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Digital Signal Processing with Field Programmable Gate Arrays - Uwe Meyer-Baese 2013-03-09

Starts with an overview of today's FPGA technology, devices, and tools

for designing state-of-the-art DSP systems. A case study in the first chapter is the basis for more than 30 design examples throughout. The following chapters deal with computer

arithmetic concepts, theory and the implementation of FIR and IIR filters, multirate digital signal processing systems, DFT and FFT algorithms, and advanced algorithms with high future potential. Each chapter contains exercises. The VERILOG source code and a glossary are given in the appendices, while the accompanying CD-ROM contains the examples in VHDL and Verilog code as well as the newest Altera "Baseline" software. This edition has a new chapter on adaptive filters, new sections on division and floating point arithmetics, an up-date to the current Altera software, and some new exercises.

Hardware Accelerators in Data Centers

- Christoforos Kachris 2018-08-21
This book provides readers with an overview of the architectures,

programming frameworks, and hardware accelerators for typical cloud computing applications in data centers. The authors present the most recent and promising solutions, using hardware accelerators to provide high throughput, reduced latency and higher energy efficiency compared to current servers based on commodity processors. Readers will benefit from state-of-the-art information regarding application requirements in contemporary data centers, computational complexity of typical tasks in cloud computing, and a programming framework for the efficient utilization of the hardware accelerators.

The Design Warrior's Guide to FPGAs -

Clive Maxfield 2004-06-16
Field Programmable Gate Arrays (FPGAs) are devices that provide a

fast, low-cost way for embedded system designers to customize products and deliver new versions with upgraded features, because they can handle very complicated functions, and be reconfigured an infinite number of times. In addition to introducing the various architectural features available in the latest generation of FPGAs, The Design Warrior's Guide to FPGAs also covers different design tools and flows. This book covers information ranging from schematic-driven entry, through traditional HDL/RTL-based simulation and logic synthesis, all the way up to the current state-of-the-art in pure C/C++ design capture and synthesis technology. Also discussed are specialist areas such as mixed hardware/software and DSP-based design flows, along with

innovative new devices such as field programmable node arrays (FPNAs). Clive "Max" Maxfield is a bestselling author and engineer with a large following in the electronic design automation (EDA) and embedded systems industry. In this comprehensive book, he covers all the issues of interest to designers working with, or contemplating a move to, FPGAs in their product designs. While other books cover fragments of FPGA technology or applications this is the first to focus exclusively and comprehensively on FPGA use for embedded systems. First book to focus exclusively and comprehensively on FPGA use in embedded designs World-renowned best-selling author Will help engineers get familiar and succeed with this new technology by providing much-needed advice on

choosing the right FPGA for any design project

VHDL-2008 - Peter J. Ashenden

2007-11-26

VHDL-2008: Just the New Stuff, as its title says, introduces the new features added to the latest revision of the IEEE standard for the VHDL hardware description language.

Written by the Chair and Technical Editor of the IEEE working group, the book is an authoritative guide to how the new features work and how to use them to improve design productivity. It will be invaluable for early adopters of the new language version, for tool implementers, and for those just curious about where VHDL is headed. * First in the market describing the new features of VHDL 2008; * Just the new features, so existing users and implementers can

focus on what's new; * Helps readers to learn the new features soon, rather than waiting for new editions of complete VHDL reference books. * Authoritative, written by experts in the area; * Tutorial style, making it more accessible than the VHDL Standard Language Reference Manual. *Applied Reconfigurable Computing.*

Architectures, Tools, and Applications - Steven Derrien
2021-06-23

This book constitutes the proceedings of the 17th International Symposium on Applied Reconfigurable Computing, ARC 2021, held as a virtual event, in June 2021. The 14 full papers and 11 short presentations presented in this volume were carefully reviewed and selected from 40 submissions. The papers cover a broad spectrum of applications of reconfigurable

computing, from driving assistance, data and graph processing acceleration, computer security to the societal relevant topic of supporting early diagnosis of Covid infectious conditions.

A Practical Introduction to Hardware/Software Codesign - Patrick R. Schaumont 2012-11-27

This textbook serves as an introduction to the subject of embedded systems design, with emphasis on integration of custom hardware components with software. The key problem addressed in the book is the following: how can an embedded systems designer strike a balance between flexibility and efficiency? The book describes how combining hardware design with software design leads to a solution to this important computer engineering problem. The

book covers four topics in hardware/software codesign: fundamentals, the design space of custom architectures, the hardware/software interface and application examples. The book comes with an associated design environment that helps the reader to perform experiments in hardware/software codesign. Each chapter also includes exercises and further reading suggestions. Improvements in this second edition include labs and examples using modern FPGA environments from Xilinx and Altera, which will make the material in this book applicable to a greater number of courses where these tools are already in use. More examples and exercises have been added throughout the book. "If I were teaching a course on this subject, I would use

this as a resource and text. If I were a student who wanted to learn codesign, I would look for a course that at least used a similar approach. If I were an engineer or engineering manager who wanted to learn more about codesign from a very practical perspective, I would read this book first before any other. When I first started learning about codesign as a practitioner, a book like this would have been the perfect introduction.” --Grant Martin, Tensilica--

Real-Time Electromagnetic Transient Simulation of AC-DC Networks -

Venkata Dinavahi 2021-06-22

Explore a comprehensive and state-of-the-art presentation of real-time electromagnetic transient simulation technology by leaders in the field
Real-Time Electromagnetic Transient

Simulation of AC-DC Networks delivers a detailed exposition of field programmable gate array (FPGA) hardware based real-time electromagnetic transient (EMT) emulation for all fundamental equipment used in AC-DC power grids. The book focuses specifically on detailed device-level models for their hardware realization in a massively parallel and deeply pipelined manner as well as decomposition techniques for emulating large systems. Each chapter contains fundamental concepts, apparatus models, solution algorithms, and hardware emulation to assist the reader in understanding the material contained within. Case studies are peppered throughout the book, ranging from small didactic test circuits to realistically sized

large-scale AC-DC grids. The book also provides introductions to FPGA and hardware-in-the-loop (HIL) emulation procedures, and large-scale networks constructed by the foundational components described in earlier chapters. With a strong focus on high-voltage direct-current power transmission grid applications, Real-Time Electromagnetic Transient Simulation of AC-DC Networks covers both system-level and device-level mathematical models. Readers will also enjoy the inclusion of: A thorough introduction to field programmable gate array technology, including the evolution of FPGAs, technology trends, hardware architectures, and programming tools An exploration of classical power system components, e.g., linear and nonlinear passive power system

components, transmission lines, power transformers, rotating machines, and protective relays A comprehensive discussion of power semiconductor switches and converters, i.e., AC-DC and DC-DC converters, and specific power electronic apparatus such as DC circuit breakers An examination of decomposition techniques used at the equipment-level as well as the large-scale system-level for real-time EMT emulation of AC-DC networks Chapters that are supported by simulation results from well-defined test cases and the corresponding system parameters are provided in the Appendix Perfect for graduate students and professional engineers studying or working in electrical power engineering, Real-Time Electromagnetic Transient Simulation of AC-DC Networks will also earn a

place in the libraries of simulation specialists, senior modeling and simulation engineers, planning and design engineers, and system studies engineers.

FPGA Implementations of Neural

Networks - Amos R. Omondi 2006-10-04

During the 1980s and early 1990s there was significant work in the design and implementation of hardware neurocomputers. Nevertheless, most of these efforts may be judged to have been unsuccessful: at no time have hardware neurocomputers been in wide use. This lack of success may be largely attributed to the fact that earlier work was almost entirely aimed at developing custom neurocomputers, based on ASIC technology, but for such niche - eas this technology was never sufficiently developed or competitive enough to

justify large-scale adoption. On the other hand, gate-arrays of the period mentioned were never large enough nor fast enough for serious artificial-neural-network (ANN) applications. But technology has now improved: the capacity and performance of current FPGAs are such that they present a much more realistic alternative. Consequently neurocomputers based on FPGAs are now a much more practical proposition than they have been in the past. This book summarizes some work towards this goal and consists of 12 papers that were selected, after review, from a number of submissions. The book is nominally divided into three parts: Chapters 1 through 4 deal with foundational issues; Chapters 5 through 11 deal with a variety of implementations; and Chapter 12 looks at the lessons

learned from a large-scale project and also reconsiders design issues in light of current and future technology.

Harnessing VLSI System Design with EDA Tools - Rajanish K. Kamat
2011-10-03

With the proliferation of VHDL, the reference material also grew in the same order. Today there is good amount of scholarly literature including many books describing various aspects of VHDL. However, an indepth review of these books reveals a different story. Many of them have emerged simply as an improved version of the manual. While some of them deal with the system design issues, they lack appropriate exemplifying to illustrate the concepts. Others give large number of examples, but lack the VLSI system design issues. In

nutshell, the fact which gone unnoticed by most of the books, is the growth of the VLSI is not merely due to the language itself, but more due to the development of large number of third party tools useful from the FPGA or semicustom ASIC realization point of view. In the proposed book, the authors have synergized the VHDL programming with appropriate EDA tools so as to present a full proof system design to the readers. In this book along with the VHDL coding issues, the simulation and synthesis with the various toolsets enables the potential reader to visualize the final design. The VHDL design codes have been synthesized using different third party tools such as Xilinx Web pack Ver.11, Modelsim PE, Leonrado Spectrum and Synplify Pro. Mixed flow

illustrated by using the above mentioned tools presents an insight to optimize the design with reference to the spatial, temporal and power metrics.

Field-Programmable Logic and Applications - International Workshop on Field-Programmable Logic and Applications 1995-08-21

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.

Verilog HDL - Samir Palnitkar 2003
VERILOG HDL, Second Edition by Samir Palnitkar
With a Foreword by Prabhu Goel
Written for both experienced and new users, this book gives you broad coverage of VerilogHDL. The book stresses the practical design and verification perspective of Verilog rather than emphasizing only the language aspects. The information presented is fully compliant with the IEEE 1364-2001 Verilog HDL standard. Among its many features, this edition-
• Describes state-of-the-art verification methodologies
• Provides full coverage of gate,

dataflow (RTL), behavioral and switch modeling bull;Introduces you to the Programming Language Interface (PLI) bull;Describes logic synthesis methodologies bull;Explains timing and delay simulation bull;Discusses user-defined primitives bull;Offers many practical modeling tips Includes over 300 illustrations, examples, and exercises, and a Verilog resource list.Learning objectives and summaries are provided for each chapter. About the CD-ROMThe CD-ROM contains a Verilog simulator with a graphical user interface and the source code for the examples in the book. Whatpeople are saying about Verilog HDL- "Mr.Palnitkar illustrates how and why Verilog HDL is used to develop today'smost complex digital designs. This book is valuable to both the novice and

theexperienced Verilog user. I highly recommend it to anyone exploring Verilogbased design." - RajeevMadhavan, Chairman and CEO, Magma Design Automation "Thisbook is unique in its breadth of information on Verilog and Verilog-relatedtopics. It is fully compliant with the IEEE 1364-2001 standard, contains allthe information that you need on the basics, and devotes several chapters toadvanced topics such as verification, PLI, synthesis and modelingtechniques." - MichaelMcNamara, Chair, IEEE 1364-2001 Verilog Standards Organization Thishas been my favorite Verilog book since I picked it up in college. It is theonly book that covers practical Verilog. A must have for beginners andexperts." - BerendOzceri, Design Engineer, Cisco

Systems, Inc. "Simple, logical and well-organized material with plenty of illustrations, makes this an ideal textbook." -Arun K. Somani, Jerry R. Junkins Chair Professor, Department of Electrical and Computer Engineering, Iowa State University, Ames PRENTICE HALL Professional Technical Reference Upper Saddle River, NJ 07458

www.phptr.com ISBN: 0-13-044911-3

Software Defined Radio - Walter H.W. Tuttlebee 2006-02-24

The impending advent of GSM in the early 1990s triggered massive investment that revolutionised the capability of DSP technology. A decade later, the vastly increased processing requirements and potential market of 3G has triggered a similar revolution, with a host of start-up companies claiming revolutionary technologies hoping to challenge and

displace incumbent suppliers. This book, with contributions from today's major players and leading start-ups, comprehensively describes both the new approaches and the responses of the incumbents, with detailed descriptions of the design philosophy, architecture, technology maturity and software support. Analysis of SDR baseband processing requirements of cellular handsets and basestations 3G handset baseband - ASIC, DSP, parallel processing, ACM and customised programmable architectures 3G basestation baseband - DSP (including co-processors), FPGA-based approaches, reconfigurable and parallel architectures Architecture optimisation to match 3G air interface and application algorithms Evolution of existing DSP, ASIC & FPGA solutions Assessment of

the architectural approaches and the implications of the trends. An essential resource for the 3G product designer, who needs to understand immediate design options within a wider context of future product roadmaps, the book will also benefit researchers and commercial managers who need to understand this rapid evolution of baseband signal processing and its industry impact.

FPGAs - Juan Jose Rodriguez Andina
2017-07-28

Field Programmable Gate Arrays (FPGAs) are currently recognized as the most suitable platform for the implementation of complex digital systems targeting an increasing number of industrial electronics applications. They cover a huge variety of application areas, such as: aerospace, food industry, art,

industrial automation, automotive, biomedicine, process control, military, logistics, power electronics, chemistry, sensor networks, robotics, ultrasound, security, and artificial vision. This book first presents the basic architectures of the devices to familiarize the reader with the fundamentals of FPGAs before identifying and discussing new resources that 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 domains, e.g., mechatronics, robotics, and power systems.

The Zynq Book - Louise H. Crockett
2014

This book is about the Zynq-7000 All

Programmable System on Chip, the family of devices from Xilinx that combines an application-grade ARM Cortex-A9 processor with traditional FPGA logic fabric. Catering for both new and experienced readers, it covers fundamental issues in an accessible way, starting with a clear overview of the device architecture, and an introduction to the design tools and processes for developing a Zynq SoC. Later chapters progress to more advanced topics such as embedded systems development, IP block design and operating systems. Maintaining a 'real-world' perspective, the book also compares Zynq with other device alternatives, and considers end-user applications. The Zynq Book is accompanied by a set of practical tutorials hosted on a companion website. These tutorials will guide

the reader through first steps with Zynq, following on to a complete, audio-based embedded systems design.

Acceleration of Biomedical Image Processing with Dataflow on FPGAs -

Frederik Grüll 2022-09-01

Short compute times are crucial for timely diagnostics in biomedical applications, but lead to a high demand in computing for new and improved imaging techniques. In this book reconfigurable computing with FPGAs is discussed as an alternative to multi-core processing and graphics card accelerators. Instead of adjusting the application to the hardware, FPGAs allow the hardware to also be adjusted to the problem. Acceleration of Biomedical Image Processing with Dataflow on FPGAs covers the transformation of image processing algorithms towards a

system of deep pipelines that can be executed with very high parallelism. The transformation process is discussed from initial design decisions to working implementations. Two example applications from stochastic localization microscopy and electron tomography illustrate the approach further. Topics discussed in the book include:

- Reconfigurable hardware
- Dataflow computing
- Image processing
- Application acceleration

Algorithm-Architecture Matching for Signal and Image Processing

Gogniat 2010-10-20

Advances in signal and image processing together with increasing computing power are bringing mobile technology closer to applications in a variety of domains like automotive, health, telecommunication,

multimedia, entertainment and many others. The development of these leading applications, involving a large diversity of algorithms (e.g. signal, image, video, 3D, communication, cryptography) is classically divided into three consecutive steps: a theoretical study of the algorithms, a study of the target architecture, and finally the implementation. Such a linear design flow is reaching its limits due to intense pressure on design cycle and strict performance constraints. The approach, called Algorithm-Architecture Matching, aims to leverage design flows with a simultaneous study of both algorithmic and architectural issues, taking into account multiple design constraints, as well as algorithm and architecture optimizations, that

couldn't be achieved otherwise if considered separately. Introducing new design methodologies is mandatory when facing the new emerging applications as for example advanced mobile communication or graphics using sub-micron manufacturing technologies or 3D-Integrated Circuits. This diversity forms a driving force for the future evolutions of embedded system designs methodologies. The main expectations from system designers' point of view are related to methods, tools and architectures supporting application complexity and design cycle reduction. Advanced optimizations are essential to meet design constraints and to enable a wide acceptance of these new technologies. Algorithm-Architecture Matching for Signal and Image Processing presents a

collection of selected contributions from both industry and academia, addressing different aspects of Algorithm-Architecture Matching approach ranging from sensors to architectures design. The scope of this book reflects the diversity of potential algorithms, including signal, communication, image, video, 3D-Graphics implemented onto various architectures from FPGA to multiprocessor systems. Several synthesis and resource management techniques leveraging design optimizations are also described and applied to numerous algorithms. Algorithm-Architecture Matching for Signal and Image Processing should be on each designer's and EDA tool developer's shelf, as well as on those with an interest in digital system design optimizations dealing

with advanced algorithms.

Applied Reconfigurable Computing. Architectures, Tools, and Applications - Nikolaos Voros

2018-04-25

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.

Field-Programmable Gate Array

Technology - Stephen M. Trimberger
2012-12-06

Many different kinds of FPGAs exist, with different programming technologies, different architectures and different software. Field-Programmable Gate Array Technology describes the major FPGA architectures available today, covering the three programming technologies that are in use and the major architectures built on those programming technologies. The reader is introduced to concepts relevant to the entire field of FPGAs using popular devices as examples. Field-Programmable Gate Array Technology

includes discussions of FPGA integrated circuit manufacturing, circuit design and logic design. It describes the way logic and interconnect are implemented in various kinds of FPGAs. It covers particular problems with design for FPGAs and future possibilities for new architectures and software. This book compares CAD for FPGAs with CAD for traditional gate arrays. It describes algorithms for placement, routing and optimization of FPGAs. Field-Programmable Gate Array Technology describes all aspects of FPGA design and development. For this reason, it covers a significant amount of material. Each section is clearly explained to readers who are assumed to have general technical expertise in digital design and design tools. Potential developers of

FPGAs will benefit primarily from the FPGA architecture and software discussion. Electronics systems designers and ASIC users will find a background to different types of FPGAs and applications of their use. *FPGAs for Software Programmers* - Dirk Koch 2016-06-17

This book makes powerful Field Programmable Gate Array (FPGA) and reconfigurable technology accessible to software engineers by covering different state-of-the-art high-level synthesis approaches (e.g., OpenCL and several C-to-gates compilers). It introduces FPGA technology, its programming model, and how various applications can be implemented on FPGAs without going through low-level hardware design phases. Readers will get a realistic sense for problems that are suited for FPGAs and how to

implement them from a software designer's point of view. The authors demonstrate that FPGAs and their programming model reflect the needs of stream processing problems much better than traditional CPU or GPU architectures, making them well-suited for a wide variety of systems, from embedded systems performing sensor processing to large setups for Big Data number crunching. This book serves as an invaluable tool for software designers and FPGA design engineers who are interested in high design productivity through behavioural synthesis, domain-specific compilation, and FPGA overlays. Introduces FPGA technology to software developers by giving an overview of FPGA programming models and design tools, as well as various application examples; Provides a

holistic analysis of the topic and enables developers to tackle the architectural needs for Big Data processing with FPGAs; Explains the reasons for the energy efficiency and performance benefits of FPGA processing; Provides a user-oriented approach and a sense for where and how to apply FPGA technology.

Field-Programmable Logic: Architectures, Synthesis and Applications - Reiner W. Hartenstein
1994-08-24

This volume contains the proceedings of the 4th International Workshop on Field-Programmable Logic and Applications (FPL '94), held in Prague, Czech Republic in September 1994. The growing importance of field-programmable devices is substantiated by the remarkably high number of 116 submissions for FPL

'94; from them, the revised versions of 40 full papers and 24 high-quality poster presentations were accepted for inclusion in this volume. Among the topics treated are: testing, layout, synthesis tools, compilation research and CAD, trade-offs and experience, innovations and smart applications, FPGA-based computer architectures, high-level design, prototyping and ASIC emulators, commercial devices, new tools, CCMs and HW/SW co-design, modelers, educational experience, and novel architectures.

Architecture of Computing Systems - ARCS 2009 - Mladen Berekovic
2009-02-25

The ARCS series of conferences has over 30 years of tradition reporting top-notch results in computer architecture and operating systems research. It is

organized by the special interest group on "Computer and System Architecture" of the GI (Gesellschaft für Informatik e.V.) and ITG (Informationstechnische Gesellschaft im VDE - Information Technology Society). In 2009, ARCS was hosted by the Delft University of Technology, which has one of the leading information technology schools in Europe. This year's special focus was set on energy awareness viewed from two different perspectives. Firstly, this deals with the improvement of computer systems to be as energy-efficient as possible (particularly for specific applications). One can think of heterogeneous multi-core architectures or reconfigurable architectures for this purpose. Secondly, this addresses the usage of computer systems to reduce

the energy consumption of other systems, which might lead to problems of communication and cooperation. Like the previous conferences in this series, it continues to be an important forum for computer architecture research. The call for papers resulted in a total of 57 submissions from around the world. Each submission was assigned to at least three members of the Program Committee for review. The Program Committee decided to accept 21 papers, which are arranged into eight sessions. The accepted papers are from: Finland, France, Germany, Japan, The Netherlands, Singapore, Spain, UK, and USA. Three intriguing keynotes from academia and industry complemented the strong technical program.

100 Power Tips for FPGA Designers -

Embedded Systems Design with Platform FPGAs - Ronald Sass 2010-09-10

Embedded Systems Design with Platform FPGAs introduces professional engineers and students alike to system development using Platform FPGAs. The focus is on embedded systems but it also serves as a general guide to building custom computing systems. The text describes the fundamental technology in terms of hardware, software, and a set of principles to guide the development of Platform FPGA systems. The goal is to show how to systematically and creatively apply these principles to the construction of application-specific embedded system architectures. There is a strong focus on using free and open source software to increase productivity. Each chapter is organized into two

parts. The white pages describe concepts, principles, and general knowledge. The gray pages provide a technical rendition of the main issues of the chapter and show the concepts applied in practice. This includes step-by-step details for a specific development board and tool chain so that the reader can carry out the same steps on their own. Rather than try to demonstrate the concepts on a broad set of tools and boards, the text uses a single set of tools (Xilinx Platform Studio, Linux, and GNU) throughout and uses a single developer board (Xilinx ML-510) for the examples. Explains how to use the Platform FPGA to meet complex design requirements and improve product performance Presents both fundamental concepts together with pragmatic, step-by-step instructions for

building a system on a Platform FPGA Includes detailed case studies, extended real-world examples, and lab exercises

Security and Embedded Systems - R. Giladi 2006-01-12

Technological advances have led to wide deployment and use of embedded systems in an increasing range of applications, from mobile phones to car, plane and spacecraft and from digital id's to military systems in the field. Many of these applications place significant security requirements and have led to significant research activity in the area of security and embedded systems, due to the limited resources of conventional embedded systems. This emerging research area is of great importance to a large number of public and private organizations, due

to their desire to deploy secure embedded systems in the field. This publication brings together one of the first international efforts to emphasize the importance of this emerging technical field and provides presentations of leading researchers in the field. Its objectives are to present the technologies and open problems of the emerging area of security and embedded systems, to present the latest research results in all aspects of security in embedded systems, and, finally, to provide a roadmap of the technology for the future. Considering the main directions of research in the field, three main areas are discussed: (i) foundations of security and embedded systems, (ii) secure embedded computing systems and (iii) telecommunications and network

services.

Design and Architecture for Signal and Image Processing - Karol Desnos
2022-08-30

This book constitutes the thoroughly refereed conference proceedings of the First International Workshop on Design and Architecture for Signal and Image Processing, DASIP 2022, held in Budapest, Hungary in June 2022. The 13 full included in the volume were carefully reviewed and selected from 32 submissions. They are organized in the following topical sections: leading signal, image and video processing and machine learning in custom embedded, edge and cloud computing architectures and systems.

IEEE International Conference on Electronics, Circuits and Systems - 1999

JavaTech, an Introduction to Scientific and Technical Computing with Java - Clark S. Lindsey
2005-10-13

JavaTech is a practical introduction to the Java programming language with an emphasis on the features that benefit technical computing. After presenting the basics of object-oriented programming in Java, it examines introductory topics such as graphical interfaces and thread processes. It goes on to review network programming and develops Web client-server examples for tasks such as monitoring remote devices. The focus then shifts to distributed computing with RMI. Finally, it examines how Java programs can access the local platform and interact with hardware. Topics include combining native code with Java, communication

via serial lines, and programming embedded processors. An extensive web site supports the book with additional instructional materials. JavaTech demonstrates the ease with which Java can be used to create powerful network applications and distributed computing applications. It will be used as a textbook for programming courses, and by researchers who need to learn Java for a particular task.

Approximate Arithmetic Circuit Architectures for FPGA-based Systems
- Salim Ullah 2023-02-27

This book presents various novel architectures for FPGA-optimized accurate and approximate operators, their detailed accuracy and performance analysis, various techniques to model the behavior of approximate operators, and thorough

application-level analysis to evaluate the impact of approximations on the final output quality and performance metrics. As multiplication is one of the most commonly used and computationally expensive operations in various error-resilient applications such as digital signal and image processing and machine learning algorithms, this book particularly focuses on this operation. The book starts by elaborating on the various sources of error resilience and opportunities available for approximations on various layers of the computation stack. It then provides a detailed description of the state-of-the-art approximate computing-related works and highlights their limitations.

Architecture of Computing Systems - ARCS 2017 - Jens Knoop 2017-03-02

This book constitutes the proceedings of the 30th International Conference on Architecture of Computing Systems, ARCS 2017, held in Vienna, Austria, in April 2017. The 19 full papers presented in this volume were carefully reviewed and selected from 42 submissions. They were organized in topical sections entitled: resilience; accelerators; performance; memory systems; parallelism and many-core; scheduling; power/energy.

FPGA Prototyping by Verilog Examples

- Pong P. Chu 2011-09-20

FPGA Prototyping Using Verilog Examples will provide you with a hands-on introduction to Verilog synthesis and FPGA programming through a “learn by doing” approach. By following the clear, easy-to-understand templates for code

development and the numerous practical examples, you can quickly develop and simulate a sophisticated digital circuit, realize it on a prototyping device, and verify the operation of its physical implementation. This introductory text that will provide you with a solid foundation, instill confidence with rigorous examples for complex systems and prepare you for future development tasks.

FPGA Prototyping by VHDL Examples - Pong P. Chu 2011-09-20

This book uses a "learn by doing" approach to introduce the concepts and techniques of VHDL and FPGA to designers through a series of hands-on experiments. FPGA Prototyping by VHDL Examples provides a collection of clear, easy-to-follow templates for quick code development; a large

number of practical examples to illustrate and reinforce the concepts and design techniques; realistic projects that can be implemented and tested on a Xilinx prototyping board; and a thorough exploration of the Xilinx PicoBlaze soft-core microcontroller.

FPGA-based Prototyping Methodology Manual - Doug Amos 2011

This book collects the best practices FPGA-based Prototyping of SoC and ASIC devices into one place for the first time, drawing upon not only the authors' own knowledge but also from leading practitioners worldwide in order to present a snapshot of best practices today and possibilities for the future. The book is organized into chapters which appear in the same order as the tasks and decisions which are performed during an FPGA-

based prototyping project. We start by analyzing the challenges and benefits of FPGA-based Prototyping and how they compare to other prototyping methods. We present the current state of the available FPGA technology and tools and how to get started on a project. The FPMM also compares between home-made and outsourced FPGA platforms and how to analyze which will best meet the needs of a given project. The central chapters deal with implementing an SoC design in FPGA technology including clocking, conversion of memory, partitioning, multiplexing and handling IP amongst many other subjects. The important subject of bringing up the design on the FPGA boards is covered next, including the introduction of the real design into the board, running embedded software

upon it in and debugging and iterating in a lab environment. Finally we explore how the FPGA-based Prototype can be linked into other verification methodologies, including RTL simulation and virtual models in SystemC. Along the way, the reader will discover that an adoption of FPGA-based Prototyping from the beginning of a project, and an approach we call Design-for-Prototyping, will greatly increase the success of the prototype and the whole SoC project, especially the embedded software portion. Design-for-Prototyping is introduced and explained and promoted as a manifesto for better SoC design. Readers can approach the subjects from a number of directions. Some will be experienced with many of the tasks involved in FPGA-based Prototyping

but are looking for new insights and ideas; others will be relatively new to the subject but experienced in other verification methodologies; still others may be project leaders who need to understand if and how the benefits of FPGA-based prototyping apply to their next SoC project. We have tried to make each subject chapter relatively standalone, or where necessary, make numerous forward and backward references between subjects, and provide recaps of certain key subjects. We hope you like the book and we look forward to seeing you on the FPMM on-line community soon (go to www.synopsys.com/fpmm).

Practical FPGA Programming in C -

David Pellerin 2005

FPGA brings high performance applications to market quickly – this

book covers the many emerging platforms in a proven, effective manner.

ISTFA 2017: Proceedings from the 43rd International Symposium for Testing and Failure Analysis - 2017-12-01

The theme for the November 2017 conference was Striving for 100% Success Rate. Papers focus on the tools and techniques needed for maximizing the success rate in every aspect of the electronic device failure analysis process.

Designing with Xilinx® FPGAs - Sanjay Churiwala 2016-10-20

This book helps readers to implement their designs on Xilinx® FPGAs. The authors demonstrate how to get the greatest impact from using the Vivado® Design Suite, which delivers a SoC-strength, IP-centric and system-centric, next generation

development environment that has been built from the ground up to address the productivity bottlenecks in system-level integration and implementation. This book is a hands-on guide for both users who are new to FPGA designs, as well as those currently using the legacy Xilinx tool set (ISE) but are now moving to Vivado. Throughout the presentation, the authors focus on key concepts, major mechanisms for design entry, and methods to realize the most efficient implementation of the target design, with the least number of iterations.

Next-Generation High-Speed Satellite Interconnect - Pietro Nannipieri
2021-07-23

This book introduces the space community to the novel SpaceFibre protocol, developed under the

guidance of the European Space Agency (ESA) as the forthcoming, high speed (Gbps) communication protocol for satellite on-board communication. Since SpaceFibre is expected to follow the success of its predecessor SpaceWire protocol (Mbps), the authors provide a system-level perspective for the end-user willing to adopt this latest technology for future space missions. The authors provide a complete view of the SpaceFibre protocol, together with an analysis of all the necessary hardware and software components to integrate this technology onboard a satellite. The text guides potential system adopters toward understanding the protocol, analyzing strengths, weaknesses and performances. Practical design examples and prototype performance measurements in

reference scenarios are also included.

Embedded Microprocessor System Design using FPGAs - Uwe Meyer-Baese
2021-04-16

This textbook for courses in Embedded Systems introduces students to necessary concepts, through a hands-on approach. It gives a great introduction to FPGA-based microprocessor system design using state-of-the-art boards, tools, and microprocessors from Altera/Intel® and Xilinx®. HDL-based designs (soft-core), parameterized cores (Nios II and MicroBlaze), and ARM Cortex-A9 design are discussed, compared and explored using many hand-on designs projects. Custom IP for HDMI coder, Floating-point operations, and FFT bit-swap are developed, implemented, tested and speed-up is measured.

Downloadable files include all design examples such as basic processor synthesizable code for Xilinx and Altera tools for PicoBlaze, MicroBlaze, Nios II and ARMv7 architectures in VHDL and Verilog code, as well as the custom IP projects. Each Chapter has a substantial number of short quiz questions, exercises, and challenging projects. Explains soft, parameterized, and hard core systems design tradeoffs; Demonstrates design of popular KCPSM6 8 Bit microprocessor step-by-step; Discusses the 32 Bit ARM Cortex-A9 and a basic processor is synthesized; Covers design flows for both FPGA Market leaders Nios II Altera/Intel and MicroBlaze Xilinx system; Describes Compiler-Compiler Tool development; Includes a substantial

number of Homework's and FPGA exercises and design projects in each chapter.

3D Microelectronic Packaging - Yan Li
2017-01-20

This volume provides a comprehensive reference for graduate students and professionals in both academia and industry on the fundamentals, processing details, and applications of 3D microelectronic packaging, an industry trend for future microelectronic packages. Chapters written by experts cover the most recent research results and industry progress in the following areas: TSV, die processing, micro bumps, direct bonding, thermal compression bonding, advanced materials, heat dissipation, thermal management, thermal mechanical modeling, quality, reliability, fault isolation, and

failure analysis of 3D microelectronic packages. Numerous images, tables, and didactic schematics are included throughout. This essential volume equips readers with an in-depth understanding of all aspects of 3D packaging, including packaging architecture, processing, thermal mechanical and moisture related reliability concerns, common failures, developing areas, and future challenges, providing insights into key areas for future research and development.

Exploring Zynq Mpsoc - CROCKETT H. DAVID LOUISE (NORTHCOTE. CRAIG, RAMSAY.) 2019-04-11

This book introduces the Zynq MPSoC (Multi-Processor System-on-Chip), an embedded device from Xilinx. The Zynq MPSoC combines a sophisticated processing system that includes ARM

Cortex-A53 applications and ARM Cortex-R5 real-time processors, with FPGA programmable logic. As well as guiding the reader through the architecture of the device, design tools and methods are also covered in detail: both the conventional hardware/software co-design approach, and the newer software-defined methodology using Xilinx's SDx development environment. Featured aspects of Zynq MPSoC design include hardware and software development, multiprocessing, safety, security and

platform management, and system booting. There are also special features on PYNQ, the Python-based framework for Zynq devices, and machine learning applications. This book should serve as a useful guide for those working with Zynq MPSoC, and equally as a reference for technical managers wishing to gain familiarity with the device and its associated design methodologies. *Field-programmable Logic and Applications* - 2000