

# Cmos Current Mode Circuits For Data Communications

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## **VLSI Design** - Esteban Tlelo-Cuautle 2012-01-20

This book provides some recent advances in design nanometer VLSI chips. The selected topics try to present some open problems and challenges with important topics ranging from design tools, new post-silicon devices, GPU-based parallel computing, emerging 3D integration, and antenna design. The book consists of two parts, with chapters such as: VLSI design for multi-sensor smart systems on a chip, Three-dimensional integrated circuits design for thousand-core processors, Parallel symbolic analysis of large analog circuits on GPU platforms, Algorithms for CAD tools VLSI design, A multilevel memetic algorithm for large SAT-encoded problems, etc.

## **Low-Frequency Noise in Advanced MOS Devices** - Martin Haartman 2007-08-23

This is an introduction to noise, describing fundamental noise sources and basic circuit analysis, discussing characterization of low-frequency noise and offering practical advice that bridges concepts of noise theory and modelling, characterization, CMOS technology and circuits. The text offers the latest research, reviewing the most recent publications and conference presentations. The book concludes with an introduction to noise in analog/RF circuits and describes how low-frequency noise can affect these circuits.

## *Intelligent Computing and Applications* - Durbadal Mandal 2015-02-23

The idea of the 1st International Conference on Intelligent Computing and Applications (ICICA 2014) is to bring the Research Engineers, Scientists, Industrialists, Scholars and Students together from in and around the globe to present the on-going research activities and hence to encourage research interactions between universities and industries. The conference provides opportunities for the delegates to exchange new ideas, applications and experiences, to establish research relations and to find global partners for future collaboration. The proceedings covers latest progresses in the cutting-edge research on various research areas of Image, Language Processing, Computer Vision and Pattern Recognition, Machine Learning, Data Mining and Computational Life Sciences, Management of Data including Big Data and Analytics, Distributed and Mobile Systems including Grid and Cloud infrastructure, Information Security and Privacy, VLSI, Electronic Circuits, Power Systems, Antenna, Computational fluid dynamics & Heat transfer, Intelligent Manufacturing, Signal Processing, Intelligent Computing, Soft Computing, Bio-informatics, Bio Computing, Web Security, Privacy and E-Commerce, E-governance, Service Orient Architecture, Data Engineering, Open Systems, Optimization, Communications, Smart wireless and sensor Networks, Smart Antennae, Networking and

Information security, Machine Learning, Mobile Computing and Applications, Industrial Automation and MES, Cloud Computing, Green IT, IT for Rural Engineering, Business Computing, Business Intelligence, ICT for Education for solving hard problems, and finally to create awareness about these domains to a wider audience of practitioners.

Interleaving Concepts for Digital-to-Analog Converters - Christian Schmidt 2019-07-19

Modern complementary metal oxide semiconductor (CMOS) digital-to-analog converters (DACs) are limited in their bandwidth due to technological constraints. These limitations can be overcome by parallel DAC architectures, which are called interleaving concepts. Christian Schmidt analyzes the limitations and the potential of two innovative DAC interleaving concepts to provide the basis for a practical implementation: the analog multiplexing DAC (AMUX-DAC) and the frequency interleaving DAC (FI-DAC). He presents analytical and discrete-time models as a theoretical foundation and develops digital signal processing (DSP) algorithms to compensate the analog impairments. Further, he quantifies the impact of various limiting parameters with numerical simulations and verifies both concepts in laboratory experiments. About the Author: Christian Schmidt works at the Fraunhofer Heinrich-Hertz-Institute, Berlin, Germany, on innovative solutions for broadband signal generation in the field of optical communications. The studies for his dissertation were carried out at the Technische Universität Berlin and at the Fraunhofer Heinrich-Hertz-Institute, both Berlin, Germany.

Adaptive Multi-Standard RF Front-Ends - Vojkan Vidojkovic 2008-02-07

This book investigates solutions, benefits, limitations, and costs associated with multi-standard operation of RF front-ends and their ability to adapt to variable radio environments. Next, it highlights the optimization of RF front-ends to allow maximum performance within a certain power budget, while targeting full integration. Finally, the book investigates possibilities for low-voltage, low-power circuit topologies in CMOS technology.

CMOS Active Inductors and Transformers - Fei Yuan 2008-06-17

Many new topologies and circuit design techniques have emerged

recently to improve the performance of active inductors, but a comprehensive treatment of the theory, topology, characteristics, and design constraint of CMOS active inductors and transformers, and a detailed examination of their emerging applications in high-speed analog signal processing and data communications over wire and wireless channels, is not available. This book is an attempt to provide an in-depth examination and a systematic presentation of the operation principles and implementation details of CMOS active inductors and transformers, and a detailed examination of their emerging applications in high-speed analog signal processing and data communications over wire and wireless channels. The content of the book is drawn from recently published research papers and are not available in a single, cohesive book. Equal emphasis is given to the theory of CMOS active inductors and transformers, and their emerging applications. Major subjects to be covered in the book include: inductive characteristics in high-speed analog signal processing and data communications, spiral inductors and transformers - modeling and limitations, a historical perspective of device synthesis, the topology, characterization, and implementation of CMOS active inductors and transformers, and the application of CMOS active inductors and transformers in high-speed analog and digital signal processing and data communications.

**Precision Temperature Sensors in CMOS Technology** - Micheal A.P. Pertijs 2006-12-06

This book describes the analysis and design of precision temperature sensors in CMOS IC technology, focusing on so-called smart temperature sensors, which provide a digital output signal that can be readily interpreted by a computer. The text shows how temperature characteristics can be used to obtain an accurate digital temperature reading. The book ends with a detailed description of three prototypes, one of which achieves the best performance reported to date.

CMOS Data Converters for Communications - Mikael Gustavsson 2006-04-18

CMOS Data Converters for Communications distinguishes itself from other data converter books by emphasizing system-related aspects of the

design and frequency-domain measures. It explains in detail how to derive data converter requirements for a given communication system (baseband, passband, and multi-carrier systems). The authors also review CMOS data converter architectures and discuss their suitability for communications. The rest of the book is dedicated to high-performance CMOS data converter architecture and circuit design. Pipelined ADCs, parallel ADCs with an improved passive sampling technique, and oversampling ADCs are the focus for ADC architectures, while current-steering DAC modeling and implementation are the focus for DAC architectures. The principles of the switched-current and the switched-capacitor techniques are reviewed and their applications to crucial functional blocks such as multiplying DACs and integrators are detailed. The book outlines the design of the basic building blocks such as operational amplifiers, comparators, and reference generators with emphasis on the practical aspects. To operate analog circuits at a reduced supply voltage, special circuit techniques are needed. Low-voltage techniques are also discussed in this book. CMOS Data Converters for Communications can be used as a reference book by analog circuit designers to understand the data converter requirements for communication applications. It can also be used by telecommunication system designers to understand the difficulties of certain performance requirements on data converters. It is also an excellent resource to prepare analog students for the new challenges ahead.

**IoT and Low-Power Wireless** - Christopher Siu 2018-06-14

The book offers unique insight into the modern world of wireless communication that included 5G generation, implementation in Internet of Things (IoT), and emerging biomedical applications. To meet different design requirements, gaining perspective on systems is important. Written by international experts in industry and academia, the intended audience is practicing engineers with some electronics background. It presents the latest research and practices in wireless communication, as industry prepares for the next evolution towards a trillion interconnected devices. The text further explains how modern RF wireless systems may

handle such a large number of wireless devices. Covers modern wireless technologies (5G, IoT), and emerging biomedical applications. Discusses novel RF systems, CMOS low power circuit implementation, antennae arrays, circuits for medical imaging, and many other emerging technologies in wireless co-space. Written by a mixture of top industrial experts and key academic professors.

**CMOS Current Amplifiers** - Kimmo Koli 2002-04-30

This "current-amplifier cookbook" contains an extensive review of different current amplifier topologies realisable with modern CMOS integration technologies. The book derives the seldom-discussed issue of high-frequency distortion performance for all reviewed amplifier topologies, using as simple and intuitive mathematical methods as possible.

**Advances in Smart Grid Automation and Industry 4.0** - M. Jaya Bharata Reddy 2021-04-21

This book comprises select proceedings of the International Conference on Emerging Trends for Smart Grid Automation and Industry 4.0 (ICETSGAI4.0 2019). The contents discuss the recent trends in smart grid technology and related applications. The topics covered include data analytics for smart grid operation and control, integrated power generation technologies, green technologies as well as advances in microgrid operation and planning. The book highlights the enhancement in technology in the field of smart grids, and how IoT, big data, robotics and automation, artificial intelligence, and wide area measurement have become prerequisites for the fourth industrial revolution, also known as Industry 4.0. The book can be a valuable reference for researchers and professionals interested in smart grid automation incorporating features of Industry 4.0.

**CMOS Time-Mode Circuits and Systems** - Fei Yuan 2018-09-03

Time-mode circuits, where information is represented by time difference between digital events, offer a viable and technology-friendly means to realize mixed-mode circuits and systems in nanometer complementary metal-oxide semiconductor (CMOS) technologies. Various architectures of time-based signal processing and design techniques of CMOS time-

mode circuits have emerged; however, an in-depth examination of the principles of time-based signal processing and design techniques of time-mode circuits has not been available—until now. CMOS Time-Mode Circuits and Systems: Fundamentals and Applications is the first book to deliver a comprehensive treatment of CMOS time-mode circuits and systems. Featuring contributions from leading experts, this authoritative text contains a rich collection of literature on time-mode circuits and systems. The book begins by presenting a critical comparison of voltage-mode, current-mode, and time-mode signaling for mixed-mode signal processing and then: Covers the fundamentals of time-mode signal processing, such as voltage-to-time converters, all-digital phase-locked loops, and frequency synthesizers Investigates the performance characteristics, architecture, design techniques, and implementation of time-to-digital converters Discusses time-mode delta-sigma-based analog-to-digital converters, placing a great emphasis on time-mode quantizers Includes a detailed study of ultra-low-power integrated time-mode temperature measurement systems CMOS Time-Mode Circuits and Systems: Fundamentals and Applications provides a valuable reference for circuit design engineers, hardware system engineers, graduate students, and others seeking to master this fast-evolving field.

CMOS Circuits for Passive Wireless Microsystems - Fei Yuan 2010-10-28

This book provides a comprehensive treatment of CMOS circuits for passive wireless microsystems. Major topics include: an overview of passive wireless microsystems, design challenges of passive wireless microsystems, fundamental issues of ultra-low power wireless communications, radio-frequency power harvesting, ultra-low power modulators and demodulators, ultra-low power temperature-compensated current and voltage references, clock generation and remote calibration, and advanced design techniques for ultra low-power analog signal processing.

**Advances in Power Systems and Energy Management** - Amik Garg 2017-11-28

This book is a collection of research articles and critical review articles, describing the overall approach to energy management. The book

emphasizes the technical issues that drive energy efficiency in context of power systems. This book contains case studies with and without solutions on modelling, simulation and optimization techniques. It covers some innovative topics such as medium voltage (MV) back-to-back (BTB) system, cost optimization of a ring frame unit in textile industry, rectenna for radio frequency (RF) energy harvesting, ecology and energy dimension in infrastructural designs, 2.4 kW three-phase inverter for aircraft application, study of automatic generation control (AGC) in a two area hydrothermal power system, energy-efficient and reliable depth-based routing protocol for underwater wireless sensor network, and power line communication using LabVIEW. This book is primarily targeted at researchers and senior graduate students, but is also highly useful for the industry professional and scientists.

*Low-Power High-Speed ADCs for Nanometer CMOS Integration* - Zhiheng Cao 2008-07-15

Low-Power High-Speed ADCs for Nanometer CMOS Integration is about the design and implementation of ADC in nanometer CMOS processes that achieve lower power consumption for a given speed and resolution than previous designs, through architectural and circuit innovations that take advantage of unique features of nanometer CMOS processes. A phase lock loop (PLL) clock multiplier has also been designed using new circuit techniques and successfully tested. 1) A 1.2V, 52mW, 210MS/s 10-bit two-step ADC in 130nm CMOS occupying 0.38mm<sup>2</sup>. Using offset canceling comparators and capacitor networks implemented with small value interconnect capacitors to replace resistor ladder/multiplexer in conventional sub-ranging ADCs, it achieves 74dB SFDR for 10MHz and 71dB SFDR for 100MHz input. 2) A 32mW, 1.25GS/s 6-bit ADC with 2.5GHz internal clock in 130nm CMOS. A new type of architecture that combines flash and SAR enables the lowest power consumption, 6-bit >1GS/s ADC reported to date. This design can be a drop-in replacement for existing flash ADCs since it does not require any post-processing or calibration step and has the same latency as flash. 3) A 0.4ps-rms-jitter (integrated from 3kHz to 300MHz offset for >2.5GHz) 1-3GHz tunable, phase-noise programmable clock-multiplier PLL for generating sampling

clock to the SAR ADC. A new loop filter structure enables phase error preamplification to lower PLL in-band noise without increasing loop filter capacitor size.

*Ultra Low Power Capacitive Sensor Interfaces* - Wouter Bracke  
2007-06-15

This book describes ultra low power capacitive sensor interfaces, and presents the realization of a very low power generic sensor interface chip that is adaptable to a broad range of capacitive sensors. The book opens by reviewing important design aspects for autonomous sensor systems, discusses different building blocks, and presents the modular architecture for the generic sensor interface chip. Finally, the generic sensor interface chip is shown in state-of-the-art applications.

*Injection-Locking in Mixed-Mode Signal Processing* - Fei Yuan  
2019-05-17

This book provides readers with a comprehensive treatment of the principles, circuit design techniques, and applications of injection-locking in mixed-mode signal processing, with an emphasis on CMOS implementation. Major topics include: An overview of injection-locking, the principle of injection-locking in harmonic and non-harmonic oscillators, lock range enhancement techniques for harmonic oscillators, lock range enhancement techniques for non-harmonic oscillators, and the emerging applications of injection-locking in mixed-mode signal processing. Provides a single-source reference to the principles, circuit design techniques, and applications of injection-locking in mixed-mode signal processing; Includes a rich collection of design techniques for increasing the lock range of oscillators under injection, along with in-depth examination of the pros and cons of these methods; Enables a broad range of applications, such as passive wireless microsystems, forwarded-clock parallel data links, frequency synthesizers for wireless and wireline communications, and low phase noise phase-locked loops.

**Analog-Baseband Architectures and Circuits for Multistandard and Low-Voltage Wireless Transceivers** - Pui-In Mak 2007-09-07

This book presents architectural and circuit techniques for wireless transceivers to achieve multistandard and low-voltage compliance. It

provides an up-to-date survey and detailed study of the state-of-the-art transceivers for modern single- and multi-purpose wireless communication systems. The book includes comprehensive analysis and design of multimode reconfigurable receivers and transmitters for an efficient multistandard compliance.

**Low Power UWB CMOS Radar Sensors** - Hervé Paulino 2008-04-30

Low Power UWB CMOS Radar Sensors deals with the problem of designing low cost CMOS radar sensors. The radar sensor uses UWB signals in order to obtain a reasonable target separation capability, while maintaining a maximum signal frequency below 2 GHz. This maximum frequency value is well within the reach of current CMOS technologies. The use of UWB signals means that most of the methodologies used in the design of circuits and systems that process narrow band signals, can no longer be applied. Low Power UWB CMOS Radar Sensors provides an analysis between the interaction of UWB signals, the antennas and the processing circuits. This analysis leads to some interesting conclusions on the types of antennas and types of circuits that should be used. A methodology to compare the noise performance of UWB processing circuits is also derived. This methodology is used to analyze and design the constituting circuits of the radar transceiver. In order to validate the design methodology a CMOS prototype is designed and experimentally evaluated.

**Substrate Noise Coupling in RFICs** - Ahmed Helmy 2008-03-23

The book reports modeling and simulation techniques for substrate noise coupling effects in RFICs and introduces isolation structures and design guides to mitigate such effects with the ultimate goal of enhancing the yield of RF and mixed signal SoCs. The book further reports silicon measurements, and new test and noise isolation structures. To the authors' knowledge, this is the first title devoted to the topic of substrate noise coupling in RFICs as part of a large SoC.

CMOS Single Chip Fast Frequency Hopping Synthesizers for Wireless Multi-Gigahertz Applications - Taoufik Bourdi 2007-03-06

In this book, the authors outline detailed design methodology for fast frequency hopping synthesizers for RF and wireless communications

applications. There is great emphasis on fractional-N delta-sigma based phase locked loops from specifications, system analysis and architecture planning to circuit design and silicon implementation. The developed techniques in the book can help in designing very low noise, high speed fractional-N frequency synthesizers.

*Low Power Circuits for Emerging Applications in Communications, Computing, and Sensing* - Fei Yuan 2018-12-07

The book addresses the need to investigate new approaches to lower energy requirement in multiple application areas and serves as a guide into emerging circuit technologies. It explores revolutionary device concepts, sensors, and associated circuits and architectures that will greatly extend the practical engineering limits of energy-efficient computation. The book responds to the need to develop disruptive new system architectures, circuit microarchitectures, and attendant device and interconnect technology aimed at achieving the highest level of computational energy efficiency for general purpose computing systems. Features Discusses unique technologies and material only available in specialized journal and conferences Covers emerging applications areas, such as ultra low power communications, emerging bio-electronics, and operation in extreme environments Explores broad circuit operation, ex. analog, RF, memory, and digital circuits Contains practical applications in the engineering field, as well as graduate studies Written by international experts from both academia and industry

**Design of High Voltage xDSL Line Drivers in Standard CMOS** - Bert Serneels 2008-01-08

This book fits in the quest for highly efficient fully integrated xDSL modems for central office applications. It presents a summary of research at one of Europe's most famous analog design research groups over a five year period. The book focuses on the line driver, the most demanding building block of the xDSL modem for lowering power. The book covers the total design flow of monolithic CMOS high voltage circuits. It is essential reading for analog design engineers.

*Metallurgie der Stahlherstellung* - Franz Oeters 1989

Application Specific Integrated Circuits - Edward Fisher 2019-04-17

The field of application-specific integrated circuits (ASICs) is fast-paced being at the very forefront of modern nanoscale fabrication and presents a deeply engaging career path. ASICs can provide us with high-speed computation in the case of digital circuits. For example, central processing units, graphics processing units, field-programmable gate arrays, and custom-made digital signal processors are examples of ASICs and the transistors they are fabricated from. We can use that same technology complementary metal-oxide semiconductor processes to implement high-precision sensing of or interfacing to the world through analog-to-digital converters, digital-to-analog converters, custom image sensors, and highly integrated micron-scale sensors such as magnetometers, accelerometers, and microelectromechanical machines. ASIC technologies now transitioning toward magneto-resistive and phase-changing materials also offer digital memory capacities that have aided our technological progress. Combining these domains, we have moved toward big data analytics and the new era of artificial intelligence and machine learning. This book provides a small selection of chapters covering aspects of ASIC development and the surrounding business model.

**CMOS Current-Mode Circuits for Data Communications** - Fei Yuan 2007-04-26

This book deals with the analysis and design of CMOS current-mode circuits for data communications. CMOS current-mode sampled-data networks, i.e. switched-current circuits, are excluded. Major subjects covered in the book include: a critical comparison of voltage-mode and current-mode circuits; the building blocks of current-mode circuits: design techniques; modeling of wire channels, electrical signaling for Gbps data communications; ESD protection for current-mode circuits and more. This book will appeal to IC design engineers, hardware system engineers and others.

**IQ Calibration Techniques for CMOS Radio Transceivers** - Sao-Jie Chen 2006-09-22

The 802.11n wireless standard uses 64-state quadrature amplitude

modulation (64-QAM) to achieve higher spectral efficiency. Consequently, the transmitter and receiver require a higher signal to noise ratio with the same level of error rate performance. This book offers a fully-analog compensation technique without baseband circuitry to control the calibration process. Using an 802.11g transceiver design as an example, it describes in detail an auto-calibration mechanism for I/Q gains and phases imbalance.

Switched-Capacitor Techniques for High-Accuracy Filter and ADC Design  
- Patrick J. Quinn 2007-07-20

This book proposes alternative switched capacitor techniques which allow the achievement of higher intrinsic analogue functional accuracy than previously possible in such application areas as analogue filter and ADC design. The validity of the concepts developed and analyzed in Switched-Capacitor Techniques for High-Accuracy Filter and ADC Design has been demonstrated in practice with the design of CMOS SC bandpass filters and algorithmic ADC stages.

**Full-Chip Nanometer Routing Techniques** - Tsung-Yi Ho 2007-08-30

This book presents a novel multilevel full-chip router, namely mSIGMA for SIGnal-integrity and MANufacturability optimization. These routing technologies will ensure faster time-to-market and time-to-profitability. The book includes a detailed description on the modern VLSI routing problems, and multilevel optimization on routing design to solve the chip complexity problem.

**IEEE Transactions on Circuits and Systems** - 2006

**RF Power Amplifiers for Mobile Communications** - Patrick Reynaert  
2006-11-18

This book tackles both high efficiency and high linearity power amplifier (PA) design in low-voltage CMOS. With its emphasis on theory, design and implementation, the book offers a guide for those actively involved in the design of fully integrated CMOS wireless transceivers. Offering mathematical background, as well as intuitive insight, the book is essential reading for RF design engineers and researchers and is also suitable as a text book.

**Analysis and Design of Quadrature Oscillators** - Luis B. Oliveira  
2008-07-08

Modern RF receivers and transmitters require quadrature oscillators with accurate quadrature and low phase-noise. Existing literature is dedicated mainly to single oscillators, and is strongly biased towards LC oscillators. This book is devoted to quadrature oscillators and presents a detailed comparative study of LC and RC oscillators, both at architectural and at circuit levels. It is shown that in cross-coupled RC oscillators both the quadrature error and phase-noise are reduced, whereas in LC oscillators the coupling decreases the quadrature error, but increases the phase-noise. Thus, quadrature RC oscillators can be a practical alternative to LC oscillators, especially when area and cost are to be minimized. The main topics of the book are: cross-coupled LC quasi-sinusoidal oscillators, cross-coupled RC relaxation oscillators, a quadrature RC oscillator-mixer, and  $\tau$ -integrator oscillators. The effect of mismatches on the phase-error and the phase-noise are thoroughly investigated. The book includes many experimental results, obtained from different integrated circuit prototypes, in the GHz range. A structured design approach is followed: a technology independent study, with ideal blocks, is performed initially, and then the circuit level design is addressed. This book can be used in advanced courses on RF circuit design. In addition to post-graduate students and lecturers, this book will be of interest to design engineers and researchers in this area.

**CMOS Circuits for Passive Wireless Microsystems** - Fei Yuan  
2014-10-07

This book provides a comprehensive treatment of CMOS circuits for passive wireless microsystems. Major topics include: an overview of passive wireless microsystems, design challenges of passive wireless microsystems, fundamental issues of ultra-low power wireless communications, radio-frequency power harvesting, ultra-low power modulators and demodulators, ultra-low power temperature-compensated current and voltage references, clock generation and remote calibration, and advanced design techniques for ultra low-power analog signal processing.

*CMOS Multichannel Single-Chip Receivers for Multi-Gigabit Optical Data Communications* - Paul Muller 2007-10-08

In the world of optical data communications this book will be an absolute must-read. It focuses on optical communications for short and very short distance applications and discusses the monolithic integration of optical receivers with processing elements in standard CMOS technologies.

What's more, it provides the reader with the necessary background knowledge to fully understand the trade-offs in short-distance communication receiver design and presents the key issues to be addressed in the development of such receivers in CMOS technologies. Moreover, novel design approaches are presented.

**Digital Systems** - Vahid Asadpour 2018-11-28

This book provides an approach toward the applications and principle theory of digital signal processing in modern intelligent systems, biological engineering, telecommunication, and information technology. Assuming the reader already has prior knowledge of signal processing theory, this book will be useful for finding novel methods that fit special needs in digital signal processing (DSP). The combination of signal processing and intelligent systems in hybrid structures rather than serial or parallel processing provide the best mechanism that is a better fit with the comprehensive nature of human. This book is a practical reference that places the emphasis on principles and applications of DSP in digital systems. It covers a broad area of digital systems and applications of machine learning methods including convolutional neural networks, evolutionary algorithms, adaptive filters, spectral estimation, data compression and functional verification. The level of the book is ideal for professional DSP users and useful for graduate students who are looking for solutions to their design problems. The theoretical principles provide the required base for comprehension of the methods and application of modifications for the special needs of practical projects.

Model and Design of Improved Current Mode Logic Gates - Kirti Gupta 2019-11-22

This book presents MOSFET-based current mode logic (CML) topologies,

which increase the speed, and lower the transistor count, supply voltage and power consumption. The improved topologies modify the conventional PDN, load, and the current source sections of the basic CML gates. Electronic system implementation involves embedding digital and analog circuits on a single die shifting towards mixed-mode circuit design. The high-resolution, low-power and low-voltage analog circuits are combined with high-frequency complex digital circuits, and the conventional static CMOS logic generates large current spikes during the switching (also referred to as digital switching noise), which degrade the resolution of the sensitive analog circuits via supply line and substrate coupling. This problem is exacerbated further with scaling down of CMOS technology due to higher integration levels and operating frequencies. In the literature, several methods are described to reduce the propagation of the digital switching noise. However, in high-resolution applications, these methods are not sufficient. The conventional CMOS static logic is no longer an effective solution, and therefore an alternative with reduced current spikes or that draws a constant supply current must be selected. The current mode logic (CML) topology, with its unique property of requiring constant supply current, is a promising alternative to the conventional CMOS static logic.

Broadband Opto-Electrical Receivers in Standard CMOS - Carolien Hermans 2007-06-13

This book opens with the basics of the design of opto-electronic interface circuits. The text continues with an in-depth analysis of the photodiode, transimpedance amplifier (TIA) and limiting amplifier (LA). To thoroughly describe light detection mechanisms in silicon, first a one-dimensional and second a two-dimensional model is developed. All material is experimentally verified with several CMOS implementations, with ultimately a fully integrated Gbit/s optical receiver front-end including photodiode, TIA and LA.

*Analog Circuit Design Techniques at 0.5V* - Shouri Chatterjee 2010-04-02

This book tackles challenges for the design of analog integrated circuits that operate from ultra-low power supply voltages (down to 0.5V).

Coverage demonstrates the signal processing circuit and circuit biasing



approaches through the design of operational transconductance amplifiers (OTAs). These amplifiers are then used to build analog system functions including continuous time filter and a sample and hold amplifier.

**Circuit and Interconnect Design for RF and High Bit-rate Applications** - Hugo Veenstra 2008-06-04

Realizing maximum performance from high bit-rate and RF circuits requires close attention to IC technology, circuit-to-circuit interconnections (i.e., the 'interconnect') and circuit design. This detailed book covers each of these topics from theory to practice, with sufficient detail to help you produce circuits that are 'first-time right'. Many

practical circuit examples are included to demonstrate the interplay between technology, interconnect and circuit design.

High-Level Modeling and Synthesis of Analog Integrated Systems - Ewout S. J. Martens 2008-01-03

Various approaches for finding optimal values for the parameters of analog cells have made their entrance in commercial applications. However, a larger impact on the performance is expected if tools are developed which operate on a higher abstraction level and consider multiple architectural choices to realize a particular functionality. This book examines the opportunities, conditions, problems, solutions and systematic methodologies for this new generation of analog CAD tools.