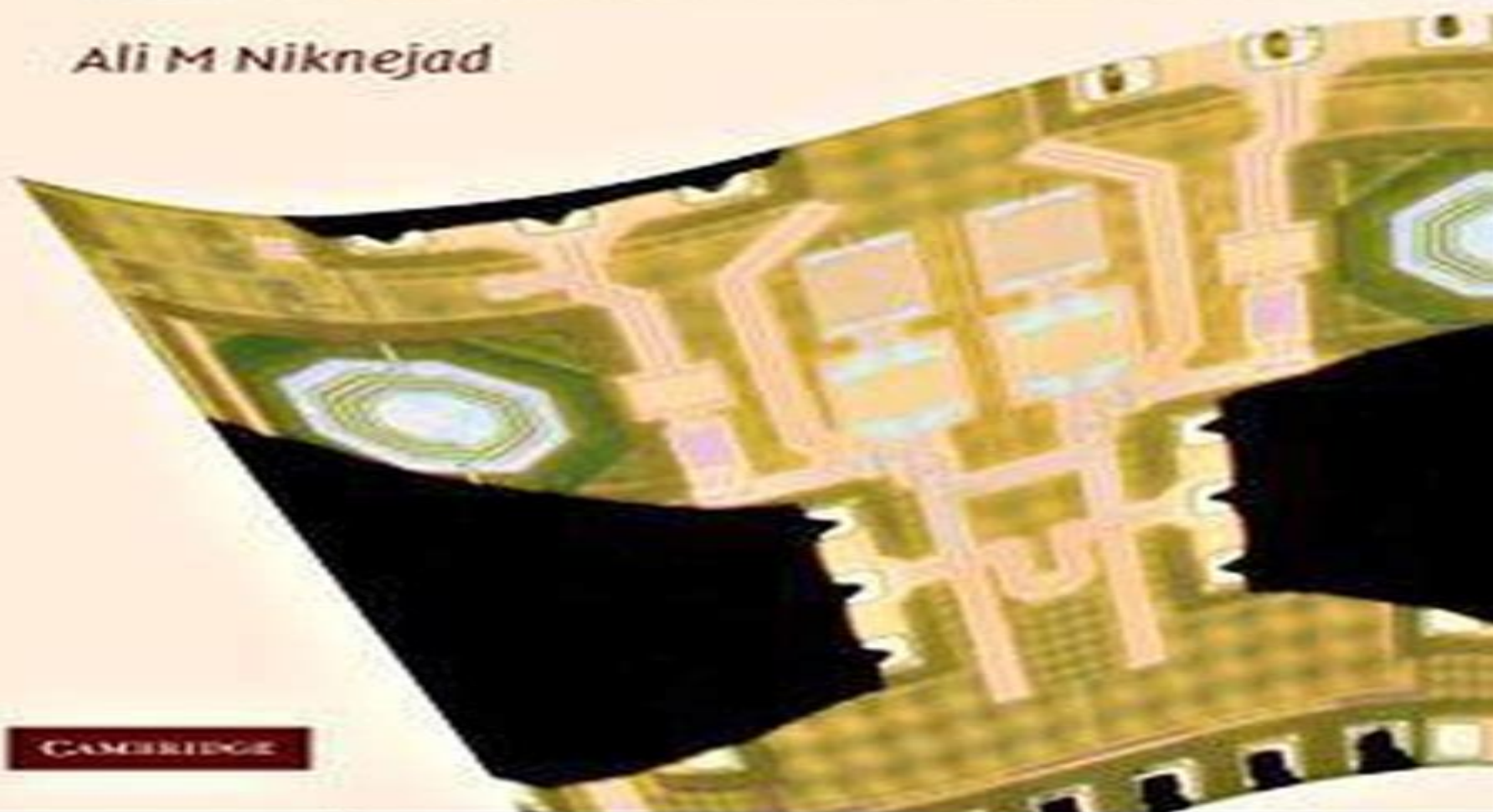


Electromagnetics for High-Speed Analog *and* Digital Communication Circuits

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Electromagnetics for High-speed Analog and Digital Communication Circuits, 2005* Describes the fundamental electromagnetics of passive and active circuit elements highlighting the various effects and potential problems in circuit design

Electromagnetics for High-Speed Analog and Digital Communication Circuits Ali M. Niknejad, 2007-02-22 Modern communications technology demands smaller faster and more efficient circuits This book reviews the fundamentals of electromagnetism in passive and active circuit elements highlighting various effects and potential problems in designing a new circuit The author begins with a review of the basics the origin of resistance capacitance and inductance then progresses to more advanced topics such as passive device design and layout resonant circuits impedance matching high speed switching circuits and parasitic coupling and isolation techniques Using examples and applications in RF and microwave systems the author describes transmission lines transformers and distributed circuits State of the art developments in Si based broadband analog RF microwave and mm wave circuits are reviewed With up to date results techniques practical examples illustrations and worked examples this book will be valuable to advanced undergraduate and graduate students of electrical engineering and practitioners in the IC design industry Further resources for this title are available at www.cambridge.org/9780521853507

Ultra High-Speed CMOS Circuits Sam Gharavi, Babak Heydari, 2011-09-25 The book covers the CMOS based millimeter wave circuits and devices and presents methods and design techniques to use CMOS technology for circuits operating beyond 100 GHz Coverage includes a detailed description of both active and passive devices including modeling techniques and performance optimization Various mm wave circuit blocks are discussed emphasizing their design distinctions from low frequency design methodologies This book also covers a device oriented circuit design technique that is essential for ultra high speed circuits and gives some examples of device circuit co design that can be used for mm wave technology

Radio Frequency Integrated Circuits and Systems Hooman Darabi, 2020-03-12 This updated and expanded new edition equips students with a thorough understanding of the state of the art in radio frequency RF design and the practical knowledge and skills needed in industry Introductory and advanced topics are covered in depth with clear step by step explanations including core topics such as RF components signals and systems two ports noise distortion low noise amplifiers power amplifiers and transceiver architectures New material has been added on wave propagation skin effect antennas mixers and oscillators and digital PAs and transmitters Two new chapters detail the analysis and design of RF and IF filters including SAW and FBAR duplexers and N path filters phase locked loops frequency synthesizers digital PLLs and frequency dividers Theory is linked to practice through real world applications practical design examples and exploration of the pros and cons of various topologies Over 250 homework problems are included with solutions and lecture slides for instructors available online With its uniquely practical and intuitive approach this is an essential text for graduate courses on RFICs and a useful reference for practicing engineers

Fast Techniques

for Integrated Circuit Design Mikael Sahrling, 2019-08-15 Do you want to deepen your understanding of complex systems and design integrated circuits more quickly Learn how with this step by step guide that shows from first principles how to employ estimation techniques to analyze and solve complex problems in IC design using a simplified modeling approach Applications are richly illustrated using real world examples from across IC design from simple circuit theory to the electromagnetic effects and high frequency design and systems such as data converters and phase locked loops Basic concepts like inductance and capacitance are related to one other and other RF phenomena inside a modern chip enhancing understanding without the need for simulators Use the easy to follow models presented to start designing your own products from inductors and amplifiers to more complex systems Whether you are an early career professional or researcher graduate student or established IC engineer looking to reduce your reliance on commercial software packages this is essential reading

Layout Techniques for Integrated Circuit Designers Mikael Sahrling, 2022-08-31 This book provides complete step by step guidance on the physical implementation of modern integrated circuits showing you their limitations and guiding you through their common remedies The book describes today s manufacturing techniques and how they impact design rules You will understand how to build common high frequency devices such as inductors capacitors and T coils and will also learn strategies for dealing with high speed routing both on package level and on chip applications Numerous algorithms implemented in Python are provided to guide you through how extraction netlist comparison and design rule checkers can be built The book also helps you unravel complexities that effect circuit design including signal integrity matching IR drop parasitic impedance and more saving you time in addressing these effects directly You will also find detailed descriptions of software tools used to analyze a layout database showing you how devices can be recognized and connectivity accurately assessed The book removes much of fog that often hides the inner workings of layout related software tools and helps you better understand the physics of advanced nodes high speed techniques used in modern integrated technologies and the inner working of software used to analyze layout databases This is an excellent resource for circuit designers implementing a schematic in a layout database especially those involved in deep submicron designs as well as layout designers wishing to deepen their understanding of modern layout rules

Continuous-Time Low-Pass Filters for Integrated Wideband Radio Receivers Ville Saari, Jussi Ryyänen, Saska Lindfors, 2012-03-15 This book presents a new filter design approach and concentrates on the circuit techniques that can be utilized when designing continuous time low pass filters in modern ultra deep submicron CMOS technologies for integrated wideband radio receivers Coverage includes system level issues related to the design and implementation of a complete single chip radio receiver and related to the design and implementation of a filter circuit as a part of a complete single chip radio receiver Presents a new filter design approach emphasizing low voltage circuit solutions that can be implemented in modern ultra deep submicron CMOS technologies Includes filter circuit implementations designed as a part of a single chip radio receiver in modern 1.2V 0.13um and 65nm CMOS Describes design

and implementation of a continuous time low pass filter for a multicarrier WCDMA base station Emphasizes system level considerations throughout **Millimeter-Wave Circuits for 5G and Radar** Gernot Hueber, Ali M. Niknejad, 2019-06-20 Discover the concepts architectures components tools and techniques needed to design millimeter wave circuits for current and emerging wireless system applications Focusing on applications in 5G connectivity radar and more leading experts in radio frequency integrated circuit RFIC design provide a comprehensive treatment of cutting edge physical layer technologies for radio frequency RF transceivers specifically RF analog mixed signal and digital circuits and architectures The full design chain is covered from system design requirements through to building blocks transceivers and process technology Gain insight into the key novelties of 5G through authoritative chapters on massive MIMO and phased arrays and learn about the very latest technology developments such as FinFET logic process technology for RF and millimeter wave applications This is an essential reading and an excellent reference for high frequency circuit designers in both academia and industry **CMOS Low Noise Amplifiers for Single and Multiband Applications: A Comprehensive Design Approach** Norlaili Mohd Noh, Farshad Eshghabadi, Arjuna Marzuki, 2023-10-11 This book provides comprehensive knowledge aimed at practicing integrated circuit design engineer or researcher to learn and design a low noise amplifier LNA for single and multiband applications The content is structured in a way so that even a beginner can follow the design method easily This book features the following characteristics different types of LNA designs with key building blocks are discussed and detailed analysis is given for each LNA design which covers from the fundamental and principal knowledge to the justification of the design approach Detailed design approaches are using 180 nm and 130nm CMOS technologies purposely presented in this manner to give exposure to the design of LNA under different technologies The LNAs in this book are designed for GSM WCDMA and WLAN standards but the same method can be used for other frequencies of operation Comprehensive analyses on the extreme or corner condition effects are highlighted Besides detailed derivation of equations relating to the parameters of the LNA s performance metrics help LNA designers in understanding how the performance metrics of the LNA can be optimized to meet the desired specification Electromagnetic analyses using Sonnet an electromagnetic tool able to replace the conventional post layout simulation with resistance and capacitance parasitic extraction for more accurate frequency performance prediction are presented The electromagnetic method is proposed to be used in the LNA design as it can accurately predict the LNA s performance before tape out for first pass fabrication MATLAB codes are provided to generate important S parameters and noise figure values *THz and Sub-THz CMOS Electronics for High-Speed Telecommunication* Carl D'heer, Patrick Reynaert, 2024-08-01 This book provides a complete overview of high speed circuit design for high speed telecommunication above 100GHz Covering everything from telecom and electronics fundamentals to system level modeling detailed circuit design and in depth performance analysis this book lends itself as the perfect design guide and reference work for beginner and experienced telecommunication circuit designers alike *FinFET*

Modeling for IC Simulation and Design Yogesh Singh Chauhan, Darsen Lu, Sriramkumar Vanugopalan, Sourabh Khandelwal, Juan Pablo Duarte, Navid Payvadosi, Ali Niknejad, Chenming Hu, 2015-03-17 This book is the first to explain FinFET modeling for IC simulation and the industry standard BSIM CMG describing the rush in demand for advancing the technology from planar to 3D architecture as now enabled by the approved industry standard The book gives a strong foundation on the physics and operation of FinFET details aspects of the BSIM CMG model such as surface potential charge and current calculations and includes a dedicated chapter on parameter extraction procedures providing a step by step approach for the efficient extraction of model parameters With this book you will learn Why you should use FinFET The physics and operation of FinFET Details of the FinFET standard model BSIM CMG Parameter extraction in BSIM CMG FinFET circuit design and simulation Authored by the lead inventor and developer of FinFET and developers of the BSIM CM standard model providing an experts insight into the specifications of the standard The first book on the industry standard FinFET model BSIM CMG

Circuits and Systems for Future Generations of Wireless Communications Aleksandar Tasic, Wouter A. Serdijn, Gianluca Setti, 2009-05-16 The idea for this book originated from a Special Session on Circuits and Systems for Future Generations of Wireless Communications that was presented at the 2005 International Symposium on Circuits and Systems which was then followed by two Special Issues bearing the same title that appeared in the March and April 2008 issues of the IEEE Transactions on Circuits and Systems Part II Express Briefs Out of a large number of great contributions we have selected those tting best the book format based on their quality We would like to thank all the authors the reviewers of the Transactions on Circuits and Systems Part II and the reviewers of the nal book material for their efforts in creating this manuscript We also thank the Springer Editorial Staff for their support in putting together all the good work We hope that this book will provide you the reader with new insights into Circuits and Systems for Future Generations of Wireless Communications

Advances in Imaging and Electron Physics, 2012-11-01 Advances in Imaging and Electron Physics merges two long running serials Advances in Electronics and Electron Physics and Advances in Optical and Electron Microscopy This series features extended articles on the physics of electron devices especially semiconductor devices particle optics at high and low energies microlithography image science and digital image processing electromagnetic wave propagation electron microscopy and the computing methods used in all these domains Contributions from leading authorities Informs and updates on all the latest developments in the field

Non-Linearities in Passive RFID Systems Gianfranco Andia, Yvan Duroc, Smail Tedjini, 2018-01-19 This book concerns a new paradigm in the field of UHF RFID systems the positive exploitation of nonlinear signals generated by the chips integrated into the RFID tags After having recalled the main principles in RFID technology and its current challenges notably with the emergence of Internet of Things or the smart connected environments the purpose is to focus on the presence of nonlinearities produced by the nonlinear circuits of RFID chips effects nuisances and solutions but also and especially use of the phenomena The presentation covers all aspects from

the characterization of the nonlinear behavior of RFID tags and the associated platforms distinguishing conducted and radiated measurement to the design of new types of tags where nonlinearities are exploited in order to offer new capabilities or enhanced performance

Transformer-Based Design Techniques for Oscillators and Frequency Dividers Howard Cam Luong, Jun Yin, 2015-10-07 This book provides in depth coverage of transformer based design techniques that enable CMOS oscillators and frequency dividers to achieve state of the art performance Design optimization and measured performance of oscillators and frequency dividers for different applications are discussed in detail focusing on not only ultra low supply voltage but also ultra wide frequency tuning range and locking range This book will be an invaluable reference for anyone working or interested in CMOS radio frequency or mm Wave integrated circuits and systems

FinFET/GAA Modeling for IC Simulation and Design Yogesh Singh Chauhan, Chenming Hu, S. Salahuddin, Girish Pahwa, Avirup Dasgupta, Darsen Lu, Sriramkumar Vanugopalan, Ali Niknejad, Sourabh Khandelwal, Juan Pablo Duarte, Navid Payvadosi, 2024-08-23 FinFET GAA Modeling for IC Simulation and Design Using the BSIM CMG Standard Second Edition is the first to book to explain FinFET modeling for IC simulation and the industry standard BSIM CMG describing the rush in demand for advancing the technology from planar to 3D architecture as now enabled by the approved industry standard The book gives a strong foundation on the physics and operation of FinFET details aspects of the BSIM CMG model such as surface potential charge and current calculations and includes a dedicated chapter on parameter extraction procedures thus providing a step by step approach for the efficient extraction of model parameters With this book users will learn Why you should use FinFET The physics and operation of FinFET Details of the FinFET standard model BSIM CMG Parameter extraction in BSIM CMG FinFET circuit design and simulation and more Authored by the lead inventor and developer of FinFET and developers of the BSIM CMG standard model providing an expert s insight into the specifications of the standard A new edition of the original groundbreaking book on the industry standard FinFET model BSIM CMG New to This Edition Includes a new chapter providing a comprehensive introduction to GAAFET including motivations device concepts structure benefits and the industry standard GAAFET model Covers the most recent developments in the BSIM CMG model Presents an updated RF modeling of FinFET using the BSIM CMG model including parameter extraction Includes a new chapter on cryogenic modeling

mm-Wave Silicon Technology Ali M. Niknejad, Hossein Hashemi, 2008-01-03 This book compiles and presents the research results from the past five years in mm wave Silicon circuits This area has received a great deal of interest from the research community including several university and research groups The book covers device modeling circuit building blocks phased array systems and antennas and packaging It focuses on the techniques that uniquely take advantage of the scale and integration offered by silicon based technologies

Nmr Probeheads For Biophysical And Biomedical Experiments: Theoretical Principles And Practical Guidelines (2nd Edition) Joel Mispelter, Mihaela Lupu, Andre Briguet, 2015-05-27 NMR Probeheads for Biophysical and Biomedical Experiments 2nd Edition is essential

reading for anyone in the field of NMR or MRI from students to medical or biological scientists performing experiments under certain physical and or geometrical conditions unattainable by conventional or available probes The material guides the reader through the most basic and comprehensive stages in accomplishing a correct probe design from a very basic oscillating circuit to much more elaborate designs This new edition has been revised and updated to include a chapter dedicated to RF components which are commonly used for probes realization and their frequency dependent characteristics Another completely revised chapter concerns the multiple coil systems and discusses arrays coils different decoupling methods and some principles for interfacing coils with low noise preamplifiers The principles of linear circuit analysis are presented in a dedicated chapter Last but not least accompanying files containing updated software for probe design have been made available from the publisher s website

Wireless Power Transmission for Sustainable Electronics Nuno Borges Carvalho, Apostolos Georgiadis, 2020-02-19 Provides a collection of works produced by COST Action IC1301 with the goal of achieving significant advances in the field of wireless power transmission This book constitutes together information from COST Action IC1301 a group of academic and industry experts seeking to align research efforts in the field of wireless power transmission WPT It begins with a discussion of backscatter as a solution for Internet of Things IoT devices and goes on to describe ambient backscattering sensors that use FM broadcasting for low cost and low power wireless applications The book also explores localization of passive RFID tags and augmented tags using nonlinearities of RFID chips It concludes with a review of methods of electromagnetic characterization of textile materials for the development of wearable antennas Wireless Power Transmission for Sustainable Electronics COST WiPE IC1301 covers textile supported wireless energy transfer and reviews methods for the electromagnetic characterization of textile materials for the development of wearable antennas It also looks at backscatter RFID sensor systems for remote health monitoring simultaneous localization of robots and objects and mapping SLAM autonomous system of wireless power distribution for static and moving nodes of wireless sensor networks and more Presents techniques for smart beam forming for on demand wireless power transmission WPT Discusses RF and microwave energy harvesting for space applications Describes miniaturized RFID transponders for object identification and sensing Wireless Power Transmission for Sustainable Electronics COST WiPE IC1301 is an excellent book for both graduate students and industry engineers involved in wireless communications and power transfer and sustainable materials for those fields

Antenna and Sensor Technologies in Modern Medical Applications Yahya Rahmat-Samii, Erdem Topsakal, 2021-02-25 A guide to the theory and recent development in the medical use of antenna technology Antenna and Sensor Technologies in Modern Medical Applications offers a comprehensive review of the theoretical background design and the latest developments in the application of antenna technology Written by two experts in the field the book presents the most recent research in the burgeoning field of wireless medical telemetry and sensing that covers both wearable and implantable antenna and sensor technologies The authors review the integrated devices that include various types of sensors

wired within a wearable garment that can be paired with external devices The text covers important developments in sensor integrated clothing that are synonymous with athletic apparel with built in electronics Information on implantable devices is also covered The book explores technologies that utilize both inductive coupling and far field propagation These include minimally invasive microwave ablation antennas wireless targeted drug delivery and much more This important book Covers recent developments in wireless medical telemetry Reviews the theory and design of in vitro in vivo testing Explores emerging technologies in 2D and 3D printing of antenna sensor fabrication Includes a chapter with an annotated list of the most comprehensive and important references in the field Written for students of engineering and antenna and sensor engineers Antenna and Sensor Technologies in Modern Medical Applications is an essential guide to understanding human body interaction with antennas and sensors

Electromagnetics For High Speed Analog And Digital Communication Circuits Book Review: Unveiling the Magic of Language

In an electronic era where connections and knowledge reign supreme, the enchanting power of language has become more apparent than ever. Its capability to stir emotions, provoke thought, and instigate transformation is truly remarkable. This extraordinary book, aptly titled "**Electromagnetics For High Speed Analog And Digital Communication Circuits**," compiled by a very acclaimed author, immerses readers in a captivating exploration of the significance of language and its profound affect our existence. Throughout this critique, we shall delve into the book is central themes, evaluate its unique writing style, and assess its overall influence on its readership.

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