7 Series Fpgas Configurable Logic Block User Guide Ug474

This book constitutes the refereed proceedings of the 12th International Symposium
Reconfigurable Computing, ARC 2016, held in Rio de Janeiro, Brazil, in March 2016. The
full papers presented in this volume were carefully reviewed and selected from 47 sub
They are organized in topical headings named: video and image processing; fault-toleran
systems; tools and architectures; signal processing; and multicore systems. In addition
contains 3 invited papers and 8 poster papers on funded RD running and completed pr
Field Programmable Gate Arrays (FPGAs) are currently recognized as the most suitable
platform for the implementation of complex digital systems targeting an increasing nu
industrial electronics applications. They cover a huge variety of application areas, such
aerospace, food industry, art, industrial automation, automotive, biomedicine, process
military, logistics, power electronics, chemistry, sensor networks, robotics, ultrasound,
and artificial vision. This book first presents the basic architectures of the devices to
the reader with the fundamentals of FPGAs before identifying and discussing new reso
extend the ability of the devices to solve problems in new application domains. Design
methodologies are discussed and application examples are included for some of these
e.g., mechatronics, robotics, and power systems.
Handbook of Signal Processing Systems is organized in three parts. The first part moti
representative applications that drive and apply state-of-the art methods for design an
implementation of signal processing systems; the second part discusses architectures
implementing these applications; the third part focuses on compilers and simulation to
describes models of computation and their associated design tools and methodologies
handbook is an essential tool for professionals in many fields and researchers of all lev
This book suggests and describes a number of fast parallel circuits for data/vector pro
using FPGA-based hardware accelerators. Three primary areas are covered: searching,
sorting, and counting in combinational and iterative networks. These include the applic
traditional structures that rely on comparators/swappers as well as alternative netwo
variety of core elements such as adders, logical gates, and look-up tables. The iterative
technique discussed in the book enables the sequential reuse of relatively large combi
blocks that execute many parallel operations with small propagation delays. For each t
network discussed, the main focus is on the step-by-step development of the architec
proposed from initial concepts to synthesizable hardware description language specific
Each type of network is taken through several stages, including modeling the desired
functionality in software, the retrieval and automatic conversion of key functions, lead
specifications for optimized hardware modules. The resulting specifications are then
synthesized, implemented, and tested in FPGAs using commercial design environments
prototyping boards. The methods proposed can be used in a range of data processing
applications, including traditional sorting, the extraction of maximum and minimum sub
from large data sets, communication-time data processing, finding frequently occurring
a set, and Hamming weight/distance counters/comparators. The book is intended to b
valuable support material for university and industrial engineering courses that involve
based circuit and system design.
Explore a comprehensive and state-of-the-art presentation of real-time electromagnet
transient simulation technology by leaders in the field Real-Time Electromagnetic Trans
Simulation of AC-DC Networks delivers a detailed exposition of field programmable gat

(FPGA) hardware based real-time electromagnetic transient (EMT) emulation for all fundamental equipment used in AC-DC power grids. The book focuses specifically on de device-level models for their hardware realization in a massively parallel and deeply pipe manner as well as decomposition techniques for emulating large systems. Each chapte fundamental concepts, apparatus models, solution algorithms, and hardware emulation the reader in understanding the material contained within. Case studies are peppered throughout the book, ranging from small didactic test circuits to realistically sized larg AC-DC grids. The book also provides introductions to FPGA and hardware-in-the-loop (H emulation procedures, and large-scale networks constructed by the foundational comp described in earlier chapters. With a strong focus on high-voltage direct-current powe transmission grid applications, Real-Time Electromagnetic Transient Simulation of AC-DC Networks covers both system-level and device-level mathematical models. Readers will enjoy the inclusion of: A thorough introduction to field programmable gate array techn including the evolution of FPGAs, technology trends, hardware architectures, and progr tools An exploration of classical power system components, e.g., linear and nonlinear p power system components, transmission lines, power transformers, rotating machines protective relays A comprehensive discussion of power semiconductor switches and co i.e., AC-DC and DC-DC converters, and specific power electronic apparatus such as DC breakers An examination of decomposition techniques used at the equipment-level as w large-scale system-level for real-time EMT emulation of AC-DC networks Chapters that supported by simulation results from well-defined test cases and the corresponding sy parameters are provided in the Appendix Perfect for graduate students and profession engineers studying or working in electrical power engineering, Real-Time Electromagnet Transient Simulation of AC-DC Networks will also earn a place in the libraries of simula specialists, senior modeling and simulation engineers, planning and design engineers, an system studies engineers.
Applied Informatics and Cybernetics in Intelligent Systems
Architectures and Applications
FPGAs and Parallel Architectures for Aerospace Applications
Three-Dimensional Design Methodologies for Tree-based FPGA Architecture
Digital Phase Lock Loops
Embedded Systems Design with FPGAs
Parallel and Distributed Processing
This book constitutes the proceedings of the 14th International Conference on Applied Reconfigurable Computing, ARC 2018, held in Santorini, Greece, in May 2018. The 29 full papers and 22 short presented in this volume were carefully reviewed and selected from 78 submissions. In addition, the volume contains 9 contributions from research projects. The papers were organized in topical sections named: machine learning and neural networks; FPGA-based design and CGRA optimizations; applications and surveys; fault-tolerance, security and communication architectures; reconfigurable and adaptive architectures; design methods and fast prototyping; FPGA-based design and applications; and special session: research projects.
This book gathers the refereed proceedings of the Applied Informatics and Cybernetics in Intelligent Systems Section of the 9th Computer Science On-line Conference 2020 (CSOC 2020), held on-line in April 2020. Modern cybernetics and computer engineering in

connection with intelligent systems are an essential aspect of ongoing research. This book addresses these topics, together with automation and control theory, cybernetic applications, and the latest research trends.

This book introduces the concepts of soft errors in FPGAs, as well as the motivation for using commercial, off-the-shelf (COTS) FPGAs in mission-critical and remote applications, such as aerospace. The authors describe the effects of radiation in FPGAs, present a large set of soft-error mitigation techniques that can be applied in these circuits, as well as methods for qualifying these circuits under radiation. Coverage includes radiation effects in FPGAs, fault-tolerant techniques for FPGAs, use of COTS FPGAs in aerospace applications, experimental data of FPGAs under radiation, FPGA embedded processors under radiation and fault injection in FPGAs. Since dedicated parallel processing architectures such as GPUs have become more desirable in aerospace applications due to high computational power, GPU analysis under radiation is also discussed.

This book focuses on the development of 3D design and implementation methodologies for Tree-based FPGA architecture. It also stresses the needs for new and augmented 3D CAD tools to support designs such as, the design for 3D, to manufacture high performance 3D integrated circuits and reconfigurable FPGA-based systems. This book was written as a text that covers the foundations of 3D integrated system design and FPGA architecture design. It was written for the use in an elective or core course at the graduate level in field of Electrical Engineering, Computer Engineering and Doctoral Research programs. No previous background on 3D integration is required, nevertheless fundamental understanding of 2D CMOS VLSI design is required. It is assumed that reader has taken the core curriculum in Electrical Engineering or Computer Engineering, with courses like CMOS VLSI design, Digital System Design and Microelectronics Circuits being the most important. It is accessible for self-study by both senior students and professionals alike.

This book constitutes the refereed proceedings of the 13th International Conference on Unconventional Computation and Natural Computation, UCNC 2014, held in London, ON, Canada, in July 2014. The 31 revised full papers were carefully reviewed and selected from 79 submissions. The papers cover a wide range of topics including among others molecular, quantum, optical and chaos computing as well as neural computation, evolutionary computation, swarm intelligence and computational neuroscience.

Design Methodologies and Tools for 5G Network Development and Application
Self Aware Security for Real Time Task Schedules in Reconfigurable Hardware Platforms
Membrane Computing Models: Implementations
11th [i.e. 11] IPPS/SPDP'99 Workshops Held in Conjunction with the 13th International Parallel Processing Symposium and 10th Symposium on Parallel and Distributed Processing, San Juan, Puerto Rico, USA, April 12-16, 1999 : Proceedings
IC4S 2020
11th EAI international Conference, ChinaCom 2016 Chongqing, China, September 24-26, 2016, Proceedings, Part II
Synthesis and Optimization of FPGA-Based Systems

FPGA Prototyping by VHDL ExamplesXilinx MicroBlaze MCS SoCJohn Wiley & Sons
This book describes the optimized implementations of several arithmetic datapath, controlpath and pseudorandom sequence generator circuits for realization of high performance arithmetic circuits targeted towards a specific family of the high-end Field Programmable Gate Arrays (FPGAs). It explores regular, modular, cascadable and bit-sliced architectures of these circuits, by directly instantiating the target FPGA-specific primitives in the HDL. Every proposed architecture is justified with detailed mathematical analyses. Simultaneously, constrained placement of the circuit building blocks is performed, by placing the logically related hardware primitives in close proximity to one another by supplying relevant placement constraints in the Xilinx proprietary "User Constraints File". The book covers the implementation of a GUI-based CAD tool named FlexiCore integrated with the Xilinx Integrated Software Environment (ISE) for design automation of platform-specific high-performance arithmetic circuits from user-level specifications. This tool has been used to implement the proposed circuits, as well as hardware implementations of integer arithmetic algorithms where several of the proposed circuits are used as building blocks. Implementation results demonstrate higher performance and superior operand-width scalability for the proposed circuits, with respect to implementations derived through other existing approaches. This book will prove useful to researchers, students and professionals engaged in the domain of FPGA circuit optimization and implementation.
This work covers field programmable gate array (FPGA)-specific optimizations of circuits computing the multiplication of a variable by several constants, commonly denoted as multiple constant multiplication (MCM). These optimizations focus on low resource usage but high performance. They comprise the use of fast carry-chains in adder-based constant multiplications including ternary (3-input) adders as well as the integration of look-up table-based constant multipliers and embedded multipliers to get the optimal mapping to modern FPGAs. The proposed methods can be used for the efficient implementation of digital filters, discrete transforms and many other circuits in the domain of digital signal processing, communication and image processing.
This book constitutes the proceedings of the 15th International Symposium on Applied Reconfigurable Computing, ARC 2019, held in Darmstadt, Germany, in April 2019. The 20 full papers and 7 short papers presented in this volume were carefully reviewed and selected from 52 submissions. In addition, the volume contains 1 invited paper. The papers were organized in topical sections named: Applications; partial reconfiguration and security; image/video processing; high-level synthesis; CGRAs and vector processing; architectures; design frameworks and methodology; convolutional neural networks.
A hands-on introduction to FPGA prototyping and SoC design This Second Edition of the popular book follows the same "learning-by-doing" approach to teach the fundamentals and practices of VHDL synthesis and FPGA prototyping. It uses a coherent series of examples to demonstrate the process to develop sophisticated digital circuits and IP (intellectual property) cores, integrate them into an SoC (system on a chip) framework, realize the system on an FPGA prototyping board, and verify the hardware and software operation. The examples start with simple gate-level circuits, progress gradually through the RT (register transfer) level modules, and lead to a functional embedded system with custom I/O peripherals and hardware accelerators. Although it is an introductory text, the examples are developed in a rigorous manner, and the derivations follow strict design guidelines and coding practices used for large, complex digital systems. The new edition is completely updated. It presents the hardware design in the SoC context and introduces the hardware-software co-design

concept. Instead of treating examples as isolated entities, the book integrates them into a single coherent SoC platform that allows readers to explore both hardware and software "programmability" and develop complex and interesting embedded system projects. The revised edition: Adds four general-purpose IP cores, which are multi-channel PWM (pulse width modulation) controller, I2C controller, SPI controller, and XADC (Xilinx analog-to-digital converter) controller. Introduces a music synthesizer constructed with a DDFS (direct digital frequency synthesis) module and an ADSR (attack-decay-sustain-release) envelop generator. Expands the original video controller into a complete stream-based video subsystem that incorporates a video synchronization circuit, a test pattern generator, an OSD (on-screen display) controller, a sprite generator, and a frame buffer. Introduces basic concepts of software-hardware co-design with Xilinx MicroBlaze MCS soft-core processor. Provides an overview of bus interconnect and interface circuit. Introduces basic embedded system software development. Suggests additional modules and peripherals for interesting and challenging projects. The FPGA Prototyping by VHDL Examples, Second Edition makes a natural companion text for introductory and advanced digital design courses and embedded system course. It also serves as an ideal self-teaching guide for practicing engineers who wish to learn more about this emerging area of interest.

10th International Conference, FPL 2000 Villach, Austria, August 27-30, 2000 Proceedings

Functional Verification of Dynamically Reconfigurable FPGA-based Systems

Bring your ideas to life by creating hardware designs and electronic circuits with SystemVerilog

11th International Conference, FPL 2001, Belfast, Northern Ireland, UK, August 27-29, 2001 Proceedings

Contemporary Complex Systems and Their Dependability

Virtualization of Computing Architecture

This book reports on cutting-edge theories and methods for analyzing complex systems, such as transportation and communication networks and discusses multi-disciplinary approaches to dependability problems encountered when dealing with complex systems in practice. The book presents the most noteworthy methods and results discussed at the International Conference on Reliability and Statistics in Transportation and Communication (RelStat), which took place in Riga, Latvia on October 16 – 19, 2019. It spans a broad spectrum of topics, from mathematical models and design methodologies, to software engineering, data security and financial issues, as well as practical problems in technical systems, such as transportation and telecommunications, and in engineering education. The two-volume set LNICST 209-210 constitutes the post-conference proceedings of the 11th EAI International Conference on Communications and Networking, ChinaCom 2016, held in Chongqing, China, in September 2016. The total of 107 contributions presented in these volumes are carefully reviewed and selected from 181 submissions. The book is organized in topical sections on MAC schemes, traffic algorithms and routing algorithms, security, coding schemes, relay systems, optical systems and networks, signal detection and estimation, energy harvesting systems, resource allocation schemes, network architecture and SDM, heterogeneous

networks, IoT (Internet of Things), hardware design and implementation, mobility management, SDN and clouds, navigation, tracking and localization, future mobile networks.

This book presents the methodologies and for embedded systems design, using field programmable gate array (FPGA) devices, for the most modern applications. Coverage includes state-of-the-art research from academia and industry on a wide range of topics, including applications, advanced electronic design automation (EDA), novel system architectures, embedded processors, arithmetic, and dynamic reconfiguration.

The demand for mobile broadband will continue to increase in upcoming years, largely driven by the need to deliver ultra-high definition video. 5G is not only evolutionary, it also provides higher bandwidth and lower latency than the current-generation technology. More importantly, 5G is revolutionary in that it is expected to enable fundamentally new applications with much more stringent requirements in latency and bandwidth. 5G should help solve the last-mile/last-kilometer problem and provide broadband access to the next billion users on earth at a much lower cost because of its use of new spectrum and its improvements in spectral efficiency. 5G wireless access networks will need to combine several innovative aspects of decentralized and centralized allocation looking to maximize performance and minimize signaling load. Research is currently conducted to understand the inspirations, requirements, and the promising technical options to boost and enrich activities in 5G. Design Methodologies and Tools for 5G Network Development and Application presents the enhancement methods of 5G communication, explores the methods for faster communication, and provides a promising alternative solution that equips designers with the capability to produce high performance, scalable, and adoptable communication protocol. This book provides complete design methodologies, supporting tools for 5G communication, and innovative works. The design and evaluation of different proposed 5G structures signal integrity, reliability, low-power techniques, application mapping, testing, and future trends. This book is ideal for researchers who are working in communication, networks, design and implementations, industry personnel, engineers, practitioners, academicians, and students who are interested in the evolution, importance, usage, and technology adoption for 5G applications.

This book focuses on how real-time task schedules for reconfigurable hardware-based embedded platforms may be affected due to the vulnerability of hardware and proposes self-aware security strategies to counteract the various threats. The emergence of Industry 4.0 has witnessed the deployment of reconfigurable hardware or field programmable gate arrays (FPGAs) in diverse embedded applications. These are associated with the execution of several real-time tasks arranged in schedules. However, they are associated with several issues. Development of fully and partially reconfigurable task schedules are discussed that eradicates the existing problems. However, such real-time task schedules

may be jeopardized due to hardware threats. Analysis of such threats is discussed and self-aware security techniques are proposed that can detect and mitigate such threats at runtime.

Field

Proceedings of the Fourteenth International Conference on Dependability of Computer Systems DepCoS-RELCOMEX, July 1-5, 2019, Brunów, Poland

Xilinx MicroBlaze MCS SoC Edition

Unconventional Computation and Natural Computation

Principles and Structures of FPGAs

Architecture, Implementation and Design Automation

Xilinx MicroBlaze MCS SoC

Reconfigurable Computing Systems Engineering: Virtualization of Computing Architecture describes the organization of reconfigurable computing system (RCS) architecture and discusses the pros and cons of different RCS architecture implementations. Providing a solid understanding of RCS technology and where it's most effective, this book: Details the architecture organization of RCS platforms for application-specific workloads Covers the process of the architectural synthesis of hardware components for system-on-chip (SoC) for the RCS Explores the virtualization of RCS architecture from the system and on-chip levels Presents methodologies for RCS architecture run-time integration according to mode of operation and rapid adaptation to changes of multi-parametric constraints Includes illustrative examples, case studies, homework problems, and references to important literature A solutions manual is available with qualifying course adoption. Reconfigurable Computing Systems Engineering: Virtualization of Computing Architecture offers a complete road map to the synthesis of RCS architecture, exposing hardware design engineers, system architects, and students specializing in designing FPGA-based embedded systems to novel concepts in RCS architecture organization and virtualization.

This book analyzes the challenges in verifying Dynamically Reconfigurable Systems (DRS) with respect to the user design and the physical implementation of such systems. The authors describe the use of a simulation-only layer to emulate the behavior of target FPGAs and accurately model the characteristic features of reconfiguration. Readers are enabled with this simulation-only layer to maintain verification productivity by abstracting away the physical details of the FPGA fabric. Two implementations of the simulation-only layer are included: Extended Re Channel is a System C library that can be used to check DRS designs at a high level; ReSim is a library to support RTL simulation of a DRS reconfiguring both its logic and state. Through a number of case studies, the authors demonstrate how their approach integrates seamlessly with existing, mainstream DRS design flows and with well-established verification methodologies such as top-down modeling and coverage-driven verification.

Get started with FPGA programming using SystemVerilog, and develop real-world skills by building projects, including a calculator and a keyboard Key Features Explore different FPGA usage methods and the

FPGA tool flow Learn how to design, test, and implement hardware circuits using SystemVerilog Build real-world FPGA projects such as a calculator and a keyboard using FPGA resources Book Description Field Programmable Gate Arrays (FPGAs) have now become a core part of most modern electronic and computer systems. However, to implement your ideas in the real world, you need to get your head around the FPGA architecture, its toolset, and critical design considerations. FPGA Programming for Beginners will help you bring your ideas to life by guiding you through the entire process of programming FPGAs and designing hardware circuits using SystemVerilog. The book will introduce you to the FPGA and Xilinx architectures and show you how to work on your first project, which includes toggling an LED. You'll then cover SystemVerilog RTL designs and their implementations. Next, you'll get to grips with using the combinational Boolean logic design and work on several projects, such as creating a calculator and updating it using FPGA resources. Later, the book will take you through the advanced concepts of AXI and show you how to create a keyboard using PS/2. Finally, you'll be able to consolidate all the projects in the book to create a unified output using a Video Graphics Array (VGA) controller that you'll design. By the end of this SystemVerilog FPGA book, you'll have learned how to work with FPGA systems and be able to design hardware circuits and boards using SystemVerilog programming. What you will learn Understand the FPGA architecture and its implementation Get to grips with writing SystemVerilog RTL Make FPGA projects using SystemVerilog programming Work with computer math basics, parallelism, and pipelining Explore the advanced topics of AXI and keyboard interfacing with PS/2 Discover how you can implement a VGA interface in your projects Who this book is for This FPGA design book is for embedded system developers, engineers, and programmers who want to learn FPGA and SystemVerilog programming from scratch. FPGA designers looking to gain hands-on experience in working on real-world projects will also find this book useful.

This exciting new book covers various types of digital phase lock loops. It presents a comprehensive coverage of a new class of digital phase lock loops called the time delay tanlock loop (TDTL). It also details a number of architectures that improve the performance of the TDTL through adaptive techniques that overcome the conflicting requirements of the locking rage and speed of acquisition.

This comprehensive textbook on the field programmable gate array (FPGA) covers its history, fundamental knowledge, architectures, device technologies, computer-aided design technologies, design tools, examples of application, and future trends. Programmable logic devices represented by FPGAs have been rapidly developed in recent years and have become key electronic devices used in most IT products. This book provides both complete introductions suitable for students and beginners, and high-level techniques useful for engineers and researchers in this field. Differently developed from usual integrated circuits, the FPGA has unique structures, design methodologies, and application techniques. Allowing programming by users, the device can

dramatically reduce the rising cost of development in advanced semiconductor chips. The FPGA is now driving the most advanced semiconductor processes and is an all-in-one platform combining memory, CPUs, and various peripheral interfaces. This book introduces the FPGA from various aspects for readers of different levels. Novice learners can acquire a fundamental knowledge of the FPGA, including its history, from Chapter 1; the first half of Chapter 2; and Chapter 4. Professionals who are already familiar with the device will gain a deeper understanding of the structures and design methodologies from Chapters 3 and 5. Chapters 6-8 also provide advanced techniques and cutting-edge applications and trends useful for professionals. Although the first parts are mainly suitable for students, the advanced sections of the book will be valuable for professionals in acquiring an in-depth understanding of the FPGA to maximize the performance of the device.
Applied Reconfigurable Computing. Architectures, Tools, and Applications
FPGA Programming for Beginners
Proceedings of the 9th Computer Science On-line Conference 2020, Volume 3
Reconfigurable Computing Systems Engineering
Field-Programmable Logic and Applications: The Roadmap to Reconfigurable Computing
12th International Symposium, ARC 2016 Mangaratiba, RJ, Brazil, March 22-24, 2016 Proceedings
Real-Time Electromagnetic Transient Simulation of AC-DC Networks

The book is composed of two parts. The first part introduces the concepts of the design of digital systems using contemporary field-programmable gate arrays (FPGAs). Various design techniques are discussed and illustrated by examples. The operation and effectiveness of these techniques is demonstrated through experiments that use relatively cheap prototyping boards that are widely available. The book begins with easily understandable introductory sections, continues with commonly used digital circuits, and then gradually extends to more advanced topics. The advanced topics include novel techniques where parallelism is applied extensively. These techniques involve not only core reconfigurable logical elements, but also use embedded blocks such as memories and digital signal processing slices and interactions with general-purpose and application-specific computing systems. Fully synthesizable specifications are provided in a hardware-description language (VHDL) and are ready to be tested and incorporated in engineering designs. A number of practical applications are discussed from areas such as data processing and vector-based computations (e.g. Hamming weight counters/comparators). The second part of the book covers the more theoretical aspects of finite state machine synthesis with the main objective of

reducing basic FPGA resources, minimizing delays and achieving greater optimization of circuits and systems.
Not only conventional computer architectures, such as the von-Neumann architecture with its inevitable von-Neumann bottleneck, but likewise the emerging field of edge computing require to substantially decrease the spatial separation of logic and memory units to overcome power and latency shortages. The integration of logic operations into memory units (Logic-in-Memory), as well as memory elements into logic circuits (Nonvolatile Logic), promises to fulfill this request by combining high-speed with low-power operation. Ferroelectric field-effect transistors (FeFETs) based on hafnium oxide prove to be auspicious candidates for the memory elements in applications of that kind, as those nonvolatile memory elements are CMOS-compatible and likewise scalable. This work presents implementations that merge logic and memory by exploiting the natural capability of the FeFET to combine logic functionality (transistor) and memory ability (nonvolatility).
This book constitutes the refereed proceedings of the 11th International Conference on Field-Programmable Logic and Application, FPL 2001, held in Belfast, Northern Ireland, UK, in August 2001.The 56 revised full papers and 15 short papers presented were carefully reviewed and selected from a total of 117 submissions. The book offers topical sections on architectural framework, place and route, architecture, DSP, synthesis, encryption, runtime reconfiguration, graphics and vision, networking, processor interaction, applications, methodology, loops and systolic, image processing, faults, and arithmetic.
This book presents the proceedings of the Thirteenth International Conference on Dependability and Complex Systems (DepCoS-RELCOMEX), which took place in the Brunów Palace in Poland from 2nd to 6th July 2018. The conference has been organized at the Faculty of Electronics, Wroc?aw University of Science and Technology since 2006, and it continues the tradition of two other events: RELCOMEX (1977-89) and Microcomputer School (1985-95). The selection of papers in these proceedings illustrates the broad variety of topics that are investigated in dependability analyses of today's complex systems. Dependability came naturally as a contemporary answer to new challenges in the reliability evaluation of these systems. Such systems cannot be considered only as structures (however complex and distributed) built on the basis of technical resources (hardware): their analysis must take into account a unique blend of interacting people (their needs and behaviours), networks (together with mobile properties, cloud-

based systems) and a large number of users dispersed geographically and producing an unimaginable number of applications (working online). A growing number of research methods apply the latest advances in artificial intelligence (AI) and computational intelligence (CI). Today's complex systems are really complex and are applied in numerous different fields of contemporary life.

This book features selected research papers presented at the Second International Conference on Computing, Communications, and Cyber-Security (IC4S 2020), organized in Krishna Engineering College (KEC), Ghaziabad, India, along with Academic Associates; Southern Federal University, Russia; IAC Educational, India; and ITS Mohan Nagar, Ghaziabad, India during 3–4 October 2020. It includes innovative work from researchers, leading innovators, and professionals in the area of communication and network technologies, advanced computing technologies, data analytics and intelligent learning, the latest electrical and electronics trends, and security and privacy issues.

Proceedings of the Thirteenth International Conference on Dependability and Complex Systems DepCoS–RELCOMEX, July 2–6, 2018, Brunów, Poland

Fundamentals, Advanced Features, and Applications in Industrial Electronics

FPGA Prototyping by VHDL Examples

Soft Errors and Fault-Tolerant Design

5th International Workshop, FPL '95, Oxford, United Kingdom, August 29 – September 1, 1995. Proceedings

Applied Reconfigurable Computing

Field-Programmable Logic and Applications

This book is the proceedings volume of the 10th International Conference on Field Programmable Logic and its Applications (FPL), held August 27 30, 2000 in Villach, Austria, which covered areas like reconfigurable logic (RL), reconfigurable computing (RC), and its applications, and all other aspects. Its subtitle "The Roadmap to Reconfigurable Computing" reminds us, that we are currently witnessing the runaway of a breakthrough. The annual FPL series is the eldest international conference in the world covering configware and all its aspects. It was founded 1991 at Oxford University (UK) and is 2 years older than its two most important competitors usually taking place at Monterey and Napa. FPL has been held at Oxford, Vienna, Prague, Darmstadt, London, Tallinn, and Glasgow (also see: http://www. fpl. uni kl. de/FPL/). The New Case for Reconfigurable Platforms: Converging Media. Indicated by palmtops, smart mobile phones, many other portables, and consumer electronics, media such as voice, sound, video, TV, wireless, cable, telephone, and Internet continue to converge. This creates new opportunities and even necessities for reconfigurable platform usage. The new converged media require high volume, flexible, multi purpose, multi standard, low power products adaptable to support evolving standards, emerging new standards, field upgrades, bug fixes, and, to meet the needs of a growing number of different kinds of services offered to zillions of individual subscribers preferring different media mixes. This book constitutes the refereed proceedings of the 21st International Symposium on

VLSI Design and Test, VDAT 2017, held in Roorkee, India, in June/July 2017. The 48 full papers presented together with 27 short papers were carefully reviewed and selected from 246 submissions. The papers were organized in topical sections named: digital design; analog/mixed signal; VLSI testing; devices and technology; VLSI architectures; emerging technologies and memory; system design; low power design and test; RF circuits; architecture and CAD; and design verification.

This book presents papers on various problems of dependability in computer systems and networks that were discussed at the 14th DepCoS-RELCOMEX conference, in Brunów, Poland, from 1st to 5th July 2019. Discussing new ideas, research results and developments in the design, implementation, maintenance and analysis of complex computer systems, it is of interest to researchers and practitioners who are dealing with dependability issues in such systems. Dependability analysis came as a response to new challenges in the evaluation of contemporary complex systems, which should be considered as systems of people – with their needs and behaviours –interacting with technical communication channels (such as mobile activities, iCloud, Internet of Everything) and online applications, often operating in hostile environments. The diversity of topics covered, illustrates the variety of methods used in this area, often with the help of the latest results in artificial and computational intelligence.

This edited volume "Field-Programmable Gate Array" is a collection of reviewed and relevant research chapters, offering a comprehensive overview of recent developments in the field of semiconductors. The book comprises single chapters authored by various researchers and edited by an expert active in the aerospace engineering systems research area. All chapters are complete within themselves but united under a common research study topic. This publication aims at providing a thorough overview of the latest research efforts by international authors and open new possible research paths for further novel developments.

The theoretical basis of membrane computing was established in the early 2000s with fundamental research into the computational power, complexity aspects and relationships with other (un)conventional computing paradigms. Although this core theoretical research has continued to grow rapidly and vigorously, another area of investigation has since been added, focusing on the applications of this model in many areas, most prominently in systems and synthetic biology, engineering optimization, power system fault diagnosis and mobile robot controller design. The further development of these applications and their broad adoption by other researchers, as well as the expansion of the membrane computing modelling paradigm to other applications, call for a set of robust, efficient, reliable and easy-to-use tools supporting the most significant membrane computing models. This work provides comprehensive descriptions of such tools, making it a valuable resource for anyone interested in membrane computing models.

Communications and Networking
Digital System Design with FPGA: Implementation Using Verilog and VHDL
Programmable Gate Array
FPGA-BASED Hardware Accelerators
VLSI Design and Test
High Performance Integer Arithmetic Circuit Design on FPGA
Development and Investigation of Novel Logic-in-Memory and Nonvolatile Logic Circuits Utilizing Hafnium Oxide-Based Ferroelectric Field-Effect Transistors

This book constitutes the proceedings of the 16th International Symposium on Applied Reconfigurable Computing, ARC 2020, held in Toledo, Spain, in April 2020. The 18 full papers and 11 poster presentations presented in this

volume were carefully reviewed and selected from 40 submissions. The papers are organized in the following topical sections: design methods & tools; design space exploration & estimation techniques; high-level synthesis; architectures; applications.

Master FPGA digital system design and implementation with Verilog and VHDL This practical guide explores the development and deployment of FPGA-based digital systems using the two most popular hardware description languages, Verilog and VHDL. Written by a pair of digital circuit design experts, the book offers a solid grounding in FPGA principles, practices, and applications and provides an overview of more complex topics. Important concepts are demonstrated through real-world examples, ready-to-run code, and inexpensive start-to-finish projects for both the Basys and Arty boards. Digital System Design with FPGA: Implementation Using Verilog and VHDL covers: • Field programmable gate array fundamentals • Basys and Arty FPGA boards • The Vivado design suite • Verilog and VHDL • Data types and operators • Combinational circuits and circuit blocks • Data storage elements and sequential circuits • Soft-core microcontroller and digital interfacing • Advanced FPGA applications • The future of FPGA

This book contains extended and revised versions of the best papers presented at the 23rd IFIP WG 10.5/IEEE International Conference on Very Large Scale Integration, VLSI-SoC 2015, held in Daejeon, Korea, in October 2015. The 10 papers included in the book were carefully reviewed and selected from the 44 full papers presented at the conference. The papers cover a wide range of topics in VLSI technology and advanced research. They address the current trend toward increasing chip integration and technology process advancements bringing about new challenges both at the physical and system-design levels, as well as in the test of these systems.

This book constitutes the refereed proceedings of 10 international workshops held in conjunction with the merged 1998 IPPS/SPDP symposia, held in Orlando, Florida, US in March/April 1998. The volume comprises 118 revised full papers presenting cutting-edge research or work in progress. In accordance with the workshops covered, the papers are organized in topical sections on reconfigurable architectures, run-time systems for parallel programming, biologically inspired solutions to parallel processing problems, randomized parallel computing, solving combinatorial optimization problems in parallel, PC based networks of workstations, fault-tolerant parallel and distributed systems, formal methods for parallel programming, embedded HPC systems and applications, and parallel and distributed real-time systems.

A hands-on introduction to FPGA prototyping and SoC design This is the successor edition of the popular FPGA Prototyping by Verilog Examples text. It follows the same "learning-by-doing" approach to teach the fundamentals and practices of HDL synthesis and FPGA prototyping. The new edition uses a coherent series of examples to demonstrate the process

to develop sophisticated digital circuits and IP (intellectual property) cores, integrate them into an SoC (system on a chip) framework, realize the system on an FPGA prototyping board, and verify the hardware and software operation. The examples start with simple gate-level circuits, progress gradually through the RT (register transfer) level modules, and lead to a functional embedded system with custom I/O peripherals and hardware accelerators. Although it is an introductory text, the examples are developed in a rigorous manner, and the derivations follow the strict design guidelines and coding practices used for large, complex digital systems. The book is completely updated and uses the SystemVerilog language, which "absorbs" the Verilog language. It presents the hardware design in the SoC context and introduces the hardware-software co-design concept. Instead of treating examples as isolated entities, the book integrates them into a single coherent SoC platform that allows readers to explore both hardware and software "programmability" and develop complex and interesting embedded system projects. The new edition: Adds four general-purpose IP cores, which are multi-channel PWM (pulse width modulation) controller, I2C controller, SPI controller, and XADC (Xilinx analog-to-digital converter) controller. Introduces a music synthesizer constructed with a DDFS (direct digital frequency synthesis) module and an ADSR (attack-decay-sustain-release) envelope generator. Expands the original video controller into a complete stream based video subsystem that incorporates a video synchronization circuit, a test-pattern generator, an OSD (on-screen display) controller, a sprite generator, and a frame buffer. Provides a detailed discussion on blocking and nonblocking statements and coding styles. Describes basic concepts of software-hardware co-design with Xilinx MicroBlaze MCS soft-core processor. Provides an overview of bus interconnect and interface circuit. Presents basic embedded system software development. Suggests additional modules and peripherals for interesting and challenging projects. FPGA Prototyping by SystemVerilog Examples makes a natural companion text for introductory and advanced digital design courses and embedded system courses. It also serves as an ideal self-teaching guide for practicing engineers who wish to learn more about this emerging area of interest.
Handbook of Signal Processing Systems
FPGA Prototyping by SystemVerilog Examples
Multiple Constant Multiplication Optimizations for Field Programmable Gate Arrays
Reliability and Statistics in Transportation and Communication
14th International Symposium, ARC 2018, Santorini, Greece, May 2-4, 2018, Proceedings
15th International Symposium, ARC 2019, Darmstadt, Germany, April 9–11, 2019, Proceedings
Selected Papers from the 19th International Conference on Reliability and Statistics in Transportation and Communication, RelStat'19, 16-19 October 2019, Riga, Latvia

This volume constitutes the proceedings of the Fifth International Workshop on Field-Programmable Logic and Its Applications, FPL '95, held in Oxford, UK in August/September 1995. The volume presents 46 full revised papers carefully selected by the program committee from a large number and wide range of submissions. The papers document the progress achieved since the predecessor conference (see LNCS 849). They are organized in sections on architectures, platforms, tools, arithmetic and signal processing, embedded systems and other applications, and reconfigurable design and models.
13th International Conference, UCNC 2014, London, ON, Canada, July 14-18, 2014, Proceedings
Proceedings of Second International Conference on Computing, Communications, and Cyber-Security
16th International Symposium, ARC 2020, Toledo, Spain, April 1–3, 2020, Proceedings
21st International Symposium, VDAT 2017, Roorkee, India, June 29 – July 2, 2017, Revised Selected Papers
FPGAs
23rd IFIP WG 10.5/IEEE International Conference on Very Large Scale Integration, VLSI-SoC 2015, Daejeon, Korea, October 5-7, 2015, Revised Selected Papers
VLSI-SoC: Design for Reliability, Security, and Low Power