Cntfet Logic Gate Design With Tolerance To Metallic Cnts

This book constitutes the refereed proceedings of the 16th International Symposium on VSLI Design and Test, VDAT 2012, held in Shibpur, India, in July 2012. The 30 revised regular papers presented together with 10 short papers and 13 poster sessions were carefully selected from 135 submissions. The papers are organized in topical sections on VLSI design, design and modeling of digital circuits and systems, testing and verification, design for testability, testing memories and regular logic arrays, embedded systems: hardware/software co-design and verification, emerging technology: nanoscale computing and nanotechnology.

This book presents the design of digital logic circuits using carbon nanotube field effect transistors (CNTFET). CNTFET is a promising device in the nanometer regime which utilizes a semiconducting carbon nanotube (CNT) channel between the source and drain terminals. Due to the excellent electrical properties of CNT it can offer very high speed integrated circuits. Starting with the basics of CNT and CNTFET this book discusses the modeling of CNTFET using Verilog-AMS language. The design of the basic logic gates is presented. The designs are simulated to verify their functionality and extract the speed and power performances. The design of reconfigurable logic circuits using transmission gate based logic is also presented. A ring oscillator circuit has been designed using CNTFET and it is found that the circuit can operate at very high frequency of 114 GHz.

Aggressive scaling of complementary metal oxide semiconductor (CMOS) has led to higher and higher integration density, the higher performance of devices, low power consumption and more complex function. However, it will eventually reach its limit to nanoscale size in near future. As device sizes approach the nanoscale, new opportunities arise from harnessing the physical properties at the nanoscale. Carbon Nanotubes are considered as the most promising carbon nanostructure material for nanoscale electronic device. In this research, a new model of carbon nanotube field-effect transistors (CNTFET) is proposed to design logic gate circuit. In this work, simulation approaches of tight binding method and density of states (DOS) of CNT have been developed and to explore device engineering issues for better transistor performance. By analyzing the electronic properties of CNT including energy dispersion relation, effective mass, doping, carrier concentration and temperature dependent bandgap, an optimum CNT has been considered in this research. An analytical current transport model has been developed to design a better performance CNTFET by analyzing charge, surface potential of the model. By using non equilibrium green function (NEGF) formulation, a better drain current has been achieved from the proposed CNTFET model. Finally a CNTFET model has been designed by using the analytical model parameter. From the details analysis of the device physics, CNT diameter is 1.95 nm and small band-gap is 0.44 eV have been achieved from the

graphene's chirality of (25, 0). From analytical model, drain current 69 μA, sub threshold swing (SS) 68mV/decade and drain induced barrier lowering (DIBL) 53.19mV/decade have been found with the channel length of 14 nano meter (nm) CNTFET. Current gain 45 dB, frequency 10 THz have been achieved from the simulation of the model by using 1.8 mS CNTFET transconductance. The logic gate circuit has been developed by using new model of CNTFET. Delay, power, power delay product (PDP), leakage current and frequency response have been simulated and compared.

Logic circuits are becoming increasingly susceptible to probabilistic behavior caused by external radiation and process variation. In addition, inherently probabilistic quantum- and nano-technologies are on the horizon as we approach the limits of CMOS scaling. Ensuring the reliability of such circuits despite the probabilistic behavior is a key challenge in IC design---one that necessitates a fundamental, probabilistic reformulation of synthesis and testing techniques. This monograph will present techniques for analyzing, designing, and testing logic circuits with probabilistic behavior.

"This book explores the methods and applications of converting semiconductor devices from micron technology to nanotechnology. It also examines existing CNTs, CNTFETs, and their applications and examines practical applications to minimize short channel effects and power dissipation in nanoscale devices and circuits" --

In recent years, research on microelectronics has been specifically focused on the proposition of efficient alternative methodologies and materials to fabricate feasible integrated circuits. This book provides a general background of thin film transistors and their simulations and constructions. The contents of the book are broadly classified into two topics: design and simulation of FETs and construction of FETs. All the authors anticipate that the provided chapters will act as a single source of reference for the design, simulation and construction of FETs. This edited book will help microelectronics researchers with their endeavors and would be a great addition to the realm of semiconductor physics.

The primary aim of this book is to discuss various aspects of nanoscale device design and their applications including transport mechanism, modeling, and circuit applications. Furthermore, the book develops a strong foundation to understand the need for moving from conventional MOSFET to novel devices, including, how the device physics and transport phenomenon changes with reduction in the device size to a nanoscale regime. Details about the simulation technique and/or fabrication process flow of the various nanoscale devices is included along with simulated results of device performance parameters. The numerical and theoretical methods are used to describe the related concepts.

This book provides a complete overview of the field of carbon nanotube electronics. It covers materials and physical properties, synthesis and fabrication processes, devices and circuits, modeling, and finally novel applications of nanotube-based electronics. The book introduces fundamental device physics

and circuit concepts of 1-D electronics. At the same time it provides specific examples of the state-of-the-art nanotube devices.

This book, gathering the Proceedings of the 2018 Computing Conference, offers a remarkable collection of chapters covering a wide range of topics in intelligent systems, computing and their real-world applications. The Conference attracted a total of 568 submissions from pioneering researchers, scientists, industrial engineers, and students from all around the world. These submissions underwent a double-blind peer review process. Of those 568 submissions, 192 submissions (including 14 poster papers) were selected for inclusion in these proceedings. Despite computer science's comparatively brief history as a formal academic discipline, it has made a number of fundamental contributions to science and society—in fact, along with electronics, it is a founding science of the current epoch of human history ('the Information Age') and a main driver of the Information Revolution. The goal of this conference is to provide a platform for researchers to present fundamental contributions, and to be a premier venue for academic and industry practitioners to share new ideas and development experiences. This book collects state of the art chapters on all aspects of Computer Science, from classical to intelligent. It covers both the theory and applications of the latest computer technologies and methodologies. Providing the state of the art in intelligent methods and techniques for solving real-world problems, along with a vision of future research, the book will be interesting and valuable for a broad readership.

This book is a collection of accepted papers that were presented at the International Conference on Communication and Computing Systems (ICCCS-2016), Dronacharya College of Engineering, Gurgaon, September 9–11, 2016. The purpose of the conference was to provide a platform for interaction between scientists from industry, academia and other areas of society to discuss the current advancements in the field of communication and computing systems. The papers submitted to the proceedings were peer-reviewed by 2-3 expert referees. This volume contains 5 main subject areas: 1. Signal and Image Processing, 2. Communication & Computer Networks, 3. Soft Computing, Intelligent System, Machine Vision and Artificial Neural Network, 4. VLSI & Embedded System, 5. Software Engineering and Emerging Technologies.

Computer Science and Multiple-Valued Logic: Theory and Applications focuses on the processes, methodologies, and approaches involved in multiple-valued logic and its

relationship to computer science. The selection first tackles an introduction to multiple-valued logic, lattice theory of post algebras, multiple-valued logic design and applications in binary computers, smallest many-valued logic for the treatment of complemented and uncomplemented error signals, and chain based lattices. Discussions focus on formulation, representation theory, theory and circuit design, logical tables, and unary operations. The text then examines multiple-valued signal processing with limiting, development of multiple-valued logic as related to computer science, p-algebras, and an algorithm for axiomatizing every finite logic. The book takes a look at completeness properties of multiple-valued logic algebras, computer simplification of multi-valued switching functions, and minimization of multivalued functions. Topics include generation of prime implicants, realizations, minimization algorithms, decomposition algorithm for multi-valued switching functions, and relation between the sum-of-products form and array of cubes. The selection is aimed at computer engineers, computer scientists, applied mathematicians, and physicists interested in multiple-valued logic as the discipline relates to computer engineering and computer science.

The brief primarily focuses on the performance analysis of CNT based interconnects in current research scenario. Different CNT structures are modeled on the basis of transmission line theory. Performance comparison for different CNT structures illustrates that CNTs are more promising than Cu or other materials used in global VLSI interconnects. The brief is organized into five chapters which mainly discuss: (1) an overview of current research scenario and basics of interconnects; (2) unique crystal structures and the basics of physical properties of CNTs, and the production, purification and applications of CNTs; (3) a brief technical review, the geometry and equivalent RLC parameters for different single and bundled CNT structures; (4) a comparative analysis of crosstalk and delay for different single and bundled CNT structures; and (5) various unique mixed CNT bundle structures and their equivalent electrical models.

This book brings together selective and specific chapters on nanoscale carbon and applications, thus making it unique due to its thematic content. It provides access to the contemporary developments in carbon nanomaterial research in electronic applications. Written by professionals with thorough expertise in similar broad area, the book is intended to address multiple aspects of carbon research in a single compiled edition. It targets professors, scientists and researchers belonging to the areas of physics, chemistry, engineering, biology and medicine, and working on theory, experiment and applications of carbon nanomaterials.

This issue of ECS Transactions features eight invited and sixty-seven regular papers on technology, devices, systems, optoelectronics, modeling and characterization; all either directly or indirectly related to microelectronics. The topics presented herein reveal the multidisciplinary character of this field, which definitely incites the highly cooperative trace of human nature.

Carbon Nanotube Field Effect Transistor (CNFET) technology has received a lot of attention in the past few years as a promising extension to silicon-CMOS for future digital logic integrated circuits. While recent research has advanced CNFET technology past many important milestones, robust and scalable solutions must be developed to realize the full potential of CNFETs. Thus, this thesis aims to develop a suite of

techniques, spanning from material synthesis to circuit solutions, compatible with very-large-scale integration (VLSI). Specifically, to enable the real-world engineering of carbon nanotube integrated circuits, this thesis presents (1) wafer-scale aligned CNT growth, (2) wafer-scale CNT Transfer, (3) wafer-scale device and circuit fabrication techniques, and (4) ACCNT, a VLSI-compatible circuit design solution to surmounting the problem of metallic CNTs. These techniques culminated in the successful demonstration of CNT transistors, inverters, and NAND logic gates on a wafer scale. Furthermore, this thesis sheds light on important design considerations for the demonstration of a simple CNT "computer" and suggests a few critical directions for future work in the field of carbon nanotube technology. In contributing the above, this thesis hopes to propel carbon nanotube technology forward towards the vision of robust, large-scale integrated circuits using high-density carbon nanotubes.

This book includes high-quality research papers presented at the 1st International Conference on Wireless Sensor Networks, Ubiquitous Computing and Applications (ICWSNUCA, 2021), which is held at Gokaraju Rangaraju Institute of Engineering and Technology, Hyderabad, India, during 26–27 February, 2021. This volume focuses on the applications, use-cases, architectures, deployments, and recent advances of wireless sensor networks as well as ubiquious computing. Different research topics are illustrated in this book, like wireless sensor networks for the Internet of Things; IoT applications for eHealth; smart cities; architectures for WSNs and IoT, WSNs hardware and new devices; low-power wireless technologies; wireless ad hoc sensor networks; routing and data transfer in WSNs; multicast communication in WSNs; security management in WSNs and in IoT systems; and power consumption optimization in WSNs.

Proceedings of the International Conference on Communication and Computing Systems (ICCCS 2016), Gurgaon, India, 9-11 September, 2016

16th International Symposium on VSLI Design and Test, VDAT 2012, Shipur, India, July 1-4, 2012, Proceedings

Nanoscale Devices

Computer Science and Multiple-Valued Logic

Carbon Nanotube Electronics

Ternary Digital System

Advances in Computer and Computational Sciences

CNTFET Logic Gate Design with Tolerance to Metallic CNTs

Digital Logic Design Using Carbon Nanotube Field Effect Transistors

Devices, Circuits and Applications

Innovations in Cyber Physical Systems

Proceedings of SIS 2021

Exchange of information and innovative ideas are necessary to accelerate the development of technology. With advent of technology, intelligent and soft computing techniques came into existence with a wide scope of implementation in engineering sciences. Keeping this ideology in preference, this book includes the insights that reflect the ‘Advances in Computer and Computational Sciences’ from upcoming researchers and leading academicians across the globe. It contains high-quality peer-reviewed papers of ‘International Conference on Computer, Communication and Computational Sciences (ICCCCS 2016),

held during 12-13 August, 2016 in Ajmer, India. These papers are arranged in the form of chapters. The content of the book is divided into two volumes that cover variety of topics such as intelligent hardware and software design, advanced communications, power and energy optimization, intelligent techniques used in internet of things, intelligent image processing, advanced software engineering, evolutionary and soft computing, security and many more. This book helps the perspective readers' from computer industry and academia to derive the advances of next generation computer and communication technology and shape them into real life applications.

This book discusses the opportunities offered by disruptive technologies to overcome the economical and physical limits currently faced by the electronics industry. It provides a new methodology for the fast evaluation of an emerging technology from an architectural prospective and discusses the implications from simple circuits to complex architectures. Several technologies are discussed, ranging from 3-D integration of devices (Phase Change Memories, Monolithic 3-D, Vertical NanoWires-based transistors) to dense 2-D arrangements (Double-Gate Carbon Nanotubes, Sublithographic Nanowires, Lithographic Crossbar arrangements). Novel architectural organizations, as well as the associated tools, are presented in order to explore this freshly opened design space.

Regular Nanofabrics in Emerging Technologies gives a deep insight into both fabrication and design aspects of emerging semiconductor technologies, that represent potential candidates for the post-CMOS era. Its approach is unique, across different fields, and it offers a synergetic view for a public of different communities ranging from technologists, to circuit designers, and computer scientists. The book presents two technologies as potential candidates for future semiconductor devices and systems and it shows how fabrication issues can be addressed at the design level and vice versa. The reader either for academic or research purposes will find novel material that is explained carefully for both experts and non-initiated readers. Regular Nanofabrics in Emerging Technologies is a survey of post-CMOS technologies. It explains processing, circuit and system level design for people with various backgrounds.

Analog Circuits, Digital VLSI Circuits, Neural Networks, Non Linear System, Computer Aided Design, Communication Systems, Digital Signal Processing, MEMS, Nano electronics

The primary aim of this book is to discuss various aspects of nanoscale device design and their applications including transport mechanism, modeling, and circuit applications. . Provides a platform for modeling and analysis of state-of-the-art devices in nanoscale regime, reviews issues related to optimizing the sub-nanometer device performance and addresses simulation aspect and/or fabrication process of devices Also, includes design problems at the end of each chapter

Nanotechnology: Advances and Real-Life Applications offers a comprehensive reference text about advanced concepts and applications in the field of nanotechnology. The text – written by researchers

practicing in the field – presents a detailed discussion of key concepts including nanomaterials and their synthesis, fabrication and characterization of nanomaterials, carbon-based nanomaterials, nano-bio interface, and nanoelectronics. The applications of nanotechnology in the fields of renewable energy, medicine and agriculture are each covered in a dedicated chapter. The text will be invaluable for senior undergraduate and graduate students in the fields of electrical engineering, electronics engineering, nanotechnology and nanoscience. Dr. Cherry Bhargava is an Associate Professor and Head, VLSI domain, at the School of Electrical and Electronics Engineering of Lovely Professional University, Jalandhar, India. Dr. Amit Sachdeva is an Associate Professor at Lovely Professional University, Jalandhar, India.

This book introduces readers to the emerging carbon nanotube field-effect transistor (CNTFET) technology, and examines the problem of designing efficient arithmetic circuits in CNTFET technology. Observing that CNTFETs make it possible to achieve two distinct threshold voltages merely by altering the diameter of the carbon nanotube used, the book begins by discussing the design of basic ternary logic elements. It then examines efficient CNTFET-based design of single and multiple ternary digit adders by judicious choice of unary operators in ternary logic, as well as the design of a ternary multiplier in CNTFET technology, and presents detailed simulation results in HSPICE. Lastly, the book outlines a procedure for automating the synthesis process and provides sample code in Python.

This book describes the bottleneck faced soon by designers of traditional CMOS devices, due to device scaling, power and energy consumption, and variability limitations. This book aims at bridging the gap between device technology and architecture/system design. Readers will learn about challenges and opportunities presented by "beyond-CMOS devices" and gain insight into how these might be leveraged to build energy-efficient electronic systems.

Regular Nanofabrics in Emerging Technologies
2018 International Symposium on Devices, Circuits and Systems (ISDCS)
Theory and Applications
Proceedings of 6th International Conference on Recent Trends in Computing
Design, Analysis and Test of Logic Circuits Under Uncertainty
Nanotechnology
Advances and Real-Life Applications
ICRTC 2020
Smart and Intelligent Systems
Fundamentals of Nanotransistors
Compact Modeling
Proceedings of International Conference on Frontiers in Computing and Systems

SDCS is a premier networking and exchange forum for researchers in the highly active fields of theory, design and implementation of devices, circuits and systems ISDCS 2018 focuses on the recent innovation of Devices, Circuits and Systems to highlight the strong foundation in

methodology and the integration of multidisciplinary approaches The Scientists, Researchers and engineers are globally innovating to change the way in which devices and circuits are understood, optimized, and leveraged in a variety of systems and applications

This book describes methodologies in the design of VLSI devices, circuits and their applications at nanoscale levels. The book begins with the discussion on the dominant role of power dissipation in highly scaled devices.The 15 Chapters of the book are classified under four sections that cover design, modeling, and simulation of electronic, magnetic and compound semiconductors for their applications in VLSI devices, circuits, and systems. This comprehensive volume eloquently presents the design methodologies for ultra–low power VLSI design, potential post–CMOS devices, and their applications from the architectural and system perspectives. The book shall serve as an invaluable reference book for the graduate students, Ph.D./ M.S./ M.Tech. Scholars, researchers, and practicing engineers working in the frontier areas of nanoscale VLSI design.

Advances in Nanotechnology Research and Application / 2012 Edition is a ScholarlyEditions™ eBook that delivers timely, authoritative, and comprehensive information about Nanotechnology. The editors have built Advances in Nanotechnology Research and Application / 2012 Edition on the vast information databases of ScholarlyNews.™ You can expect the information about Nanotechnology in this eBook to be deeper than what you can access anywhere else, as well as consistently reliable, authoritative, informed, and relevant. The content of Advances in Nanotechnology Research and Application / 2012 Edition has been produced by the world's leading scientists, engineers, analysts, research institutions, and companies. All of the content is from peer-reviewed sources, and all of it is written, assembled, and edited by the editors at ScholarlyEditions™ and available exclusively from us. You now have a source you can cite with authority, confidence, and credibility. More information is available at http://www.ScholarlyEditions.com/.

This book is a collection of high-quality peer-reviewed research papers presented at Sixth International Conference on Recent Trends in Computing (ICRTC 2020) held at SRM Institute of Science and Technology, Ghaziabad, Delhi, India, during 3 -4 July 2020. The book discusses a wide variety of industrial, engineering and scientific applications of the emerging techniques. The book presents original works from researchers from academic and industry in the field of networking, security, big data and the Internet of things.

Offering first-hand insights by top scientists and industry experts at the forefront of R&D into nanoelectronics, this book neatly links the underlying technological principles with present and future applications. A brief introduction is followed by an overview of present and emerging logic devices, memories and power technologies. Specific chapters are dedicated to the enabling factors, such as new materials, characterization techniques, smart manufacturing and advanced circuit design. The second part of the book provides detailed coverage of the current state and showcases real future applications in a wide range of fields: safety, transport, medicine, environment, manufacturing, and social life, including an analysis of emerging trends in the internet of things and cyber-physical systems. A survey of main economic factors and trends concludes the book. Highlighting the importance of nanoelectronics in the core fields of communication and information technology, this is essential reading for materials scientists, electronics and electrical engineers, as well as those working in the semiconductor and sensor industries.

Most of the recent texts on compact modeling are limited to a particular class of semiconductor devices and do not provide comprehensive coverage of the field. Having a single comprehensive

reference for the compact models of most commonly used semiconductor devices (both active and passive) represents a significant advantage for the reader. Indeed, several kinds of semiconductor devices are routinely encountered in a single IC design or in a single modeling support group. Compact Modeling includes mostly the material that after several years of IC design applications has been found both theoretically sound and practically significant. Assigning the individual chapters to the groups responsible for the definitive work on the subject assures the highest possible degree of expertise on each of the covered models.

While theories based on classical physics have been very successful in helping experimentalists design microelectronic devices, new approaches based on quantum mechanics are required to accurately model nanoscale transistors and to predict their characteristics even before they are fabricated. Advanced Nanoelectronics provides research information on advanced nanoelectronics concepts, with a focus on modeling and simulation. Featuring contributions by researchers actively engaged in nanoelectronics research, it develops and applies analytical formulations to investigate nanoscale devices. The book begins by introducing the basic ideas related to quantum theory that are needed to better understand nanoscale structures found in nanoelectronics, including graphenes, carbon nanotubes, and quantum wells, dots, and wires. It goes on to highlight some of the key concepts required to understand nanotransistors. These concepts are then applied to the carbon nanotube field effect transistor (CNTFET). Several chapters cover graphene, an unzipped form of CNT that is the recently discovered allotrope of carbon that has gained a tremendous amount of scientific and technological interest. The book discusses the development of the graphene nanoribbon field effect transistor (GNRFET) and its use as a possible replacement to overcome the CNT chirality challenge. It also examines silicon nanowire (SiNW) as a new candidate for achieving the downscaling of devices. The text describes the modeling and fabrication of SiNW, including a new top-down fabrication technique. Strained technology, which changes the properties of device materials rather than changing the device geometry, is also discussed. The book ends with a look at the technical and economic challenges that face the commercialization of nanoelectronics and what universities, industries, and government can do to lower the barriers. A useful resource for professionals, researchers, and scientists, this work brings together state-of-the-art technical and scientific information on important topics in advanced nanoelectronics.

Have you ever puzzled over how to perform Boolean logic at the atomic scale? Or wondered how you can carry out more general calculations in one single molecule or using a surface dangling bond atomic scale circuit? This volume gives you an update on the design of single molecule devices, such as recitfiers, switches and transistors, more advanced semi-classical an quantum boolean gates integrated in a single molecule or constructed atom by atom on a passivated semi-conductor surface and describes their interconnections with adapted nano-scal wiring. The main contributors to the field of single molecule logic gates and surface dangling bond atomic scale circuits theory and design, were brought together for the first time to contribute on topics such as molecule circuits, surface dangling bond circuits, quantum controlled logic gates and molecular qubits. Contributions in this volume originate from the Barcelona workshop of the AtMol conference series, held from January 12-13 2012.

Select Proceedings of VCAS 2019

Beyond-CMOS Technologies for Next Generation Computer Design

From Device to System Level

Proceedings of ICCCCS 2016

Microelectronics Technology and Devices - SBMicro 2009

Principles, Techniques and Applications
Architecture and Design of Molecule Logic Gates and Atom Circuits
Design and Fabrication Methods for Nanoscale Digital Circuits
COMSYS 2020
Low-Complexity Arithmetic Circuit Design in Carbon Nanotube Field Effect Transistor Technology
Proceedings of ICWSNUCA 2021
Materials, Devices, Applications, 2 Volumes

This book gathers outstanding research papers presented at the International Conference on Frontiers in Computing and Systems (COMSYS 2020), held on January 13-15, 2019 at Jalpaiguri Government Engineering College, West Bengal, India and jointly organized by the Department of Computer Science & Engineering and Department of Electronics & Communication Engineering. The book presents the latest research and results in various fields of machine learning, computational intelligence, VLSI, networks and systems, computational biology, and security, making it a rich source of reference material for academia and industry alike

The transistor is the key enabler of modern electronics. Progress in transistor scaling has pushed channel lengths to the nanometer regime where traditional approaches to device physics are less and less suitable. These lectures describe a way of understanding MOSFETs and other transistors that is much more suitable than traditional approaches when the critical dimensions are measured in nanometers. It uses a novel, "bottom-up approach" that agrees with traditional methods when devices are large, but that also works for nano-devices. Surprisingly, the final result looks much like the traditional, textbook, transistor models, but the parameters in the equations have simple, clear interpretations at the nanoscale. The objective is to provide readers with an understanding of the essential physics of nanoscale transistors as well as some of the practical technological considerations and fundamental limits. This book is written in a way that is broadly accessible to students with only a very basic knowledge of semiconductor physics and electronic circuits. Complemented with online lecture by Prof Lundstrom: nanoHUB-U Nanoscale Transistor Contents:MOSFET Fundamentals:OverviewThe Transistor as a Black BoxThe MOSFET: A Barrier-Controlled DeviceMOSFET IV: Traditional ApproachMOSFET IV: The Virtual Source ModelMOS Electrostatics:Poisson Equation and the Depletion ApproximationGate Voltage and Surface PotentialMobile Charge: Bulk MOSMobile Charge: Extremely Thin SOI2D MOS ElectrostaticsThe VS Model RevisitedThe Ballistic MOSFET:The Landauer Approach to TransportThe Ballistic MOSFETThe Ballistic Injection VelocityConnecting the Ballistic and VS ModelsTransmission Theory of the MOSFET:Carrier Scattering and TransmissionTransmission Theory of the MOSFETConnecting the Transmission and VS ModelsVS Characterization of Transport in NanotransistorsLimits and Limitations Readership: Any student and professional with an undergraduate degree in the physical sciences or engineering.

Ternary digital system is commonly known as three valued digital system.Three valued logic is an elementary set of Multiple Valued Logic, which is introduced in the book at the beginning. The book provides a detail overview of every concept required for the design and applications of ternary circuits. It covers the basic concepts for ternary logic fundamentals,ternary logic gates, its logic gate truth tables, Boolean rules for ternary logic up to ternary logic families, function synthesis and minimization techniques and an applications like one trit T-ALU, Two

trit T-ALU Slice, Ternary R-S and D memory elements and an analog to ternary converter for DSP application as a fundamental block are developed and simulated using EDA tool. Finally computer simulation using EDA (Electronic Design Automation) tools like Tanner, spice and VHDL is also illustrated. In the first half of 19 th century G.Boolean have proposed the Algebra for two valued (Binary logic) system after that Shanon has expressed the behavior of electrical switches in terms of Boolean algebra and he paved the ramp to an industrial development that is recognized as initiating one of the most revolutionary economic changes ever. MVL is also known as Multi-Valued, Multiple-Valued or Many-Valued logic. Multi-Value logic is regarded as a switch with more than two states. Such as a 3- value switch with states '0', '1' and '2'. Or a 4-value switch with states '0', '1', '2' and '3'. In case of 3-Valued logic the term ternary logic is used & term quaternary logic for 4-Valued logic. Alexander (1964) showed that the most efficient radix for implementation of switching systems is the natural base (e ?2.71828), it seems likely that the best integral radix is 3 rather than 2.It should be noted that this book emphasis on Ternary logic with concepts and applications. The fundamental work on Multiple Valued Logic (MVL) System was done by E.L.Post in the beginning of 19 th centuries and based on that work P.C.Rosen Bloom modeled the Algebra for MVL is called Post Algebra.

This book comprises select peer-reviewed papers from the International Conference on VLSI, Communication and Signal processing (VCAS) 2019, held at Motilal Nehru National Institute of Technology (MNNIT) Allahabad, Prayagraj, India. The contents focus on latest research in different domains of electronics and communication engineering, in particular microelectronics and VLSI design, communication systems and networks, and signal and image processing. The book also discusses the emerging applications of novel tools and techniques in image, video and multimedia signal processing. This book will be useful to students, researchers and professionals working in the electronics and communication domain.

Nanoscale VLSI
Nanoelectronics
Disruptive Logic Architectures and Technologies
A New Carbon Nanotube Model for High Performance Logic Gates Circuit
IoT and Analytics for Sensor Networks
Proceedings of the 2nd AtMol European Workshop
Intelligent Computing
Advances in VLSI, Communication, and Signal Processing
2018 IEEE 61st International Midwest Symposium on Circuits and Systems (MWSCAS)
Carbon Nanotube Based VLSI Interconnects
Analysis and Design