrical Fundamentals by the same co-authors, have been developed using a classic textbook – Electricity and Electronics: A Survey (5th Edition) by Patrick and Fardo – as a framework. Both new books have been structured using the same basic sequence and organization of the textbook as previous editions.

This book has been expanded to 22 chapters, further simplifying content and providing a more comprehensive coverage of fundamental content. The content has been continually updated and revised through new editions and by external reviewers throughout the years. Additional quality checks to ensure technical accuracy, clarity and coverage of content have always been an area of focus. Each edition of the text has been improved through the following features:

1. Improved and updated text content
2. Improved usage of illustrations and photos
3. Use of color to add emphasis and clarify content.

Keywords: Electronic Devices, Electronic Circuits, Atomic Theory, Semiconductor, P-N Junction Diodes, Zener Diodes, Tunnel Diodes, Varactor Diodes, Varistor, Schottky-Barrier Diodes, PIN Diodes, IMPATT Diodes, Power Supplies, Rectifiers, Diodes, Filters, Voltage Regulators, Clipper, Clamper, Voltage Multiplier, Bipolar Junction Transistors (BJTs), Amplifiers, Load Line Analysis, Field Effect Transistors (FETs), Power Amplifiers, JFETs, MOSFETs, Biasing, Amplifier Gain, Decibels, Amplifier Coupling, Transducers, Unijunction Transistors (UJT), Thyristors, Silicon Controlled Rectifiers (SCRs), Triacs, Diacs, Optoelectronic Devices, Light-Emitting Diodes (LEDs), Phototransistors, Integrated Circuits (ICs), Operational Amplifiers (Op-Amps), Linear Circuits, Non-Linear Circuits, Filter Circuits, Frequency Response, Active Filters, Comparator, Oscillator Circuits, Radio Frequency (RF) Circuits, Communication Systems, Amplitude Modulation (AM), Frequency Modulation (FM), Television Circuits, Digital Circuits, Electronic Troubleshooting.

River Publishers Series in Electronic Materials, Circuits and Devices

Selected Topics in Intelligent Chips with Emerging Devices, Circuits and Systems

Editors:

Alex James, Digital University Kerala, India

Bhaskar Choubey, Siegen University, Germany

ISBN: 9788770227650

e-ISBN: 9788770227643

Available From: July 2022

Price: € 98.50



Description:

Memristors have provided a new direction of thinking for circuit designers to overcome the limits of scalability and for thinking of building systems beyond Moore's law. Over the last decade, there has been a significant number of innovations in using memristors for building neural networks through analog computing, in-memory computing, and stochastic computing approaches. The emergence of intelligent integrated circuits is inevitable for the future of integrated circuit applications.

This book provides a collection of talks conducted as part of the IEEE Seasonal School on Circuits and System, having a focus on Intelligence in Chip: Tomorrow of Integrated Circuits. Technical topics discussed in the book include:

- Edge of Chaos Theory Explains Complex Phenomena in Memristor Circuits
- Analog Memristive Computing
- Designing energy efficient neo-cortex system with on-device learning
- Integrated sensors
- Challenges and recent advances in NVM based Neuromorphic Computing ICs
- In-memory Computing (for deep learning)
- Deep learning with Spiking Neural Networks
- Computational Intelligence for Designing Integrated Circuits and Systems
- Neurochip Design, Modeling, and Applications

Keywords: memristor networks, in-memory computing, analog crossbars, spiking neural networks, computational intelligence, NVM, Edge of Chaos, sensors

River Publishers Series in Electronic Materials, Circuits and Devices

Advanced Tutorial on Analog Circuit Design

Editors:

Milin Zhang, Tsinghua University, China

Zhijia Wang, Tsinghua University, China

Jan Van der Spiegel, University of Pennsylvania, USA

Franco Maloberti, University of Pavia, Italy

ISBN: 9788770227599

e-ISBN: 9788770227582

Available From: July 2022

Price: € 110.00



Description:

This book is a summary of analog circuit design related lectures from IEEE Advanced CMOS Technology School (ACTS) 2019. The topics cover continuous-time delta-sigma data converter, switched-capacitor power converter, ADC and power management IC. The slides are selected from the handouts, while the text was edited according to the lecturers talk.

ACTS is a joint activity supported by the IEEE Circuit and System Society (CASS) and the IEEE Solid-State Circuits Society (SSCS). The goal of the school is to provide society members as well researchers and engineers from industry the opportunity to learn about new emerging areas from leading experts in the field. ACTS is an example of high-level continuous education for junior engineers, teachers in academe, and students. ACTS was the results of a successful collaboration between societies, the local chapter leaders, and industry leaders.

Keywords: Continuous-time Delta-Sigma Data Converter, Switched-Capacitor Power Converter, ADC, Power Management IC.

River Publishers Series in Electronic Materials, Circuits and Devices

Electric and Electronic Circuit Simulation using TINA-TI®

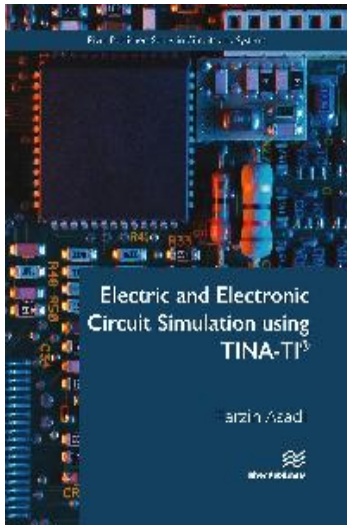
Author: Farzin Asadi, Maltepe University, Turkey

ISBN: 9788770226868

e-ISBN: 9788770226851

Price: £ 0.00 | \$ 120.00

Distributed exclusively by Routledge



Description:

A circuit simulator is a computer program that permits us to see circuit behavior, i.e. circuit voltages and currents, without making the circuit. Use of a circuit simulator is a cheap, efficient, and safe way to study the behavior of circuits.

The Toolkit for Interactive Network Analysis (TINA®) is a powerful yet affordable SPICE based circuit simulation and PCB design software package for analyzing, designing, and real time testing of analog, digital, VHDL, MCU, and mixed electronic circuits and their PCB layouts. This software was created by DesignSoft. TINA-TI is a spinoff software program that was designed by Texas Instruments (TI®) in cooperation with DesignSoft which incorporates a library of pre-made TI components to for the user to utilize in their designs.

This book shows how a circuit can be analyzed in the TINA-TI® environment. Students of engineering (for instance, electrical, biomedical, mechatronics and robotics to name a few), engineers who work in industry and anyone who want to learn the art of circuit simulation with TINA-TI can benefit from this book.

Keywords: Buck converter, Common mode rejection ratio, Coupled inductors, DC-DC converter, Frequency response of circuit, Full wave rectifier, Half wave rectifier, Input impedance of circuit, Output impedance of circuit, Opamp circuits, Oscillator circuit, Phasor analysis, Rectifier, RLC Circuit, Simulation of electric circuits, Simulation of electronic circuits, Step response of circuit, Thevenin theorem, Three phase circuits, TINA-TI, Total harmonic distortion, Voltage gain.

River Publishers Series in Electronic Materials, Circuits and Devices

Technology and Agribusiness: How Technology is Impacting Agribusiness

Editor: Victor Grimblatt, R&D Group Director and General Manager
Latin America Executive Sponsor, Synopsys Chile R&D Center, Chile

ISBN: 9788770225977

e-ISBN: 9788770225960

Available From: July 2021

Price: € 98.50



Description:

The world population is growing, and it is expected that in 2050 there will be 9.7 billion inhabitants on the Earth. According to FAO (United Nations, Food and Agriculture Organization) we need to increase the productivity of agriculture by between 50% and 70% to be able to feed the world population in 2050. Other researchers think that reducing the wastage of food may be enough to handle the 2050 population.

Several factors must be considered to ensure that humanity is able to feed the world's population in 2050 and beyond.

- Less arable land: As cities are growing, the space available for agriculture is shrinking.
- Climate change: Dramatic impacts on agribusiness.
- Role of agribusiness on GHG emissions.
- Planetary boundaries and the role of agribusiness.
- Availability of freshwater.
- Soil degradation.

The seasonal school presents and discusses the major problems that agribusiness is facing and the different technologies that can be applied to solve and improve such issues. Specific case studies are presented along with the technological solutions that have been applied to solve or minimize the impact. Agribusiness covers different topics such as arable farming, dairy farming, fruits, vegetables, meat, etc. Each of these domains has different needs that can be addressed through smart agriculture technologies such as circuits and systems. Also, these domains affect the sustainability of the planet as they impact at least 4 out of the 9 planetary boundaries.

Keywords: Agribusiness ; Smart Agriculture, IoT, Sensors, Artificial Intelligence, LoRa, Sigfox, Circuit Design, RF

Sensors and Measurement Systems, Second Edition

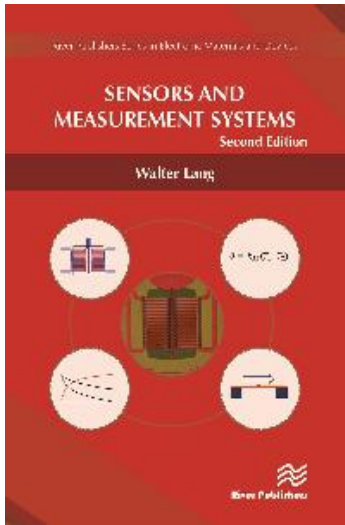
Author: Walter Lang, University of Bremen, Germany

ISBN: 9788770226073

e-ISBN: 9788770226066

Available From: April 2021

Price: € 40.00



Description:

Sensors and measurement systems is an introduction to microsensors for engineering students in the final undergraduate or early graduate level, technicians who want to know more about the systems they are using, and anybody curious enough to know what microsystems and microsensors can do.

The book discusses five families of sensors:

- Thermal sensors
- Force and pressure sensors
- Inertial sensors
- Magnetic field sensors
- Flow sensors

For each sensor, theoretical, technology and application aspects are examined. The sensor function is modelled to understand sensitivity, resolution and noise. We ask ourselves: What do we want to measure? What are possible applications? How are the sensor chips made in the cleanroom? How are they mounted and integrated in a system?

After reading this book, you should be able to:

- Understand important thermal, mechanical, inertial and magnetic sensors
- Work with characterization parameters for sensors
- Choose sensors for a given application and apply them
- Understand micromachining technologies for sensors

Keywords: Sensors; microsystems; MEMS; thermopile; pressure sensor; accelerometer; angular rate sensor; microgyroscope; thermal flow sensor

River Publishers Series in Electronic Materials, Circuits and Devices

Heterogeneous Cyber Physical Systems of Systems

Editors:

Ioannis Papaefstathiou, Aristotle University of Thessaloniki, Greece

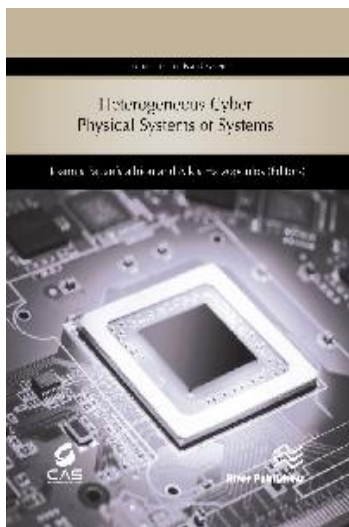
Alkis Hatzopoulos, Aristotle University of Thessaloniki, Greece

ISBN: 9788770222020

e-ISBN: 9788770222013

Available From: February 2021

Price: € 95.00



Description:

Cyber-physical systems are the natural extension of the so-called "Internet of Things". They are "systems of collaborating computational elements controlling physical entities". Cyber Physical Systems of Systems (CPSoS) are considered "The Next Computing Revolution" after Mainframe computing (60's-70's), Desktop computing & Internet (80's-90's) and Ubiquitous computing (00's); because all aspects of daily life are rapidly evolving towards humans interacting amongst themselves as well as their environment via computational devices (often mobile), and because in most cases systems will employ their computational capabilities to interact amongst themselves.

CPSoS enable the physical world to merge with the cyber one. Using sensors, the embedded systems monitor and collect data from physical processes, such as the steering of a vehicle, energy consumption or human health functions. The systems are networked making the data globally available. CPSoS make it possible for software applications to directly interact with events in the physical world, for example to measure and react to changes in blood pressure or peaks in energy consumption. Embedded hardware and software systems crucially expand the functionality and competitiveness of vehicles, aircraft, medical equipment, production plants and household appliances. Connecting these systems to a virtual environment of globally networked services and information systems opens completely new areas of innovation and novel business platforms.

Future CPSoS will have many sophisticated, interconnected parts that must instantaneously exchange, parse, and act on detailed data in a highly coordinated manner. Continued advances in science and engineering will be necessary to enable advances in design and development of these complex systems. Multi- scale, multi-layer, multi-domain, and multi-system integrated infrastructures will require new foundations in system science and engineering. Scientists and engineers with an understanding of otherwise physical systems will need to work in tandem with computer and information scientists to achieve effective, workable designs. In this tutorial, basic and advanced issues on the design of the future heterogeneous CPSoS are presented including relevant Blockchain technologies, reconfigurable systems, advanced sensor interfaces and human-centered design processes. Certain advanced tools for the design and implementation of the cyber parts of the CPSoS (i.e. FPGA design tools from Xilinx) are also covered.

Keywords: Cyber Physical Systems of Systems (CPSoS), Internet of things (IoT), Security, Blockchain, Human Computer Interaction (HCI), smart sensors, energy harvesting, Hardware/software codesign, reconfigurable systems

Selected Topics in Biomedical Circuits and Systems

Editors:

Minkyu Je, KAIST, Korea

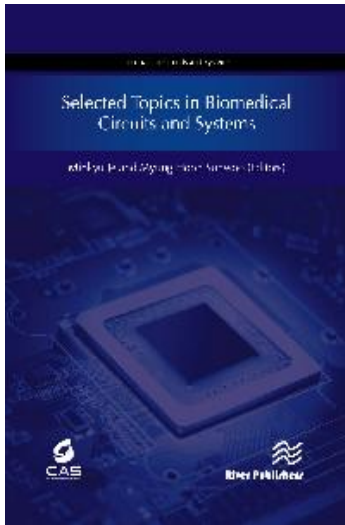
Myung Hoon Sunwoo, Ajou University, Korea

ISBN: 9788770221481

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Available From: February 2021

Price: € 95.00



Description:

Integrated circuits and microsystems play a vital role in a variety of biomedical applications including life-saving/changing miniature medical devices, surgical procedures with less invasiveness and morbidity, low-cost preventive healthcare solutions for daily life, solutions for effective chronic disease management, point-of-care diagnosis for early disease detection, high-throughput bio sequencing and drug screening and groundbreaking brain-machine interfaces based on a deep understanding of human intelligence. In response to such strong demands for biomedical circuits and systems, a considerable amount of effort has been devoted to the research and development in this area, both by industry and academia, over recent years.

This book, which belongs to the “Tutorials in Circuits and Systems” series, provides readers with an overview of new developments in the field of biomedical circuits and systems. It covers basic information about system-level and circuit-level requirements, operation principles, key factors of considerations, and design/implementation techniques, as well as recent advances in integrated circuits and microsystems for emerging biomedical applications.

Technical topics covered in this book include:

- Biomedical Microsystem Integration;
- Biomedical Sensor Interface Circuits;
- Neural Stimulation Circuits;
- Wireless Power Transfer Circuits for Biomedical Microsystems;
- Artificial Intelligence Processors for Biomedical Circuits and Systems;
- Neuro-Inspired Computing and Neuromorphic Processors for Biomedical Circuits and Systems.

This book is ideal for personnel in medical devices and biomedical engineering industries as well as academic staff and postgraduate/research students in biomedical circuits and systems.

Keywords: Biomedical circuits and systems, integrated circuits, microsystems, sensor interface, neural stimulation, wireless power transfer, artificial intelligence, neuro-inspired computing, neuromorphic processors

Electronic Skin: Sensors and Systems

Editors:

Ali Ibrahim, Lebanese International University, Lebanon and University of Genoa, Italy
Maurizio Valle, University of Genoa, Italy

ISBN: 9788770222167

e-ISBN: 9788770222150

Available From: December 2020

Price: € 95.00



Description:

Considerable amount of effort has been devoted, over the recent years, towards the development of electronic skin (e-skin) for many application domains such as prosthetics, robotics, and industrial automation.

Electronic Skin: Sensors and Systems focuses on the main components constituting the e-skin system. The e-skin system is based on: i) sensing materials composing the tactile sensor array, ii) the front end electronics for data acquisition and signal conditioning, iii) the embedded processing unit performing tactile data decoding, and iv) the communication interface in charge of transmitting the sensors data for further computing.

Technical topics discussed in the book include:

- Tactile sensing material;
- Electronic Skin systems;
- Embedded computing and tactile data decoding;
- Communication systems for tactile data transmission;
- Relevant applications of e-skin system;

The book takes into account not only sensing materials but it also provides a thorough assessment of the current state of the art at system level. The book addresses embedded electronics and tactile data processing and decoding, techniques for low power embedded computing, and the communication interface.

Electronic Skin: Sensors and Systems is ideal for researchers, Ph.D. students, academic staff and Masters/research students in sensors/sensing systems, embedded systems, data processing and decoding, and communication systems.

Keywords: Electronic skin system, tactile sensors, embedded data processing, efficient algorithms for smart tactile sensors, optical communication links, electronic skin system applications

River Publishers Series in Electronic Materials, Circuits and Devices

Advanced VLSI Technology **Technical Questions with Solutions**

Authors:

Cherry Bhargava, Lovely Professional University, India

Gaurav Mani Khanal, University of Rome Tor Vergata, Italy

ISBN: 9788770221740

e-ISBN: 9788770221733

Available From: October 2020

Price: € 95.00



Description:

The trend in design and manufacturing of very large-scale integrated (VLSI) circuits is towards smaller devices on increasing wafer dimensions. VLSI is the inter-disciplinary science of the process of creating an integrated circuit (IC) by combining thousands of transistors into a single chip. VLSI design can reduce the area of the circuit, making it less expensive and requiring less power.

The book gives an understanding of the underlying principles of the subject. It not only focuses on circuit design process obeying VLSI rules but also on technological aspects of prototyping and fabrication. All the clocking processes, interconnects, and circuits of CMOS are explained in this book in an understandable format. The book provides contents on VLSI Physical Design Automation, Design of VLSI Devices and also its Impact on Physical Design.

The book is intended as a reference book for senior undergraduate, first-year post graduate students, researchers as well as academicians in VLSI design, electronics & electrical engineering, and materials science. The basics and applications of VLSI design from STA, PDA and VLSI Testing along with FPGA based Prototyping are covered in a comprehensive manner.

The latest technology used in VLSI design is discussed along with the available tools for FPGA prototyping as well as ASIC design. Each unit contains technical questions with solutions at the end.

Technical topics discussed in the book include:

- Static Timing Analysis
- CMOS Layout and Design rules
- Physical Design Automation
- Testing of VLSI Circuits
- Software tools for Frontend and Backend design

Keywords: FPGA, Stick diagram, Static Timing Analysis, Physical Design Automation, VLSI Testing

River Publishers Series in Electronic Materials, Circuits and Devices

Linear Electronics

Authors:

Marcelo Sampaio de Alencar, Federal University of Bahia, Brazil

Raphael Tavares de Alencar, Institut National Polytechnique de Grenoble, France

Raissa Bezerra Rocha, Federal University of Sergipe, Brazil

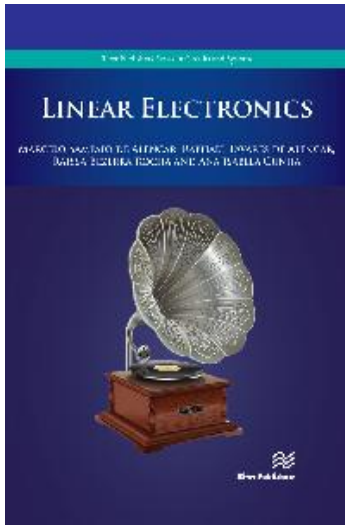
Ana Isabela Cunha, Federal University of Bahia, Brazil

ISBN: 9788770221467

e-ISBN: 9788770221450

Available From: June 2020

Price: € 95.00



Description:

A considerable amount of effort has been devoted, both in industry and academia, towards the design, performance analysis and evaluation of amplification schemes and filters to be used in control systems, audio and video equipment, instrumentation and communication systems.

This book is intended to serve as a complementary textbook for courses dealing with Linear Amplification, but also as a professional book, for engineers who need to update their knowledge in the electronics, control, and communications areas.

The book is suitable for the undergraduate as well as the initial graduate levels of Electrical and Electronics Engineering, Mecatronics, Telecommunications, Automation and Control. courses, and is useful for the professional who wants to review or get acquainted with the modern exposition of the amplification theory. The book presents essential concepts in plain language and covers the most important applications of amplifier circuits.

The book has seven chapters, dealing with transistor modeling, linear amplification, types of amplifiers, operational amplifiers, electronic circuits with operational amplifiers, active filters, applications and tests with operational amplifiers and communication circuits.

Four appendices are included, an appendix to detail the operational amplifier model, an appendix with specification data sheets, an appendix on Fourier transform and signal spectrum, including the concepts of convolution, and another one that presents and explains the usual electronics acronyms.

Keywords: Electronics; linear amplification; Amplifiers; Circuits; active filters; Fourier transforms;

Basic VLSI Design Technology

Technical Questions and Solutions

Authors:

Cherry Bhargava, Lovely Professional University, India

Gaurav Mani Khanal, University of Rome Tor Vergata, Italy

ISBN: 9788770221580

e-ISBN: 9788770221573

Available From: June 2020

Price: € 95.00



Description:

The current cutting-edge VLSI circuit design technologies provide end-users with many applications, increased processing power and improved cost effectiveness. This trend is accelerating, with significant implications on future VLSI and systems design. VLSI design engineers are always in demand for front-end and back-end design applications.

The book aims to give future and current VLSI design engineers a robust understanding of the underlying principles of the subject. It not only focuses on circuit design processes obeying VLSI rules but also on technological aspects of fabrication. The Hardware Description Language (HDL) Verilog is explained along with its modelling style. The book also covers CMOS design from the digital systems level to the circuit level. The book clearly explains fundamental principles and is a guide to good design practices.

The book is intended as a reference book for senior undergraduate, first-year post graduate students, researchers as well as academicians in VLSI design, electronics & electrical engineering and materials science. The basics and applications of VLSI design from digital system design to IC fabrication and FPGA Prototyping are each covered in a comprehensive manner. At the end of each unit is a section with technical questions including solutions which will serve as an excellent teaching aid to all readers.

Technical topics discussed in the book include:

- Digital System Design
- Design flow for IC fabrication and FPGA based prototyping
- Verilog HDL
- IC Fabrication Technology
- CMOS VLSI Design
- Miscellaneous (It covers basics of Electronics, and Reconfigurable computing, PLDs, Latest technology etc.)

Keywords: Digital design, IC fabrication, FPGA, HDL, CMOS, VLSI design

Electronic Interfaces for Differential Capacitive Sensors

Authors:

Gianluca Barile, Università degli Studi dell'Aquila, Italy

Giuseppe Ferri, Università degli Studi dell'Aquila, Italy

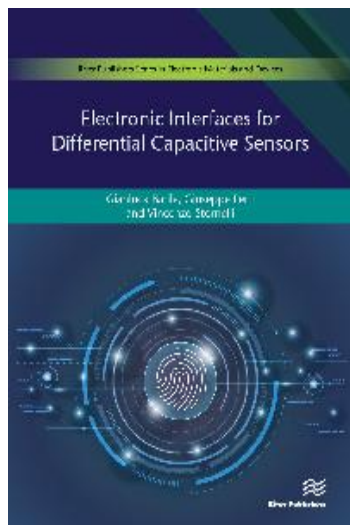
Vincenzo Stornelli, Università degli Studi dell'Aquila, Italy

ISBN: 9788770221504

e-ISBN: 9788770221498

Available From: March 2020

Price: € 95.00



Description:

In a world where great efforts are spent designing and creating more complex, yet efficient systems, sensing elements and related readout circuits, which constitute an integral part of them, need to be designed fulfilling these constraints, beside the common key parameters, such as high sensitivity, resolution and accuracy. Capacitive sensors and their differential subset provide virtually no energy dissipation, show insensitivity to temperature variations and have the capability to be micromachined directly onto a silicon substrate, together with the readout interface. Designing a readout circuit that takes advantage of these benefits, according to any specific application, is thus of utmost importance. This volume introduces the reader to state-of-the-art techniques and research achievements in interfacing differential capacitance sensors.

Technical topics discussed in the book include:

- Switched capacitor based interfaces;
- Voltage mode, differential capacitance to time, voltage, digital converters;
- Current mode interfaces based on standard components;
- Current mode interfaces based on CCII and VCII;
- Principles of second generation current and voltage conveyors.

This book gives the reader a comprehensive overview on the working principles, equivalent circuit models and most advanced interfacing techniques for differential capacitive transducers, highlighting benefits and downsides of each option. Electronic interfaces for differential capacitive sensors is an ideal text for academic staff and Masters/research students in electronic and microelectronic engineering.

Keywords: Differential capacitive sensors, sensor interfaces, analog circuits, switched capacitors, auto-balanced bridges, synchronous demodulation, parasitic compensation, second generation current conveyor (CCII), second generation voltage conveyor (VCII)

From Artificial Intelligence to Brain Intelligence

Editors:

Rajiv Joshi, IBM Research Division, USA

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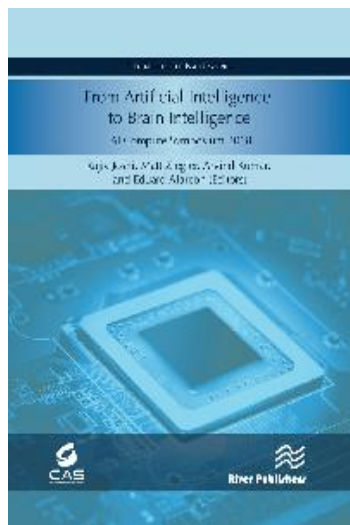
Eduard Alarcon, Technical University of Catalunya, UPC BarcelonaTech, Spain

ISBN: 9788770221238

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Available From: February 2020

Price: € 95.00



Description:

The field of AI is not new to researchers, as its foundations were established in the 1950s. After many decades of inattention, there has been a dramatic resurgence of interest in AI, fueled by a confluence of several factors. The benefits of decades of Dennard scaling and Moore's law miniaturization, coupled with the rise of highly distributed processing, have led to massively parallel systems well suited for handling big data. The widespread availability of big data, necessary for training AI algorithms, is another important factor. Finally, the greatly increased compute power and memory bandwidths have enabled deeper networks and new algorithms capable of accuracy rivaling that of human perception.

Already AI has shown success in many diverse areas, including finance (portfolio management, investment strategies), marketing, health care, transportation, gaming, defense, robotics, computer vision, education, search engines, online assistants, image/facial recognition, anomaly detection, spam filtering, online customer service, biometric sensors, and predictive maintenance, to name a few. Despite these remarkable advances, the human brain is still superior in many ways - including, notably, energy efficiency and one-shot learning - giving researchers new areas to explore. In summary, AI research and applications will continue with vigor in software, algorithms, and hardware accelerators. These exciting developments have also brought new questions of ethics and privacy, areas which must be studied in tandem with technological advances.

To continue the success story of AI, the AI Compute symposium was launched with the sponsorship of IBM, IEEE CAS and EDS for the first time. The aim of this publication is to compile all the materials presented by the renowned speakers in the symposium into a book format, serving as a learning tool for the audience.

This book contains two broad topics: general AI advances (chapters 1-5) and neuromorphic computing directions (chapters 6-9). Technical topics discussed in the book include:

- Research Directions in AI algorithms and systems
- An ARM perspective on hardware requirements and challenges for AI
- The new Era of AI hardware
- AI and the Opportunity for Unconventional Computing Platforms
- Thermodynamic Computing
- Brain-like cognitive engineering system
- BRAINWAY and Nano - Abacus architecture: Brain-inspired Cognitive Computing using Energy Efficient Physical Computational Structures, Algorithms and Architecture Co-Design
- Applying Lessons from Nature for Today's Computing Challenges
- Emerging Memories - RRAM Fabric for Neuromorphic Computing Applications

Keywords: AI algorithms and systems, memory processing unit, In-memory computation, Thermodynamic computing, Neuromorphic, Cognitive

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River Publishers Series in Electronic Materials, Circuits and Devices

Introduction to Wireless Communication Circuits 2nd Edition

Authors:

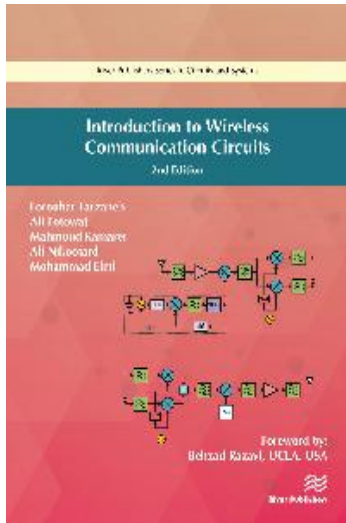
Forouhar Farzaneh, Sharif University of Technology, Iran
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Mohammad Elmi, KavoshCom Asia Co., Iran

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Available From: January 2020

Price: € 95.00



Description:

Over the past decade the tremendous development of Wireless Communications has changed human life incredibly. Considerable advancement has been made in the design and architecture of communications related RF and Microwave circuits. This book is focused on special circuits dedicated to the RF level of wireless Communications. From Oscillators to Modulation and Demodulation and from Mixers to RF and Power Amplifier Circuits, the topics are presented in a sequential manner. A wealth of analysis is provided in the text alongside various worked out examples. Related problem sets are given at the end of each chapter. Basic concepts of RF Analog Circuit Design are developed in the book.

Technical topics discussed in the book include:

- Wireless Communication System
- RF Oscillators and Phase Locked Loops
- Modulator and Demodulator Circuits
- RF Mixers
- Automatic Gain Control and Limiters
- Microwave Circuits, Transmission Lines and S-Parameters
- Matching network
- Linear Amplifier Design and Power Amplifiers
- Linearization Techniques

Keywords: Wireless Communication, RF Circuits, Microwaves, Receiver, Transmitter, Oscillator, Oscillator Topology, PLL, RF Amplifier, RF Mixer, Modulator, Demodulator, Impedance Matching, Smith Chart, AGC, Limiter, Transmission Lines, Scattering Parameters, Power Amplifier, Nonlinearity, Large Signal, Linearization

River Publishers Series in Electronic Materials, Circuits and Devices

Understanding Nanoelectromechanical Quantum Circuits and Systems (NEMX) for the Internet of Things (IoT) Era

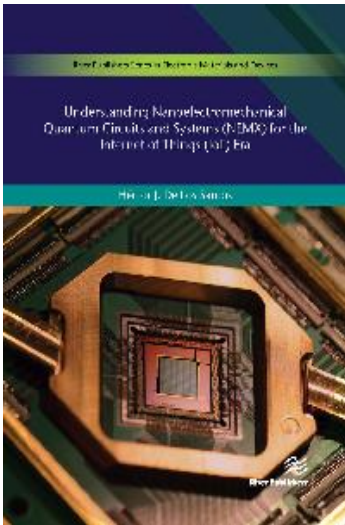
Author: Héctor J. De Los Santos, NanoMEMS Research, LLC, USA

ISBN: 9788770221283

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Available From: December 2019

Price: € 95.00



Description:

The operational theme permeating most definitions of the IoT concept, is the wireless communication of networked objects, in particular, smart sensing devices and machines, exchanging data a la Internet. In this book, a detailed look is taken at the fundamental principles of devices and techniques whose exploitation will facilitate the development of compact, power-efficient, autonomous, smart, networked sensing nodes underlying and encompassing the emerging IoT era.

The book provides an understanding of nanoelectromechanical quantum circuits and systems (NEMX), as exemplified by firstly the uncovering of their origins, impetus and motivation, and secondly by developing an understanding of their device physics, including, the topics of actuation, mechanical vibration and sensing. Next the fundamentals of key devices, namely, MEMS/NEMS switches, varactors and resonators are covered, including a wide range of implementations. The book then looks at their energy supply via energy harvesting, as derived from wireless energy and mechanical vibrations. Finally, after an introduction to the fundamentals of IoT networks and nodes, the book concludes with an exploration of how the NEMX components are encroaching in a variety of emerging IoT applications.

Keywords: Internet, IoT, Wireless Connectivity, MEMS, NEMS, NEMX, Quantum Sensors, Smart Nodes, Energy Harvesting, 5G.

Ultra-Low Power FM-UWB Transceivers for IoT

Authors:

Vladimir Kopta, CSEM SA, Switzerland

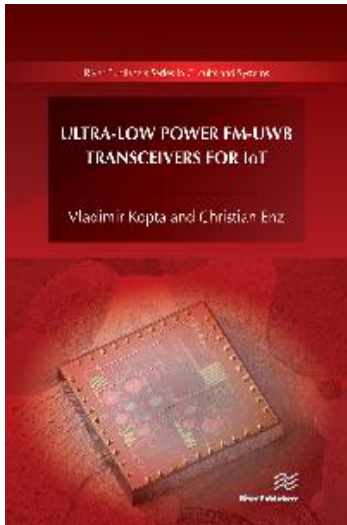
Christian Enz, EPFL, Switzerland

ISBN: 9788770221443

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Available From: December 2019

Price: € 95.00



Description:

Over the past two decades we have witnessed the increasing popularity of the internet of things. The vision of billions of connected objects, able to interact with their environment, is the key driver directing the development of future communication devices. Today, power consumption as well as the cost and size of radios remain some of the key obstacles towards fulfilling this vision.

Ultra-Low Power FM-UWB Transceivers for IoT presents the latest developments in the field of low power wireless communication. It promotes the FM-UWB modulation scheme as a candidate for short range communication in different IoT scenarios. The FM-UWB has the potential to provide exactly what is missing today. This spread spectrum technique enables significant reduction in transceiver complexity, making it smaller, cheaper and more energy efficient than most alternative options.

The book provides an overview of both circuit-level and architectural techniques used in low power radio design, with a comprehensive study of state-of-the-art examples. It summarizes key theoretical aspects of FM-UWB with a glimpse at potential future research directions. Finally, it gives an insight into a full FM-UWB transceiver design, from system level specifications down to transistor level design, demonstrating the modern power reduction circuit techniques.

Ultra-Low Power FM-UWB Transceivers for IoT is a perfect text and reference for engineers working in RF IC design and wireless communication, as well as academic staff and graduate students engaged in low power communication systems research.

Keywords: IoT, WSN, FM, low-power, UWB, wideband, CMOS, RF, circuits, analog

River Publishers Series in Electronic Materials, Circuits and Devices

Circuits and Systems for Wearable Technologies **IEEE UKCAS 2019**

Editors:

Sara Ghoreishizadeh, University College London, UK

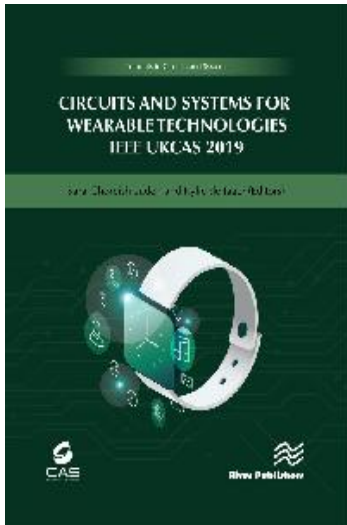
Kylie De Jager, University College London, UK

ISBN: 9788770221320

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Available From: November 2019

Price: € 90.00



Description:

This book is based on presentations given at the 2nd IEEE United Kingdom Circuits and Systems (UKCAS 2019) Workshop. It covers several advanced topics in the areas of semiconductor devices, circuits and systems, and energy harvesting; discussing their application in emerging implantable and wearable technologies and IoT. Notable application examples discussed include rapid infectious disease monitoring, in-situ tear fluid analysis, sleep engineering, chronic pain treatment, personalised anti-cancer therapy, foetus and neonate monitoring, monitoring of bone healing, orthopedic implants, magnetomyography and intelligent gesture recognition. Fundamental aspects of these topics are discussed, and state-of-the-art developments are presented.

Keywords: Low-power biomedical circuits, circuit topologies, wearable medical devices, implantable sensors, lab-on-chip, ISFET, magnetomyography, nanowire sensors, real-time data analysis, kinetic energy harvesting, IoT

River Publishers Series in Electronic Materials, Circuits and Devices

Introduction to Analog-to-Digital Converters

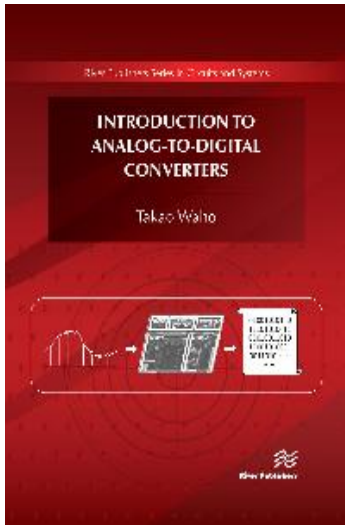
Author: Takao Waho, Sophia University, Japan

ISBN: 9788770221023

e-ISBN: 9788770221016

Available From: August 2019

Price: € 95.00



Description:

Analog-to-digital (A/D) and digital-to-analog (D/A) converters, or data converters in short, play a critical role as interfaces between the real analog world and digital equipment. They are now indispensable in the field of sensor networks, internet of things (IoT), robots, and automatic driving vehicles, as well as high-precision instrumentation and wideband communication systems. As the world increasingly relies on digital information processing, the importance of data converters continues to increase.

The primary purpose of this book is to explain the fundamentals of data converters for students and engineers involved in this fascinating field as a newcomer. The selected topics are as follows:

- Sampling and quantization
- Sample-and-hold (S/H) circuits and comparators
- Architectures and circuit implementations of D/A converters
- Architectures and circuit implementations of Nyquist-rate and oversampling A/D converters
- Recent trends based on scaled-down CMOS technology

Introduction to Analog-to-Digital Converters is not only for circuit designers, but also for engineers who are trying to develop their target by using A/D converters. The book will also help students who have learned the basics of analog circuit design to understand the state-of-the-art data converters. It is desirable for readers to be familiar with basic analog IC design and digital signal processing using z-transform.

Keywords: Data converter, A/D converter (flash, successive approximation, pipelined, time-interleaved, hybrid), D/A converter, sampling (S/H circuit, thermal noise, bootstrap switch, jitter), Sigma-Delta modulator (MASH, continuous-time, decimation filter), digital calibration

On-Wafer Calibration Techniques Enabling Accurate Characterization of High-Performance Silicon Devices at the mm-Wave Range and Beyond

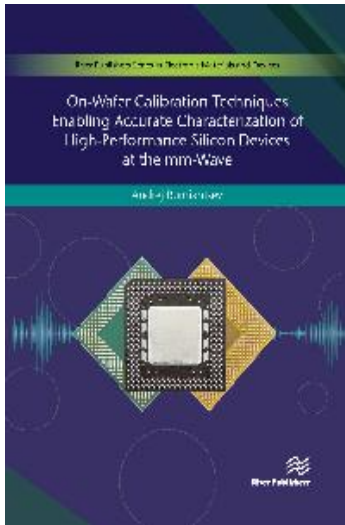
Author: Andrej Rumiantsev, MPI Corporation, Taiwan

ISBN: 9788770221122

e-ISBN: 9788770221115

Available From: June 2019

Price: € 95.00



Description:

The increasing demand for more content, services, and security drives the development of high-speed wireless technologies, optical communication, automotive radar, imaging and sensing systems and many other mm-wave and THz applications. S-parameter measurement at mm-wave and sub-mm wave frequencies plays a crucial role in the modern IC design debug. Most importantly, however, is the step of device characterization for development and optimization of device model parameters for new technologies. Accurate characterization of the intrinsic device in its entire operation frequency range becomes extremely important and this task is very challenging.

This book presents solutions for accurate mm-wave characterization of advanced semiconductor devices. It guides through the process of development, implementation and verification of the in-situ calibration methods optimized for high-performance silicon technologies.

Technical topics discussed in the book include:

- Specifics of S-parameter measurements of planar structures
- Complete mathematical solution for lumped-standard based calibration methods, including the transfer Thru-Match-Reflect (TMR) algorithms
- Design guideline and examples for the on-wafer calibration standards realized in both advanced SiGe BiCMOS and RF CMOS processes
- Methods for verification of electrical characteristics of calibration standards and accuracy of the in-situ calibration results
- Comparison of the new technique vs. conventional approaches: the probe-tip calibration and the pad parasitic de-embedding for various device types, geometries and model parameters
- New aspects of the on-wafer RF measurements at mmWave frequency range and calibration assurance.

Keywords: Calibration Verification; Coplanar waveguides; De-embedding, Device Characterization, Error correction; Microstrip waveguides; Millimeter wave measurements; On-wafer calibration, Probe-Tip Calibration; Process development, RF CMOS process; RF Probes, Scattering parameters measurement; Semiconductor device modeling; Semiconductor device measurements; SiGe BiCMOS process; S-Parameter Calibration

River Publishers Series in Electronic Materials, Circuits and Devices

IC Design Insights - from Selected Presentations at CICC 2017

Editors:

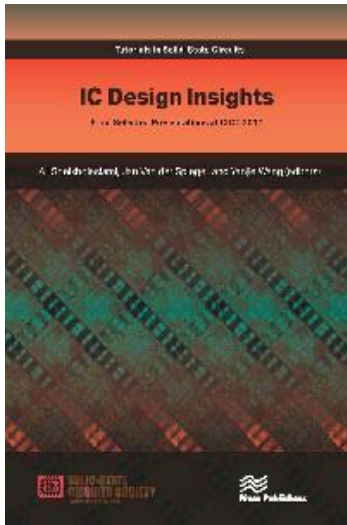
Ali Sheikholeslami, University of Toronto, Canada
Jan Van der Spiegel, University of Pennsylvania, USA
Yanjie Wang, Intel Corporation, USA

ISBN: 9788770220491

e-ISBN: 9788770220484

Available From: April 2019

Price: € 95.00



Description:

This book contains a selection of tutorial and invited presentations that were given at the IEEE CICC 2017 in Austin, Texas. The selection of the talks was made to provide a comprehensive coverage of key topics, including Circuits Techniques for mm-wave front-ends, RF and mm-wave receivers and frequency synthesis, data and DC-DC converters, and techniques for IoT security.

The book is organized into five parts, namely:

- I: Millimeter-wave Transmitter Circuits
- II: Millimeter-wave and RF Receiver Circuits
- III: Data Converters
- IV: DC-DC Converters and Voltage Regulators
- V: IoT Security Circuits and Techniques

The book is part of an educational initiative of the IEEE Solid-State Circuits Society to offer its members state of the art educational material.

Keywords: Millimeter-wave Transmitter Circuits, Integrated Circuits, RF Receiver Circuits, Data Converters, Analog-to-Digital Converters, DC-DC Converters, Voltage Regulators, IoT Security Circuits, IoT Devices, Power Amplifiers, Wireless Systems

River Publishers Series in Electronic Materials, Circuits and Devices

MEMS Silicon Oscillating Accelerometers and Readout Circuits

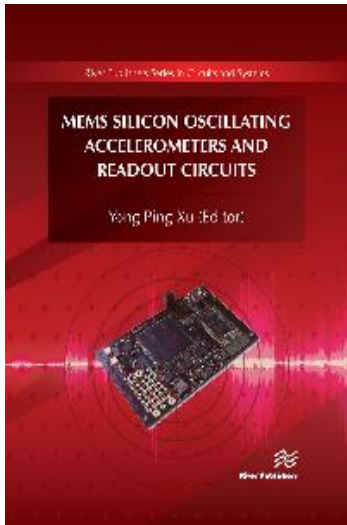
Editor: Yong Ping Xu, National University of Singapore, Singapore

ISBN: 9788770220453

e-ISBN: 9788770220446

Available From: February 2019

Price: € 95.00



Description:

Most MEMS accelerometers on the market today are capacitive accelerometers that are based on the displacement sensing mechanism. This book is intended to cover recent developments of MEMS silicon oscillating accelerometers (SOA), also referred to as MEMS resonant accelerometer. As contrast to the capacitive accelerometer, the MEMS SOA is based on the force sensing mechanism, where the input acceleration is converted to a frequency output.

MEMS Silicon Oscillating Accelerometers and Readout Circuits consists of six chapters and covers both MEMS sensor and readout circuit, and provides an in-depth coverage on the design and modelling of the MEMS SOA with several recently reported prototypes. The book is not only useful to researchers and engineers who are familiar with the topic, but also appeals to those who have general interests in MEMS inertial sensors. The book includes extensive references that provide further information on this topic.

Keywords: Inertial Sensors, Micro Electro-Micromechanical Systems, MEMS accelerometer, MEMS oscillating accelerometer, MEMS resonant accelerometer, Readout Circuit, MEMS interface, Front-end amplifier, Phase noise, Frequency-to-digital converter, MEMS seismic Sensor, MEMS oscillator.

Real-Time Multi-Chip Neural Network for Cognitive Systems

Editors:

Amir Zjajo, Delft University of Technology, The Netherlands

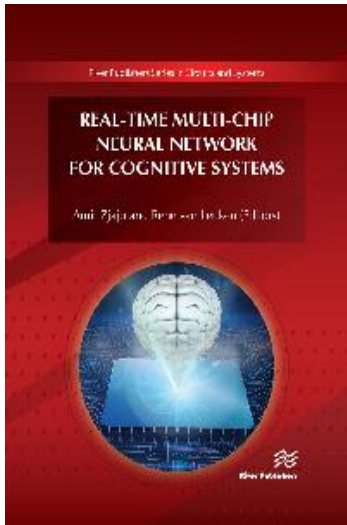
Rene van Leuken, Delft University of Technology, The Netherlands

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Price: € 95.00



Description:

Simulation of brain neurons in real-time using biophysically-meaningful models is a pre-requisite for comprehensive understanding of how neurons process information and communicate with each other, in effect efficiently complementing in-vivo experiments. In spiking neural networks (SNNs), propagated information is not just encoded by the firing rate of each neuron in the network, as in artificial neural networks (ANNs), but, in addition, by amplitude, spike-train patterns, and the transfer rate. The high level of realism of SNNs and more significant computational and analytic capabilities in comparison with ANNs, however, limit the size of the realized networks. Consequently, the main challenge in building complex and biophysically-accurate SNNs is largely posed by the high computational and data transfer demands.

Real-Time Multi-Chip Neural Network for Cognitive Systems presents novel real-time, reconfigurable, multi-chip SNN system architecture based on localized communication, which effectively reduces the communication cost to a linear growth. The system use double floating-point arithmetic for the most biologically accurate cell behavior simulation, and is flexible enough to offer an easy implementation of various neuron network topologies, cell communication schemes, as well as models and kinds of cells. The system offers a high run-time configurability, which reduces the need for resynthesizing the system. In addition, the simulator features configurable on- and off-chip communication latencies as well as neuron calculation latencies. All parts of the system are generated automatically based on the neuron interconnection scheme in use. The simulator allows exploration of different system configurations, e.g. the interconnection scheme between the neurons, the intracellular concentration of different chemical compounds (ions), which affect how action potentials are initiated and propagate.

Keywords: Neuron network, biophysically accurate neuron simulation, multi-chip data-flow architecture

Sensors and Measurement Systems

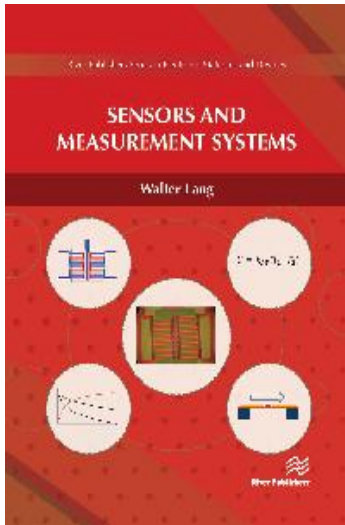
Author: Walter Lang, University of Bremen, Germany

ISBN: 9788770220286

e-ISBN: 9788770220279

Available From: January 2019

Price: € 40.00



Description:

Sensors and measurement systems is an introduction to microsensors for engineering students in the final undergraduate or early graduate level, technicians who wants to know more about the systems they are using, and anybody curious enough to know what microsystems and microsensors can do.

The book discusses five families of sensors:

- Thermal sensors
- Force and pressure sensors
- Inertial sensors
- Magnetic field sensors
- Flow sensors

For each sensor, theoretical, technology and application aspects are examined. The sensor function is modelled to understand sensitivity, resolution and noise. We ask ourselves: What do we want to measure? What are possible applications? How are the sensor chips made in the cleanroom? How are they mounted and integrated in a system?

After reading this book, you should be able to:

- Understand important thermal, mechanical, inertial and magnetic sensors
- Work with characterization parameters for sensors
- Choose sensors for a given application and apply them
- Understand micromachining technologies for sensors

Keywords: Sensors; microsystems; MEMS; thermopile; pressure sensor; accelerometer; angular rate sensor; microgyroscope; thermal flow sensor

Rad-hard Semiconductor Memories

Editors:

Cristiano Calligaro, RedCat Devices, Italy

Umberto Gatti, RedCat Devices, Italy

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e-ISBN: 9788770220194

Available From: November 2018

Price: € 95.00



Description:

Rad-hard Semiconductor Memories is intended for researchers and professionals interested in understanding how to design and make a preliminary evaluation of rad-hard semiconductor memories, making leverage on standard CMOS manufacturing processes available from different silicon foundries and using different technology nodes.

In the first part of the book, a preliminary overview of the effects of radiation in space, with a specific focus on memories, will be conducted to enable the reader to understand why specific design solutions are adopted to mitigate hard and soft errors. The second part will be devoted to RHBD (Radiation Hardening by Design) techniques for semiconductor components with a specific focus on memories. The approach will follow a top-down scheme starting from RHBD at architectural level (how to build a rad-hard floor-plan), at circuit level (how to mitigate radiation effects by handling transistors in the proper way) and at layout level (how to shape a layout to mitigate radiation effects).

After the description of the mitigation techniques, the book enters in the core of the topic covering SRAMs (synchronous, asynchronous, single port and dual port) and PROMs (based on AntiFuse OTP technologies), describing how to design a rad-hard flash memory and fostering RHBD toward emerging memories like ReRAM. The last part will be a leap into emerging memories at a very early stage, not yet ready for industrial use in silicon but candidates to become an option for the next wave of rad-hard components.

Technical topics discussed in the book include:

- Radiation effects on semiconductor components (TID, SEE)
- Radiation Hardening by Design (RHBD) Techniques
- Rad-hard SRAMs
- Rad-hard PROMs
- Rad-hard Flash NVMs
- Rad-hard ReRAMs
- Rad-hard emerging technologies

Keywords: rad-hard components, semiconductor memories, SRAM, PROM, Flash, ReRAM, Emerging Memories

River Publishers Series in Electronic Materials, Circuits and Devices

Circuits and Systems for Biomedical Applications UKCAS 2018

Editors:

Hadi Heidari, University of Glasgow, UK

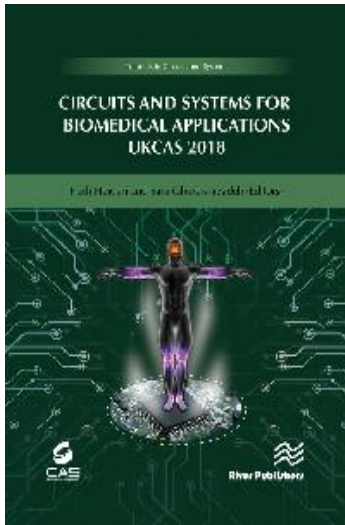
Sara Ghoreishizadeh, University College London, UK

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e-ISBN: 9788770220521

Available From: November 2018

Price: € 95.00



Description:

Circuits and Systems for Biomedical Applications-UKCAS 2018 covers several advanced topics in the area of Devices, Analog and Mixed-Signal Circuits and Systems for Biomedical Applications. The fundamental aspects of these topics are discussed, and state-of-the-art developments are presented.

The book proceeds the 1st United Kingdom Circuits and Systems (UKCAS 2018) Workshop. It addresses multidisciplinary theme areas such as Biosensing, Memristors, next-generation medical diagnostics, neural-inspired circuits, neural implants, neuro-prostheses, prosthetic hand and neuro-rehabilitation. Having perceived the device and circuit assets for such technologies and knowing what challenges these present for the biomedical scientists and engineers, integrated circuits for addressable biosensing are reviewed in the first chapter. The Second Chapter is harnessing the power of the brain using metaloxide Memristors. The third chapter contains construction of an endoscopic capsule for the diagnostics of dysmotilities in the gastrointestinal track. The next three chapters are on neural interfaces: analogue building blocks of neural inspired circuits are described in the fourth chapter while chapter five focuses on circuits for bio-potential recording from the brain. Networked Integrated circuits and their use in creating advanced implantable stimulation systems will be discussed in chapter six. This topic will be completed by circuits and systems for control of Prosthetic Hands in seventh chapter and genetically enhanced brainimplants for neuro-rehabilitation in chapter eight.

Keywords: Biomedical Circuits and Systems, Biosensors, Memristors, Emerging Diagnostics, Neural-Inspired Circuits, Neural Recording, Brain Implant Chips, Neuro-prostheses, Prosthetic Hand, Neurorehabilitation

River Publishers Series in Electronic Materials, Circuits and Devices

Low Power Circuit Design Using Advanced CMOS Technology

Editors:

Milin Zhang, Tsinghua University, Beijing, China

Zhihua Wang, Tsinghua University, Beijing, China

Jan Van der Spiegel, University of Pennsylvania, Philadelphia, USA

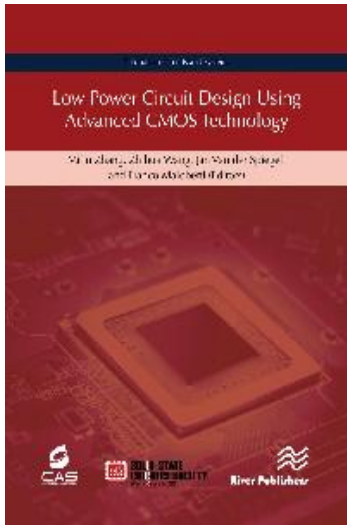
Franco Maloberti, University of Pavia, Pavia, Italy

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Available From: October 2018

Price: € 95.00



Description:

Low Power Circuit Design Using Advanced CMOS Technology is a summary of lectures from the first Advanced CMOS Technology Summer School (ACTS) 2017. The slides are selected from the handouts, while the text was edited according to the lecturers talk.

ACTS is a joint activity supported by the IEEE Circuit and System Society (CASS) and the IEEE Solid-State Circuits Society (SSCS). The goal of the school is to provide society members as well researchers and engineers from industry the opportunity to learn about new emerging areas from leading experts in the field. ACTS is an example of high-level continuous education for junior engineers, teachers in academe, and students. ACTS was the results of a successful collaboration between societies, the local chapter leaders, and industry leaders. This summer school was the brainchild of Dr. Zhihua Wang, with strong support from volunteers from both the IEEE SSCS and CASS. In addition, the local companies, Synopsys China and Beijing IC Park, provided support.

This first ACTS was held in the summer 2017 in Beijing. The lectures were given by academic researchers and industry experts, who presented each 6-hour long lectures on topics covering process technology, EDA skill, and circuit and layout design skills. The school was hosted and organized by the CASS Beijing Chapter, SSCS Beijing Chapter, and SSCS Tsinghua Student Chapter. The co-chairs of the first ACTS were Dr. Milin Zhang, Dr. Hanjun Jiang and Dr. Liyuan Liu. The first ACTS was a great success as illustrated by the many participants from all over China as well as by the publicity it has been received in various media outlets, including Xinhua News, one of the most popular news channels in China.

Keywords: Analog Front-End Design, Mobile and Multimedia SoC, Low Power Digital Design, Mobile Computing, Mobile Embedded, CMOS Wireless Link, Transceiver Design, Layout Design, Advanced Technologies

River Publishers Series in Electronic Materials, Circuits and Devices

Enabling Technologies for the Internet of Things: Wireless Circuits, Systems and Networks

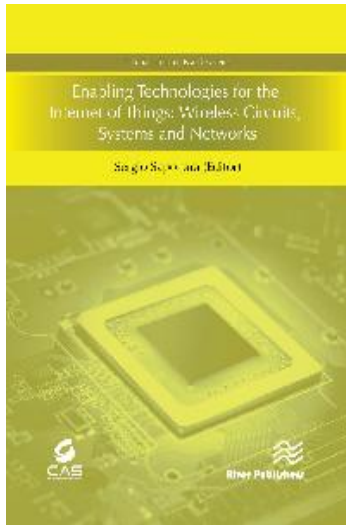
Editor: Sergio Saponara, University of Pisa, Italy

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Available From: July 2018

Price: € 90.00



Description:

Enabling Technologies for the Internet of Things: Wireless Circuits, Systems and Networks collects slides and notes from the lectures given in the 2017 Seasonal School Enabling Technologies for the Internet-of-Things, supported by IEEE CAS Society and by INTEL funding, and organized by Prof. Sergio Saponara, and Prof. Giuliano Manara.

The book discusses new trends in Internet-of-Things (IoT) technologies, considering technological and training aspects, with special focus on electronic and electromagnetic circuits and systems. IoT involves research and design activities both in analog and in digital circuit/signal domains, including focus on sensors interfacing and conditioning, energy harvesting, low-power signal processing, wireless connectivity and networking, functional safety (FuSa). FuSa is one of the emerging key issues in IoT applications in safety critical domain like industry 4.0, autonomous and connected vehicles and e-health. Our world is becoming more and more interconnected. Currently it is estimated that two hundred billion smart objects will be part of the IoT by 2020. This new scenario will pave the way to innovative business models and will bring new experiences in everyday life. The challenge is offering products, services and comprehensive solutions for the IoT, from technology to intelligent and connected objects and devices to connectivity and data centers, enhancing smart home, smart factory, autonomous driving cars and much more, while at the same time ensuring the highest safety standards. In safety-critical contexts, where a fault could jeopardize the human life, safety becomes a key aspect.

Keywords: Internet of Things (IoT), Radio Frequency Identification (RFID); Wireless Power Transfer; Wireless Sensor Networks; Integrated circuits; Electronics; Applied Electromagnetics; VLSI; RF/mm-wave Transceivers; Functional Safety; Remote Sensing; SW-defined Autonomous IoT; Ultra-low-power devices; Near-field Focused Antennas; mm-wave Antennas; Telecommunications

Power Management for Internet of Everything

Editors:

Mathieu Coustans, EPFL, Switzerland

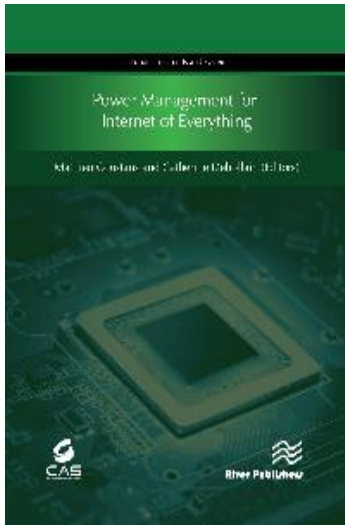
Catherine Dehollain, EPFL, Switzerland

ISBN: 9788793609839

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Available From: June 2018

Price: € 90.00



Description:

In this book, several advanced topics in the area of Power Management Analog and Mixed-Signal Circuits and Systems have been addressed. The fundamental aspects of these topics are discussed, and state-of-the-art developments are presented.

The book covers subject areas like bio-sensors co-integration with nanotechnology, and for these CMOS circuits one popular application could be personalized medicine. Having seen the power assets for such technologies, and knowing what challenges these present for the circuits and systems designer, remote powering and sensors solutions are reviewed in the second chapter. The third chapter contains an industrial contribution on remote powering, presenting energy harvesting from the RF field to power a target wireless sensor network consumption. Having touched the idea of the low current consumption, μA or Nano-Amp range and their transient behaviours are also described. Digital and large-scale integrated circuits - seen from an academic point of view - is included in chapter five, and this same topic from an industrial point of view is given in the chapter thereafter. An additional topic on the hall sensor, applied in an automotive case study, is then also presented. Approaching the duty-cycling of active mode, oscillator for timers and system-level power management including the cloud are covered in the last chapters.

Power Management for Internet of Everything targets post-graduate students and those persons active in industry, whom understand and can connect system design with system on chip (SoC) and mixed-signal design as broader set of circuits and systems. The topic of Internet of Things (IoT), ranging from data converters for sensor interfaces to radios and software application, is also addressed from the viewpoint of power and energy management. The contents ensures a good balance between academia and industry, combined with a judicious selection of distinguished international authors.

Keywords: Biosensors, Power Delivery, Remotely Powered Sensor Networks, System on Chip, Energy Harvesting, Wireless Power Transfer, Dynamic Current Profiles, Variation-Aware Digital Low Power, VLSI Design for IoT, Hall Effect Sensors, FD-SOI, Embedded Systems, Vertical Co-Design

River Publishers Series in Electronic Materials, Circuits and Devices

Ultra-Low Input Power Conversion Circuits based on Tunnel-FETs

Authors:

David Cavalheiro, Universitat Politècnica de Catalunya, Spain

Francesc Moll, Universitat Politècnica de Catalunya, Spain

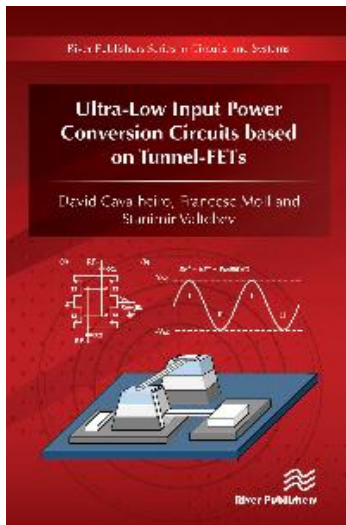
Stanimir Valtchev, Universidade Nova de Lisboa, Portugal

ISBN: 9788793609761

e-ISBN: 9788793609754

Available From: May 2018

Price: € 90.00



Description:

The increasing demand in electronic portability imposes low power consumption as a key metric to analog and digital circuit design. Tunnel FET (*TFET*) devices have been explored mostly in digital circuits, showing promising results for ultra-low power and energy efficient circuit applications. The *TFET* presents a low inverse sub-threshold slope (*SS*) that allows a low leakage energy consumption, desirable in many digital circuits, especially memories.

In this book, the *TFET* is explored as an alternative technology also for ultra-low power and voltage conversion and management circuits, suitable for weak energy harvesting (*EH*) sources. The *TFET* distinct electrical characteristics under reverse bias conditions require changes in conventional circuit topologies. In this book, ultra-low input power conversion circuits based on *TFETs* are designed and analyzed, evaluating their performance as rectifiers, charge pumps and power management circuits (*PMC*) for *RF* and *DC EH* sources.

Keywords: Tunnel FET, Energy harvesting, Ultra-low-voltage circuits, nanpower, power management circuits.

Introduction to Wireless Communication Circuits

Authors:

Forouhar Farzaneh, Sharif University of Technology, Iran

Ali Fotowat, Sharif University of Technology, Iran

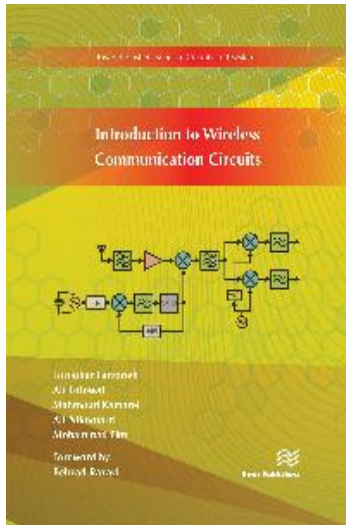
Mahmoud Kamarei, University of Tehran, Iran

Ali Nikoofard, University of California at San Diego, USA

Mohammad Elmi, KavoshCom Asia Co., Iran

Foreword by: Behzad Razavi, UCLA, USA

ISBN: 9788793609716



Description:

Over the past decade, tremendous development of Wireless Communications has changed human life and engineering. Considerable advancement has been made in design and architecture of related RF and microwave circuits. *Introduction to Wireless Communication Circuits* focusses on special circuits dedicated to the RF level of wireless communications. From oscillators to modulation and demodulation, and from mixers to RF and power amplifier circuits, all are presented in a sequential manner. A wealth of analytical relations is provided in the text alongside various worked out examples. Related problem sets are given at the end of each chapter. Basic concepts of RF Analog Circuit Design are developed in the book.

Technical topics discussed include:

- Wireless Communication System
- RF Oscillators and Phase Locked Loops
- Modulator and Demodulator Circuits
- RF Mixers
- Automatic Gain Control and Limiters
- Microwave Circuits, Transmission Lines and S-Parameters
- Matching networks
- Linear Amplifier Design and Power Amplifiers
- Linearization Techniques

This textbook is intended for advanced undergraduate and graduate students, as well as RF Engineers and professionals

Keywords: Wireless Communication, RF Circuits, Microwaves, Receiver, Transmitter, Oscillator, Oscillator Topology, PLL, RF Amplifier, RF Mixer, Modulator, Demodulator, Impedance Matching, Smith Chart, AGC, Limiter, Transmission Lines, Scattering Parameters, Power Amplifier, Nonlinearity, Large Signal, Linearization

Circuit Design Considerations for Implantable Devices

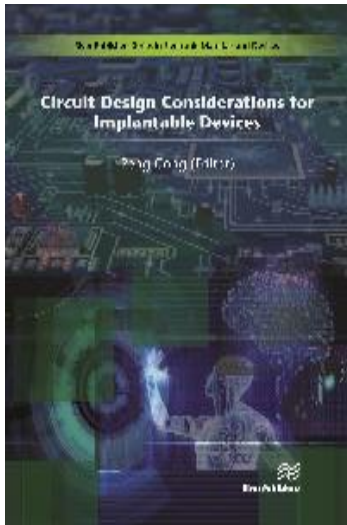
Editor: Peng Cong, Verily Life Science, USA

ISBN: 9788793519862

e-ISBN: 9788793519855

Available From: January 2018

Price: € 85.00



Description:

Implantable devices are a unique area for circuit designers. A comprehensive understanding of design trade-offs at the system level is important to ensure device success. Circuit Design Considerations for Implantable Devices provides knowledge to CMOS circuit designers with limited biomedical background to understand design challenges and trade-offs for implantable devices, especially neural interfacing.

Technical topics discussed in the book include:

- Neural interface
- Neural sensing amplifiers
- Electrical stimulation
- Embedded Signal Analysis
- Wireless Power Transmission to mm-Sized Free-Floating Distributed Implants
- Next Generation Neural Interface Electronics

Keywords: Implantable medical device, neural interface, interface circuit design, electrical stimulation, neuromodulation, brain machine interface

Selected Topics in Power, RF, and Mixed-Signal ICs

Editors:

Yan Lu, University of Macau, China

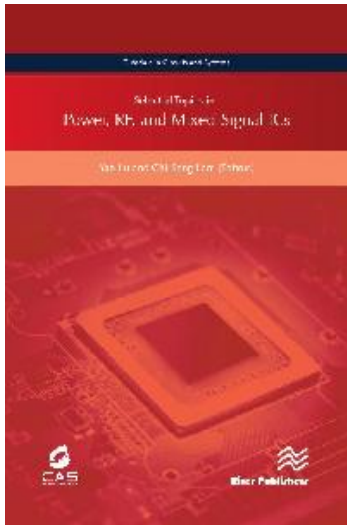
Chi-Seng Lam, University of Macau, China

ISBN: 9788793609402

e-ISBN: 9788793609396

Available From: December 2017

Price: € 90.00



Description:

Driven by advanced CMOS technology, power management units, RF transceivers, and sensors, analog and mixed-signal circuits can now be fully integrated with VLSI digital systems for applications ranging from mobile, internet-of-things (IoT), wearable, and implantable medical devices. Evidently, the circuit- and system-level innovations have pushed the device performance boundaries to become orders of magnitude higher, whilst keeping the same or even lower power consumption.

Selected Topic in Power, RF, and Mixed-Signal ICs provides a practical overview and state-of-the-art advancements on several selected topics in the areas of power, RF, and mixed-signal integrated circuits and systems.

Topics covered in the book include:

- Very-High-Frequency DC-DC Switching Converters
- Analog and Digital Low-Dropout Regulators
- Analog and Digital Sub-Sampling Frequency Synthesizers
- Hybrid ADC Architecture with Digital Assisted Techniques
- CMOS Image Sensors and Their Biomedical Applications
- CMOS Temperature Sensors
- CMOS Millimeter-Wave Power Amplifiers
- Zigbee/BLE Transmitter for IoT Applications

Keywords: DC-DC Switching Converters, Analog and Digital Regulators, Analog and Digital Frequency Synthesizers, Hybrid ADC Architecture, CMOS Image Sensors, CMOS Temperature Sensors, CMOS Millimeter-Wave Power Amplifiers, Zigbee, BLE Transmitter, IoT Applications

Cyber-Physical Systems: Decision Making Mechanisms and Applications

Authors:

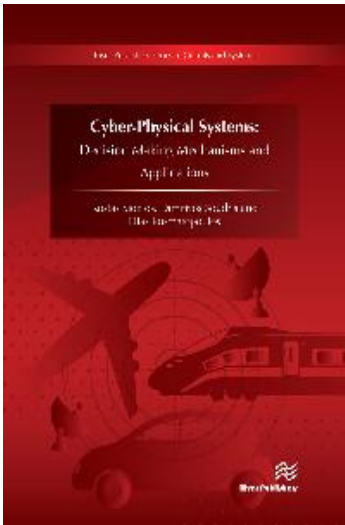
Kostas Siozios, Aristotle University of Thessaloniki, Greece
Dimitrios Soudris, National Technical University of Athens, Greece
Elias Kosmatopoulos, Democritus University of Thrace, Greece

ISBN: 9788793609099

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Available From: November 2017

Price: € 80.00



Description:

As systems continue to evolve they rely less on human decision-making and more on computational intelligence. This trend in conjunction with the available technologies for providing advanced sensing, measurement, process control, and communication lead towards the new field of the CyberPhysical System (CPS). CyberPhysical systems are expected to play a major role in the design and development of future engineering platforms with new capabilities that far exceed today's levels of autonomy, functionality and usability. Although these systems exhibit remarkable characteristics, their design and implementation is a challenging issue, as numerous (heterogeneous) components and services have to be appropriately modeled and simulated together. The problem of designing efficient CPS becomes far more challenging in case the target system has to meet also real-time constraints.

CyberPhysical Systems: Decision Making Mechanisms and Applications describes essential theory, recent research and large-scale user cases that addresses urgent challenges in CPS architectures. In particular, it includes chapters on:

- Decision making for large scale CPS
- Modeling of CPS with emphasis at the control mechanisms
- Hardware/software implementation of the control mechanisms
- Fault-tolerant and reliability issues for the control mechanisms
- CyberPhysical user-cases that incorporate challenging decision making

Keywords: Decision making, Large-Scale systems, System-of-Systems (SoS), Cyberphysical Systems (CPS), Modelling and Analysis of complex systems, Fault-Tolerance, Examples, User-cases for control in CPS

River Publishers Series in Electronic Materials, Circuits and Devices

Circuits and Systems for the Internet of Things CAS4IoT

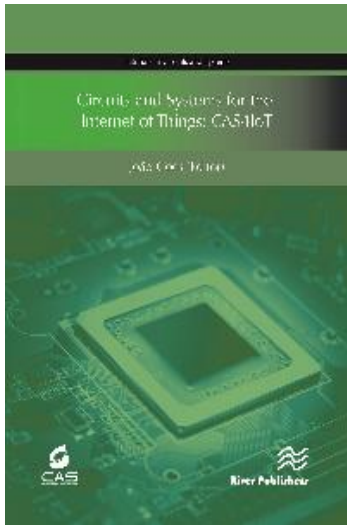
Editor: João Goes, NOVA University of Lisbon, FCT NOVA Portugal

ISBN: 9788793519909

e-ISBN: 9788793519893

Available From: August 2017

Price: € 80.00



Description:

Internet-of-Things (IoT) can be envisaged as a dynamic network of interconnected physical and virtual entities ("things"), with their own identities and attributes, seamlessly integrated in order to e.g. actively participate in economic or societal processes, interact with services, and react autonomously to events while sensing the environment. By enabling things to connect and becoming recognizable, while providing them with intelligence, informed and context based decisions are expected in a broad range of domains spanning from health and elderly care to energy efficiency, either providing business competitive advantages to companies, either addressing key social concerns. The level of connectivity and analytical intelligence provided by the IoT paradigm is expected to allow creating new services that would not be feasible by other means.

This CAS4IoT book targets post-graduate students and design engineers, with the skills to understand and design a broader range of analog, digital and mixed-signal circuits and systems, in the field of IoT, spanning from data converters for sensor interfaces to radios, ensuring a good balance between academia and industry, combined with a judicious selection of worldwide distinguished authors.

Keywords: Circuits-and-Systems, Internet-of-Things, Sensor-interfaces, Micro-power Analog Circuits, Analog-to-Digital Converters, Sigma-Delta Modulators, ADCs, SAR ADCs, Microprocessors, Nano-sensors, Energy-management, Power-management, Smart Adaptive Monitoring, Radio Architecture, BLE Transceivers, MCUs

River Publishers Series in Electronic Materials, Circuits and Devices

Computational Electrodynamics A Gauge Approach with Applications in Microelectronics

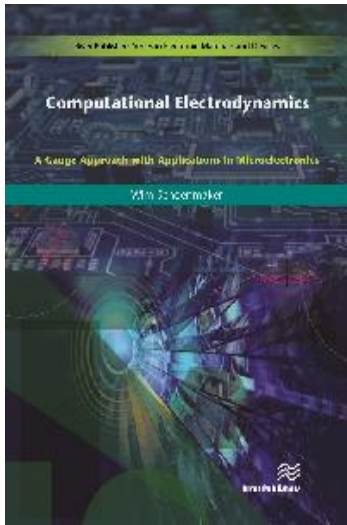
Author: Wim Schoenmaker, MAGWEL, Belgium

ISBN: 9788793519848

e-ISBN: 9788793519831

Available From: May 2017

Price: € 90.00



Description:

Computational Electrodynamics is a vast research field with a wide variety of tools. In physics the principle of gauge invariance plays a pivotal role as a guide towards a sensible formulation of the laws of nature as well as computing the properties of elementary particles using the lattice formulation of gauge theories, yet the gauge principle has played a much less pronounced role in performing computation in classical electrodynamics. In this work the author will demonstrate that starting from the gauge formulation of electrodynamics using the electromagnetic potentials leads to computational tools that can very well compete with the conventional electromagnetic field-based tools. Once accepting the formulation based on gauge fields, the computational code is very transparent due to the mimetic mapping of the electrodynamic variables on the computational grid. Although the illustrations and applications originate from microelectronic engineering, the method has a much larger range of applicability. Therefore this book is of interest to everyone having interest in computational electrodynamics. The volume is organized as follows: In part 1, a detailed introduction and overview is presented of the Maxwell equations as well as the derivation of the current and charge densities in different materials. Semiconductors are responding to electromagnetic fields in a non-linear way and the induced complications are discussed in detail. In part 2, the transition of the theory of electrodynamics, using the gauge potentials, to a formulation that can serve as the gateway to computational code is presented. In part 3, the feasibility and success of the methods of part 2 are demonstrated by a collection of microelectronic device designs. Part 4 focuses on a set of topical themes that brings the reader to the frontier of research in building the simulation tools using the gauge principle in computational electrodynamics.

Technical topics discussed in the book include:

- Electromagnetic Field Equations
- Constitutive Relations
- Discretization and Numerical Analysis
- Finite Element and Finite Volume Methods
- Design of Integrated Passive Components

Keywords: Electrodynamics, computation, semiconductors, microelectronic, simulation electrical engineering, numerical analysis, Applied Mathematics

FM-UWB Transceivers for Autonomous Wireless Systems

Authors:

Nitz Saputra, Qualcomm Inc., USA

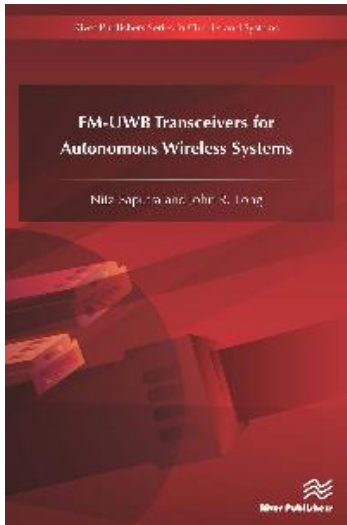
John R. Long, University of Waterloo, Canada

ISBN: 9788793519169

e-ISBN: 9788793519152

Available From: February 2017

Price: € 80.00



Description:

Significant research effort has been devoted to the study and realization of autonomous wireless systems for wireless sensor and personal-area networking, the internet of things, and machine-to-machine communications. Low-power RF integrated circuits, an energy harvester and a power management circuit are fundamental elements of these systems.

An FM-UWB Transceiver for Autonomous Wireless Systems presents state-of-the-art developments in low-power FM-UWB transceiver realizations. The design, performance and implementation of prototype transceivers in CMOS technology are presented. A working hardware realization of an autonomous node that includes a prototype power management circuit is also proposed and detailed in this book.

Technical topics include:

- Low-complexity FM-UWB modulation schemes
- Low-power FM-UWB transceiver prototypes in CMOS technology
- CMOS on-chip digital calibration techniques
- Solar power harvester and power management in CMOS for low-power RF circuits

An FM-UWB Transceiver for Autonomous Wireless Systems is an ideal text and reference for engineers working in wireless communication industries, as well as academic staff and graduate students engaged in electrical engineering and communication systems research.

Keywords: Ultrawideband, FM-UWB, low-power RF transceiver, autonomous wireless systems, SAR-FLL, digital calibration, RF-CMOS, programmable RF matching, regenerative RF amplifier, current-controlled oscillator, frequency tripling PA, bias current reuse, power harvester, power management, solar antenna, switched-capacitor, DC-DC converter, charge pump, LDO, RF circuit design

New Topics in Simulation and Modeling of RF Circuits

Authors:

Alexandru Gabriel Gheorghe, University Politehnica of Bucharest, Romania

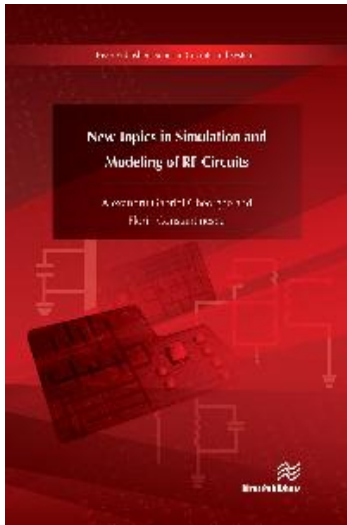
Florin Constantinescu, University Politehnica of Bucharest, Romania

ISBN: 9788793379466

e-ISBN: 9788793379459

Available From: December 2016

Price: € 75.00



Description:

New Topics in Simulation and Modeling of RF Circuits addresses two main topics: simulation of RF circuits and new models of nonlinear power BAW resonators and filters.

Since RF circuits have several unique features, and all analysis methods are based on the circuit essential properties, the book begins by describing the properties of RF circuits, characterization of circuits with customary and uncusomary behavior and some theorems of solutions existence and uniqueness for dynamic nonlinear circuits.

Thereafter, the main time domain and frequency domain analysis methods for RF circuits are presented. The advantages and disadvantages of each method have been highlighted, and an algorithm for the time step choice in transient analysis based on energy balance errors is also presented.

Lastly, the final part contains some nonlinear circuit models of power BAW resonators. The behavioral models for the time domain analysis are simple circuits containing weakly nonlinear elements. The behavioral models for frequency domain analysis are based on the measured values of the frequency dependent S parameters for a set of incident powers. S parameters corresponding to certain intermodulation products of practical interest are also considered. The physical models contain artificial transmission lines with nonlinear circuit elements corresponding to mechanical and electrical nonlinearities.

Keywords: RF circuits, time domain analysis, frequency domain analysis, circuit models, BAW resonators and filters

River Publishers Series in Electronic Materials, Circuits and Devices

Selected Topics in RF, Analog and Mixed Signal Circuits and Systems

Editors:

Kiran Gunnam, Western Digital Corporation, USA

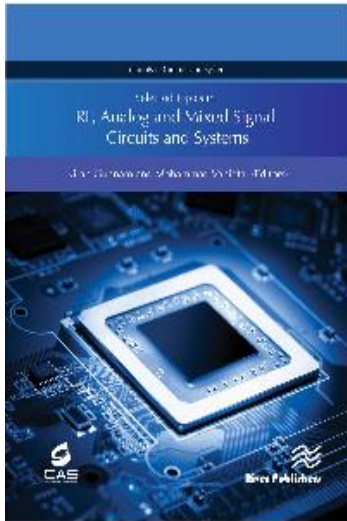
Mohammad VahidFar, Apple, USA

ISBN: 9788793519183

e-ISBN: 9788793519176

Available From: December 2016

Price: € 80.00



Description:

CMOS process technology progress has led to a revolution towards new and innovative integrated circuits and systems. This trend is still moving forward for applications ranging from high-speed wireless and wireline data transfer down to ultra-low-power mobile applications for more interconnected world. The high performance analog and RF circuits and systems are at the heart of all these developments.

Selected Topics in RF, Analog and Mixed Signal Circuits and Systems provides an overview and the state of the art developments on several selected topics in RF, analog and mixed signal circuits and system. The topics include ADC conversion and equalization for high-speed links, clock and data recovery for high speed wireline transmission with speeds in several Gb/s, signal generation for terahertz application, oscillator phase noise fundamentals and analog/digital PLL overview.

Topics covered in the book include:

- Overview of Oscillator Phase Noise
- Clock and Data Recovery in High-Speed Wireline Communication
- Phase Lock Loop Design Techniques
- Terahertz and mm-Wave Signal Generation, Synthesis and Amplification: Reaching the Fundamental Limits
- Equalization and A/D conversion for high-speed links

Keywords: Time-Variation, Phase Modulation, Oscillator Phase Noise; Data Recovery, High-Speed Wireline Communication; Analog-to-Digital Converters, High-Speed Links, Terahertz, mm-Wave Signal Generation and A/D Conversion for High-Speed Links

River Publishers Series in Electronic Materials, Circuits and Devices

Electronic System-Level HW/SW Co-Design of Heterogeneous Multi-Processor Embedded Systems

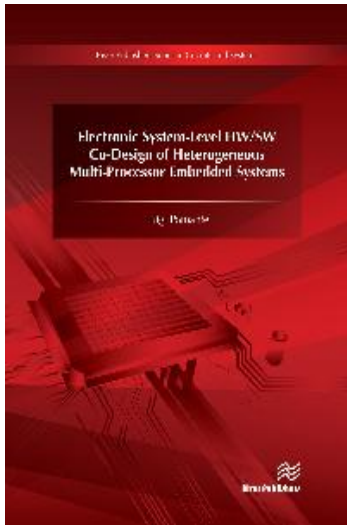
Author: Luigi Pomante, Università degli Studi dell'Aquila, Italy

ISBN: 9788793379381

e-ISBN: 9788793379374

Available From: June 2016

Price: € 80.00



Description:

Modern electronic systems consist of a fairly heterogeneous set of components. Today, a single system can be constituted by a hardware platform, frequently composed of a mix of analog and digital components, and by several software application layers. The hardware can include several heterogeneous microprocessors (e.g. GPP, DSP, GPU, etc.), dedicated ICs (ASICs and/or FPGAs), memories, a set of local connections between the system components, and some interfaces between the system and the environment (sensors, actuators, etc.). Therefore, on the one hand, multi-processor embedded systems are capable of meeting the demand of processing power and flexibility of complex applications. On the other hand, such systems are very complex to design and optimize, so that the design methodology plays a major role in determining the success of the products. For these reasons, to cope with the increasing system complexity, the approaches typically used today are oriented towards co-design methodologies working at the higher levels of abstraction. Unfortunately, such methodologies are typically customized for the specific application, suffer of a lack of generality and still need a considerable effort when real-size project are envisioned. Therefore, there is still the need for a general methodology able to support the designer during the high-level steps of a co-design flow, enabling an effective design space exploration before tackling the low-level steps and thus committing to the final technology. This should prevent costly redesign loops.

In such a context, the work described in this book, composed of two parts, aims at providing models, methodologies and tools to support each step of the co-design flow of embedded systems implemented by exploiting heterogeneous multi-processor architectures mapped on distributed systems, as well as fully integrated onto a single chip.

The first part focuses on issues like the analysis of system specification languages, and the analysis of existing system-level HW/SW co-simulation methodologies to support heterogeneous multi-processor architectures. The second part focuses mainly on Design Space Exploration, and it presents both some theoretical advancements with respect to the first part, and the development of a prototypal framework that provides practical exploitation of the proposed concepts.

Keywords: HW/SW Co-Design, Electronic System-Level Design, Heterogeneous Multi-Processor Architectures, Embedded Systems, Dedicated Systems

Wideband FM Techniques for Low-Power Wireless Communications

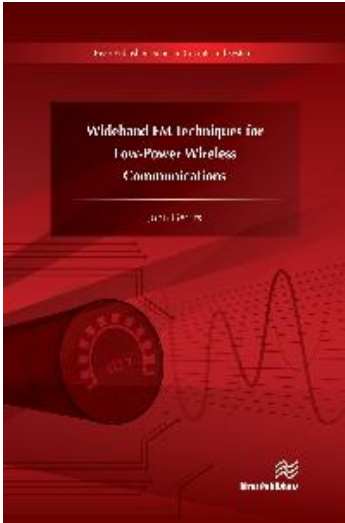
Author: John Gerrits, CSEM, Switzerland and Delft University of Technology, The Netherlands

ISBN: 9788793379626

e-ISBN: 9788793379619

Available From: June 2016

Price: € 75.00



Description:

Ultra Wideband (UWB) communications are poised to enable short-range applications, such as remote health monitoring (e-health) and home or office automation. Sensor networks are also suitable candidates for UWB since the low radiated power of the UWB transmitter enables low DC power consumption, yielding long battery life and the possibility to use energy scavenging. Size and cost constraints require a low-complexity approach that allows multiple users to share the same RF bandwidth, and offers robustness to interference, frequency-selective multipath and antenna mismatch.

Wideband FM Techniques for Low-Power Wireless Communications presents research and applications that have taken place in UWB Communications over the past years. This book is being published posthumously in agreement with the authors' former colleagues from both the Swiss Center for Electronics and Microtechnology (CSEM) and Delft University of Technology in The Netherlands.

Keywords: Wireless Communications, Ultrawideband (UWB), RF Circuits, Low-Power Circuits

A Short History of Circuits and Systems

Editors:

Franco Maloberti, University of Pavia, Italy

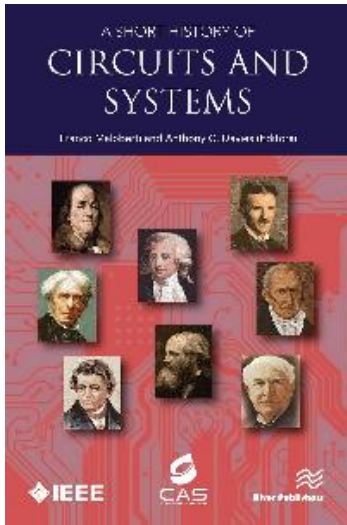
Anthony C. Davies, King's College London, UK

ISBN: 9788793379718

e-ISBN: 9788793379695

Available From: May 2016

Price: € 45.00



Description:

After an overview of major scientific discoveries of the 18th and 19th centuries, which created electrical science as we know and understand it and led to its useful applications in energy conversion, transmission, manufacturing industry and communications, this Circuits and Systems History book fills a gap in published literature by providing a record of the many outstanding scientists, mathematicians and engineers who laid the foundations of Circuit Theory and Filter Design from the mid-20th Century. Additionally, the book records the history of the IEEE Circuits and Systems Society from its origins as the small Circuit Theory Group of the Institute of Radio Engineers (IRE), which merged with the American Institute of Electrical Engineers (AIEE) to form IEEE in 1963, to the large and broad-coverage worldwide IEEE Society which it is today.

Many authors from many countries contributed to the creation of this book, working to a very tight time-schedule. The result is a substantial contribution to their enthusiasm and expertise which it is hoped that readers will find both interesting and useful. It is sure that in such a book omissions will be found and in the space and time available, much valuable material had to be left out. It is hoped that this book will stimulate an interest in the marvellous heritage and contributions that have come from the many outstanding people who worked in the Circuits and Systems area.

Keywords: Circuits and Systems, Circuit Theory, Filter Design, Electronic Devices