Vhdl Based Fault Injection With Verify

This book introduces a novel framework for accurately modeling the errors in nanoscale CMOS technology and developing a smooth tool flow at high-level design abstractions to estimate and mitigate the effects of errors. The book presents novel techniques for high-level fault simulation and reliability estimation as well as architecture-level and system-level fault tolerant designs. It also presents a survey of state-of-the-art problems and solutions, offering insights into reliability issues in digital design and their cross-layer countermeasures.

This book constitutes the revised selected papers of the 11th International Symposium on Foundations and Practice of Security, FPS 2018, held in Montreal, QC, Canada, in March 2018. The 16 full papers, 1 short paper, 1 position paper and 2 invited papers presented in this book, were carefully reviewed and selected from 51 submissions. They cover a range of topics including mobile security; cloud security and big data; IoT security; software security, malware analysis, and vulnerability detection; cryptography; cyber physical security and hardware security; and access control.

Contributions on UML address the application of UML in the specification of embedded HW/SW systems. C-Based System Design embraces the modeling of operating systems, modeling with different models of computation, generation of test patterns, and experiences from case studies with SystemC. Analog and Mixed-Signal Systems covers rules for solving general modeling problems in VHDL-AMS, modeling of multi-nature systems, synthesis, and modeling of Mixed-Signal Systems with SystemC. Languages for formal methods are addressed by contributions on formal specification and refinement of hybrid, embedded and real-time stems. Together with articles on new languages such as SystemVerilog and Software Engineering in Automotive Systems the contributions selected for this book embrace all aspects of languages and models for specification, design, modeling and verification of systems. Therefore, the book gives an excellent overview of the actual state-of-the-art and the latest research results.

"This book covers aspects of system design and efficient modelling, and also introduces various fault models and fault mechanisms associated with digital circuits integrated into System on Chip (SoC), Multi-Processor System-on Chip (MPSoC) or Network on Chip (NoC)"--

Embedded systems applications that are either mission or safety-critical usually entail low- to mid- production volumes, require the rapid development of specific tasks, which are typically computing intensive, and are cost bounded. The adoption of re-configurable FPGAs in such application domains is constrained to the availability of suitable techniques to guarantee the dependability requirements entailed by critical applications. This book describes the challenges faced by designers when implementing a mission- or safety-critical application using re-configurable FPGAs and it details various techniques to overcome these challenges. In addition to an overview of the key concepts of re-configurable

FPGAs, it provides a theoretical description of the failure modes that can cause incorrect operation of re-configurable FPGA-based electronic systems. It also outlines analysis techniques that can be used to forecast such failures and covers the theory behind solutions to mitigate fault effects. This book also reviews current technologies available for building re-configurable FPGAs, specifically SRAM-based technology and Flash-based technology. For each technology introduced, theoretical concepts presented are applied to real cases. Design techniques and tools are presented to develop critical applications using commercial, off-the-shelf devices, such as Xilinx Virtex FPGAs, and Actel ProASIC FPGAs. Alternative techniques based on radiation hardened FPGAs, such as Xilinx SIRF and Atmel ATF280 are also presented. This publication is an invaluable reference for anyone interested in understanding the technologies of re-configurable FPGAs, as well as designers developing critical applications based on these technologies.

VHDL Answers to Frequently asked Questions is a follow-up to the author's book VHDL Coding Styles and Methodologies (ISBN 0-7923-9598-0). On completion of his first book, the author continued teaching VHDL and actively participated in the comp. lang. vhdl newsgroup. During his experiences, he was enlightened by the many interesting issues and questions relating to VHDL and synthesis. These pertained to: misinterpretations in the use of the language; methods for writing error free, and simulation efficient, code for testbench designs and for synthesis; and general principles and guidelines for design verification. As a result of this wealth of public knowledge contributed by a large VHDL community, the author decided to act as a facilitator of this information by collecting different classes of VHDL issues, and by elaborating on these topics through complete simulatable examples. This book is intended for those who are seeking an enhanced proficiency in VHDL. Its target audience includes: 1. Engineers. The book addresses a set of problems commonly experienced by real users of VHDL. It provides practical explanations to the questions, and suggests practical solutions to the raised issues. It also includes packages to achieve common utilities, useful in the generation of debug code aDd testbench designs. These packages include conversions to strings (the IMAGE package), generation of Linear Feedback Shift Registers (LFSR), Multiple Input Shift Register (MISR), and random number generators.

This book constitutes the refereed proceedings of the 33nd International Conference on Computer Safety, Reliability, and Security, SAFECOMP 2014, held in Florence, Italy, in September 2014. The 20 revised full papers presented together with 3 practical experience reports were carefully reviewed and selected from 85 submissions. The papers are organized in topical sections on fault injection techniques, verification and validation techniques, automotive systems, coverage models and mitigation techniques, assurance cases and arguments, system analysis, security and trust, notations/languages for safety related aspects, safety and security.

The European Commission emphasizes, in its Fifth Research Framework, the ". . . emerging generic dependability requirements in the information society, stemming both from the ubiquity and volume of embedded and networked systems and services as well as from the global and complex nature of large scale information and communication infrastructures, from citizens, administrations and business in terms of technologies, tools, systems, applications and services". The series of Conference on Computer Safety, Reliability, and Security (Safecomp) contributes to satisfy these requirements by reviewing the state of the art, experiences, and new trends in the relevant scientific and industrial areas. Safecomp is intended to be a platform for technology transfer among academia, industry, and research institutions, providing the opportunity for exchange of ideas, opinions, and visions among experts. This year Safecomp celebrates the 20th anniversary, its first Conference having been organized in Stuttgart by EWICS (European Workshop on Industrial Computer Systems) in 1979, and we hope these Proceedings will contribute to the celebration by supporting Safecomp aims. The Proceedings include the 25 papers that have been presented orally at the Conference and the full version of the 14 papers that have been presented as posters, all of which were selected from 76 submissions. Papers almost uniformly take up Safecomp topics, dealing with the issues of Safety Assessment and Human Factors, Verification and Validation, Design for Safety, Formal Methods, and Security.

This is a comprehensive guide to fault injection techniques used to evaluate the dependability of a digital system. The description and the critical analysis of different fault injection techniques and tools are authored by key scientists in the field of system dependability and fault tolerance.

This book constitutes the refereed proceedings of the 19th International Conference on Computer Safety, Reliability, and Security, SAFECOMP 2000, held in Rotterdam, The Netherlands in October 2000.The 33 revised full papers presented together with three invited papers were carefully reviewed and selected for inclusion in the book. The papers are organized in topical sections on verification and validation; software process improvement; formal methods; safety guidelines, standards and certification; hardware aspects; safety assessment; design for safety; and transport and infrastructure.

Space applications, nuclear physics, military operations, medical imaging, and especially electronics (modern silicon processing) are obvious fields in which radiation damage can have serious consequences, i.e., degradation of MOS devices and circuits. Zeroing in on vital aspects of this broad and complex topic, Radiation Effects in Semiconductors addresses the ever-growing need for a clear understanding of radiation effects on semiconductor devices and circuits to combat potential damage it can cause. Features a chapter authored by renowned radiation authority Lawrence T. Clark on Radiation Hardened by Design SRAM Strategies for TID and SEE Mitigation This book analyzes the radiation problem, focusing on the most important aspects required for comprehending the degrading effects observed in semiconductor devices, circuits, and systems when they are irradiated. It explores how radiation interacts with solid materials, providing a detailed analysis of three ways this occurs: Photoelectric effect, Compton effect, and creation of electron-positron pairs. The author explains that the probability of these three effects occurring depends on the energy of the incident photon and the atomic number of the target. The book also discusses the effects that photons can have on matter—in terms of ionization effects and nuclear displacement Written for post-graduate researchers, semiconductor engineers, and nuclear and space engineers with some electronics background, this carefully constructed reference explains how ionizing radiation is creating damage in semiconducting devices and circuits and systems—and how that damage can be avoided in areas such as military/space missions, nuclear applications, plasma damage, and X-ray-based techniques. It features top-notch international experts in industry and academia who address emerging detector technologies, circuit design techniques, new

materials, and innovative system approaches.

This book provides a comprehensive introduction to hardware security, from specification to implementation. Applications discussed include embedded systems ranging from small RFID tags to satellites orbiting the earth. The authors describe a design and synthesis flow, which will transform a given circuit into a secure design incorporating counter-measures against fault attacks. In order to address the conflict between testability and security, the authors describe innovative design-for-testability (DFT) computer-aided design (CAD) tools that support security challenges, engineered for compliance with existing, commercial tools. Secure protocols are discussed, which protect access to necessary test infrastructures and enable the design of secure access controllers.

New manufacturing technologies have made possible the integration of entire systems on a single chip. This new design paradigm, termed system-on-chip (SOC), together with its associated manufacturing problems, represents a real challenge for designers. SOC is also reshaping approaches to test and validation activities. These are beginning to migrate from the traditional register-transfer or gate levels of abstraction to the system level. Until now, test and validation have not been supported by system-level design tools so designers have lacked the infrastructure to exploit all the benefits stemming from the adoption of the system level of abstraction. Research efforts are already addressing this issue. This monograph provides a state-of-the-art overview of the current validation and test techniques by covering all aspects of the subject including: modeling of bugs and defects; stimulus generation for validation and test purposes (including timing errors; design for testability.

This book presents the theory behind software-implemented hardware fault tolerance, as well as the practical aspects needed to put it to work on real examples. By evaluating accurately the advantages and disadvantages of the already available approaches, the book provides a guide to developers willing to adopt software-implemented hardware fault tolerance in their applications. Moreover, the book identifies open issues for researchers willing to improve the already available techniques.

Este libro contiene las presentaciones de la XVII Conferencia de Diseño de Circuitos y Sistemas Integrados celebrado en el Palacio de la Magdalena, Santander, en noviembre de 2002. Esta Conferencia ha alcanzado un alto nivel de calidad, como consecuencia de su tradición y madurez, que lo convierte en uno de los acontecimientos más importantes para los circuitos de microelectrónica y la comunidad de diseño de sistemas en el sur de Europa. Desde su origen tiene una gran contribución de Universidades españolas, aunque hoy los autores participan desde catorce países

This book constitutes the refereed proceedings of the 13th International Symposium on Applied Reconfigurable Computing, ARC 2017, held in Delft, The Netherlands, in April 2017. The 17 full papers and 11 short papers presented in this volume were carefully reviewed and selected from 49 submissions. They are organized in topical sections on adaptive architectures, embedded computing and security, simulation and synthesis, design space exploration, fault tolerance, FGPA-based designs, neural neworks, and languages and estimation techniques.

The idea of creating the European Dependable Computing Conference (EDCC) was born at the moment when the Iron Curtain fell. A group of enthusiasts, who were pre viously involved in research and teaching in the ?eld of fault tolerant computing in different European countries, agreed that there is no longer any

point in keeping pre viously independent activities apart and created a steering committee which took the responsibility for preparing the EDCC calendar and appointing the chairs for the in dividual conferences. There is no single European or global professional organization that took over the responsibility for this conference, but there are three national in terest groups that sent delegates to the steering committee and support its activities, especially by promoting the conference materials. As can be seen from these materi als, they are the SEE Working Group "Dependable Computing" (which is a successor organizationof AFCET)in France,theGI/ITG/GMATechnicalCommitteeonDepend ability and Fault Tolerance in Germany, and the AICA Working Group "Dependability of Computer Systems" in Italy. In addition, committees of several global professional organizations, such as IEEE and IFIP, support this conference. Prague has been selected as a conference venue for several reasons. It is an easily accessible location that may attract many visitors by its beauty and that has a tradition in organizing international events of this kind (one of the last FTSD conferences took place here).

"Reliability and Risk Issues in Large Scale Safety-critical Digital Control Systems" provides a comprehensive coverage of reliability issues and their corresponding countermeasures in the field of large-scale digital control systems, from the hardware and software in digital systems to the human operators who supervise the overall process of large-scale systems. Unlike other books which examine theories and issues in individual fields, this book reviews important problems and countermeasures across the fields of software reliability, software verification and validation, digital systems, human factors engineering and human reliability analysis. Divided into four sections dealing with software reliability, digital system reliability, human reliability and human operators in large-scale digital systems, the book offers insights from professional researchers in each specialized field in a diverse yet unified approach.

This book describes the benefits and drawbacks inherent in the use of virtual platforms (VPs) to perform fast and early soft error assessment of multicore systems. The authors show that VPs provide engineers with appropriate means to investigate new and more efficient fault injection and mitigation techniques. Coverage also includes the use of machine learning techniques (e.g., linear regression) to speed-up the soft error evaluation process by pinpointing parameters (e.g., architectural) with the most substantial impact on the software stack dependability. This book provides valuable information and insight through more than 3 million individual scenarios and 2 million simulation-hours. Further, this book explores machine learning techniques usage to navigate large fault injection datasets.

This book reviews fault-tolerance techniques for SRAM-based Field Programmable Gate Arrays (FPGAs), outlining many methods for designing fault tolerance systems. Some of these are based on new fault-tolerant architecture, and others on protecting the high-level hardware description before synthesis in

the FPGA. The text helps the reader choose the best techniques project-by-project, and to compare fault tolerant techniques for programmable logic applications.

This volume provides an extensive overview of radiation effects on integrated circuits, offering major guidelines for coping with radiation effects on components. It contains a set of chapters based on the tutorials presented at the International School on Effects of Radiation on Embedded Systems for Space Applications (SERESSA) that was held in Manaus, Brazil, November 20-25, 2005.

Comprehensive coverage of all aspects of space application oriented fault tolerance techniques • Experienced expert author working on fault tolerance for Chinese space program for almost three decades • Initiatively provides a systematic texts for the cutting-edge fault tolerance techniques in spacecraft control computer, with emphasis on practical engineering knowledge • Presents fundamental and advanced theories and technologies in a logical and easy-to-understand manner • Beneficial to readers inside and outside the area of space applications

This book constitutes the proceedings of the 29th International Conference on Computer Safety, Reliability, and Security held in Vienna, Austria in September 2010. This tutorial book gives an overview of the current state of the art in measuring the different aspects of dependability of systems: reliability, security and performance. This year we celebrated another anniversary: after 20 years of SAFECOMP in 1999, th this was the 20 SAFECOMP since its inauguration in 1979. This series of events focuses on critical computer applications. It is intended to be a platform for knowledge transfer between academia, industry, and research institutions. Papers are solicited on all aspects of computer systems in which safety, reliability, and security (applied to safety in terms of integrity and availability) are of importance. The 20th SAFECOMP tried to cover new grounds, both thematically and geographically. The previous 19 SAFECOMPs were held in Austria (1989, 1996), France (1987, 1999), Germany (1979, 1988, 1998), Great Britain (1983, 1986, 1990, 1997), Italy (1985, 1995), Norway (1991), Poland (1993), Switzerland (1992), The th Netherlands (2000), and in the USA (1981, 1992), whereas the 20 was held in Hungary. Authors from 13 countries responded to the Call for Papers, and 10 countries were represented in the final program. The proceedings include 20 papers plus 3 invited papers, covering the areas Reliability Assessment and Security, Safety Case and Safety Analysis, Testing, Formal Methods, Control Systems, and this year covering new grounds with a special emphasis on Human Machine Interface, Components off the Shelf, and Medical Systems.

Simulation Based Fault Injection in VHDL ModelsSimulation Based Fault Injection Technique Into VHDL Models of VLSI CircuitsFault Injection Techniques and Tools for Embedded Systems Reliability EvaluationSpringer Science & Business Media

It is always a special honor to chair the European Dependable Computing C- ference (EDCC). EDCC has become one of the well-established conferences in the ?eld of dependability in the European research area. Budapest was selected as the host of this conference due to its traditions in organizing international scienti?c events and its traditional role of serving as a meeting point between East and West. EDCC-5 was the ?fth in the series of these high-quality scienti?c conf- ences. In addition to the overall signi?cance of such a pan-European event, this year's conference was a special one

due to historic reasons. The roots of EDCC date back to the moment when the Iron Curtain fell. Originally, two groups of scientists from di?erent European countries in Western and Eastern Europe – who were active in research and education related to dependability created a – joint forum in order to merge their communities as early as in 1989. This trend has continued up to today. This year's conference was the ?rst one where the overwhelming majority of the research groups belong to the family of European nations united in the European Union. During the past 16 years we observed that the same roots in all the professional, cultural and scienti?c senses led to a seamless integration of these research communities previously separated ar- ?cially for a long time. EDCC has become one of the main European platforms to exchange new - searchideasinthe?eldofdependability.

Since its first volume in 1960, Advances in Computers has presented detailed coverage of innovations in computer hardware, software, theory, design, and applications. It has also provided contributors with a medium in which they can explore their subjects in greater depth and breadth than journal articles usually allow. As a result, many articles have become standard references that continue to be of sugnificant, lasting value in this rapidly expanding field. In-depth surveys and tutorials on new computer technology Well-known authors and researchers in the field Extensive bibliographies with most chapters Many of the volumes are devoted to single themes or subfields of computer science

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This comprehensive survey on the state of the art of SystemC in industry and research is organised into 11 self-contained chapters. Selected SystemC experts present their approaches in the domains of modelling, analysis and synthesis, ranging from mixed signal and discrete system to embedded software.

This book presents a new approach to on-line observation and concurrent checking of processors by refining and improving known techniques and introducing new ideas.The proposed on-line error detection and fast recover techniques support and complement other established methods. In combination with other on-line observation priniciples and with a combined hardware-software test, these techniques are used to fulfill a complete self-check scheme for an embedded processor.

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