

HSPICE® User Guide: Signal Integrity

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Hspice User Guide

JR Anderson



Hspice User Guide:

MOSFET Modeling & BSIM3 User's Guide Yuhua Cheng, Chenming Hu, 2007-05-08 Circuit simulation is essential in integrated circuit design and the accuracy of circuit simulation depends on the accuracy of the transistor model BSIM3v3 BSIM for Berkeley Short channel IGFET Model has been selected as the first MOSFET model for standardization by the Compact Model Council a consortium of leading companies in semiconductor and design tools In the next few years many fabless and integrated semiconductor companies are expected to switch from dozens of other MOSFET models to BSIM3 This will require many device engineers and most circuit designers to learn the basics of BSIM3 MOSFET Modeling BSIM3 User's Guide explains the detailed physical effects that are important in modeling MOSFETs and presents the derivations of compact model expressions so that users can understand the physical meaning of the model equations and parameters It is the first book devoted to BSIM3 It treats the BSIM3 model in detail as used in digital analog and RF circuit design It covers the complete set of models i e I V model capacitance model noise model parasitics model substrate current model temperature effect model and non quasi static model MOSFET Modeling BSIM3 User's Guide not only addresses the device modeling issues but also provides a user's guide to the device or circuit design engineers who use the BSIM3 model in digital analog circuit design RF modeling statistical modeling and technology prediction This book is written for circuit designers and device engineers as well as device scientists worldwide It is also suitable as a reference for graduate courses and courses in circuit design or device modelling Furthermore it can be used as a textbook for industry courses devoted to BSIM3 MOSFET Modeling BSIM3 User's Guide is comprehensive and practical It is balanced between the background information and advanced discussion of BSIM3 It is helpful to experts and students alike **HSPICE User's Manual**, 1996 [HSPICE User's Manual](#), 1992 *Nanoelectronic Device Applications Handbook* James E. Morris, Krzysztof Iniewski, 2017-11-22 Nanoelectronic Device Applications Handbook gives a comprehensive snapshot of the state of the art in nanodevices for nanoelectronics applications Combining breadth and depth the book includes 68 chapters on topics that range from nano scaled complementary metal oxide semiconductor CMOS devices through recent developments in nano capacitors and AlGaAs GaAs devices The contributors are world renowned experts from academia and industry from around the globe The handbook explores current research into potentially disruptive technologies for a post CMOS world These include Nanoscale advances in current MOSFET CMOS technology Nano capacitors for applications such as electronics packaging and humidity sensors Single electron transistors and other electron tunneling devices Quantum cellular automata and nanomagnetic logic Memristors as switching devices and for memory Graphene preparation properties and devices Carbon nanotubes CNTs both single CNT and random network Other CNT applications such as terahertz sensors interconnects and capacitors Nano system architectures for reliability Nanowire device fabrication and applications Nanowire transistors Nanodevices for spintronics The book closes with a call for a new generation of simulation tools to handle nanoscale mechanisms in realistic

nanodevice geometries This timely handbook offers a wealth of insights into the application of nanoelectronics It is an invaluable reference and source of ideas for anyone working in the rapidly expanding field of nanoelectronics Practical RF Amplifier Design and Performance Optimization with SPICE and Load- and Source-pull Techniques Amal Banerjee,2021-03-01 This book explains and demonstrates with an exhaustive set of design examples how common types of radio frequency RF amplifiers classes A B AB C D E F G and H can be designed and then have their performance characteristics evaluated and optimized with SPICE The author demonstrates the transient analysis features of SPICE along with industry standard load and source pull techniques to simulate the steady state long term time domain behavior of any test RF amplifier Describes methods for designing and evaluating optimizing the performance characteristics of an RF amplifier that circumvent the issues involved with existing traditional methods and don t require expensive high end software tools Includes C language executables for each RF amplifier type eliminating errors that might creep in while computing passive component capacitor inductor resistor values for a given RF amplifier type Demonstrates industry standard load and source pull schemes that can be included easily in text SPICE netlists allowing accurate calculation of impedance matching and impedance values at the input and output ports of the test RF amplifier eliminating messy error prone S parameter based calculations HSPICE User's Manual ,1996 **Power Distribution Network Design for VLSI** Qing K. Zhu,2004-02-19 A hands on troubleshooting guide for VLSI network designers The primary goal in VLSI very large scale integration power network design is to provide enough power lines across a chip to reduce voltage drops from the power pads to the center of the chip Voltage drops caused by the power network s metal lines coupled with transistor switching currents on the chip cause power supply noises that can affect circuit timing and performance thus providing a constant challenge for designers of high performance chips Power Distribution Network Design for VLSI provides detailed information on this critical component of circuit design and physical integration for high speed chips A vital tool for professional engineers especially those involved in the use of commercial tools as well as graduate students of engineering the text explains the design issues guidelines and CAD tools for the power distribution of the VLSI chip and package and provides numerous examples for its effective application Features of the text include An introduction to power distribution network design Design perspectives such as power network planning layout specifications decoupling capacitance insertion modeling and analysis Electromigration phenomena IR drop analysis methodology Commands and user interfaces of the VoltageStorm TM CAD tool Microprocessor design examples using on chip power distribution Flip chip and package design issues Power network measurement techniques from real silicon The author includes several case studies and a glossary of key words and basic terms to help readers understand and integrate basic concepts in VLSI design and power distribution

Strain-Engineered MOSFETs C.K. Maiti,T.K. Maiti,2018-10-03 Currently strain engineering is the main technique used to enhance the performance of advanced silicon based metal oxide semiconductor field effect transistors MOSFETs Written

from an engineering application standpoint Strain Engineered MOSFETs introduces promising strain techniques to fabricate strain engineered MOSFETs and to methods to assess the applications of these techniques The book provides the background and physical insight needed to understand new and future developments in the modeling and design of n and p MOSFETs at nanoscale This book focuses on recent developments in strain engineered MOSFETs implemented in high mobility substrates such as Ge SiGe strained Si ultrathin germanium on insulator platforms combined with high k insulators and metal gate It covers the materials aspects principles and design of advanced devices fabrication and applications It also presents a full technology computer aided design TCAD methodology for strain engineering in Si CMOS technology involving data flow from process simulation to process variability simulation via device simulation and generation of SPICE process compact models for manufacturing for yield optimization Microelectronics fabrication is facing serious challenges due to the introduction of new materials in manufacturing and fundamental limitations of nanoscale devices that result in increasing unpredictability in the characteristics of the devices The down scaling of CMOS technologies has brought about the increased variability of key parameters affecting the performance of integrated circuits This book provides a single text that combines coverage of the strain engineered MOSFETs and their modeling using TCAD making it a tool for process technology development and the design of strain engineered MOSFETs

Continuous System Modeling François E. Cellier, Jürgen

Greifeneder, 2013-03-14 Modeling and Simulation have become endeavors central to all disciplines of science and engineering They are used in the analysis of physical systems where they help us gain a better understanding of the functioning of our physical world They are also important to the design of new engineering systems where they enable us to predict the behavior of a system before it is ever actually built Modeling and simulation are the only techniques available that allow us to analyze arbitrarily non linear systems accurately and under varying experimental conditions Continuous System Modeling introduces the student to an important subclass of these techniques They deal with the analysis of systems described through a set of ordinary or partial differential equations or through a set of difference equations This volume introduces concepts of modeling physical systems through a set of differential and or difference equations The purpose is twofold it enhances the scientific understanding of our physical world by codifying organizing knowledge about this world and it supports engineering design by allowing us to assess the consequences of a particular design alternative before it is actually built This text has a flavor of the mathematical discipline of dynamical systems and is strongly oriented towards Newtonian physical science

Source-Synchronous Networks-On-Chip Ayan Mandal, Sunil P. Khatri, Rabi

Mahapatra, 2013-11-19 This book describes novel methods for network on chip NoC design using source synchronous high speed resonant clocks The authors discuss NoCs from the bottom up providing circuit level details before providing architectural simulations As a result readers will get a complete picture of how a NoC can be designed and optimized Using the methods described in this book readers are enabled to design NoCs that are 5X better than existing approaches in terms

of latency and throughput and can also sustain a significantly greater amount of traffic

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