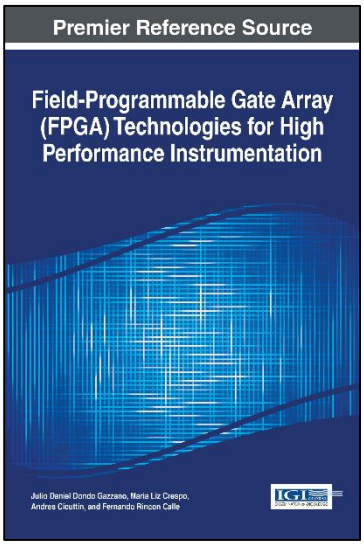
Field-Programmable Gate Array (FPGA) Technologies for High Performance Instrumentation



Part of the Advances in Computer and Electrical Engineering (ACEE) Book Series

Julio Daniel Dondo Gazzano (University of Castilla-La Mancha, Spain), Maria Liz Crespo (International Centre for Theoretical Physics, Italy), Andres Cicuttin (International Centre for Theoretical Physics, Italy) and Fernando Rincon Calle (University of Castilla-La Mancha, Spain)

Description:

Field-Programmable Gate Array (FPGA) technologies have increased in popularity in recent years due to their adaptability and high computing potential. Further research in this area illustrates the potential for further advancements and applications of this useful technology.

Field-Programmable Gate Array (FPGA) Technologies for High Performance Instrumentation presents experimental and theoretical research on FPGA-based design and the development of virtual scientific instrumentation that can be used by a broad segment of scientists across a variety of research fields. Focuses on crucial innovations and algorithms for signal processing, data acquisition mechanisms, FPGA-based hardware design, and parallel computing.

Readers:

This publication is a critical resource for researchers, development engineers, and graduate-level students.

ISBN: 9781522502999 **Release Date:** June, 2016 **Copyright:** 2016 **Pages:** 240

Topics Covered:

- Embedded System Development
- High-Speed Data Acquisitions
- Parallel Computing
- Reconfigurable Computer Architectures
- Scientific Instrumentation
- System Testing and Verification

Hardcover + Free E-Access:	E-Access + Free Hardcover:
$185.00	$185.00

Preface

Acknowledgment

Section 1

Nuclear Physics applications

Chapter 1
Implementation of Reactor Control Rod Position Sensing/Display Using a Vlsi Chip
Prof. Imbaby I. Mahmoud, Atomic Energy Authority, Egypt

Chapter 2
Development of Algorithms and their Hardware Implementation for Gamma Radiation Spectrometry
Prof. Imbaby Ismail Mahmoud, Atomic Energy Authority, Egypt
Dr. Mohamed S. EL_TOKHY, Atomic Energy Authority, Egypt

Section 2

Chaotic maps

Chapter 3
Methodology for FPGA Implementation of a Chaos-based AWGN Generator
Dr. Luciana De Micco, Engineering Faculty National University of Mar del Plata, Argentina
Dr. Hilda Angela Larrondo, CONICET, School of Engineering, National University of Mar del Plata, Argentina

Chapter 4
FPGA implementations for chaotic maps using fixed-point and floating-point representations
Ricardo Francisco Martinez-Gonzalez, Veracruz Institute of Technology, Mexico
Dr. Ruben Vazquez-Medina, Instituto Politecnico Nacional, Mexico
Dr. Jose Alejandro Diaz-Mendez, Instituto Nacional de Astrofisica, Optica y Electronica, Mexico
Dr. Juan Lopez-Hernandez, Universidad Politecnica de Victoria, Mexico

Section 3

Virtual instrumentations

Chapter 5
Reconfigurable Virtual Instrumentation based on FPGA for Science and High-Education
Dr. Maria Liz Crespo, Abdus Salam-UNESCO International Centre for Theoretical Physics, Italy
Andres Cicuttin, Abdus Salam-UNESCO International Centre for Theoretical Physics, Italy
Julio Dondo Gazzano, University of Castilla-La Mancha, Spain
Fernando Rincon Calle, University of Castilla-La Mancha, Spain

Chapter 6
Dynamic Reconfiguration for Internal System Monitoring
Julio Daniel Dondo Gazzano, University of Castilla-La Mancha, Spain
Fernando Rincon Calle, University of Castilla-La Mancha, Spain
Julian Caba, University of Castilla-La Mancha, Spain
David de la Fuente, University of Castilla-La Mancha, Spain
Jesus Barba Romero, University of Castilla-La Mancha, Spain
Juan Carlos Lopez, University of Castilla-La Mancha, Spain

Section 4
Miscellaneous applications

Chapter 7
Hardware Acceleration of CBIR System with FPGA Based Platform
Veronica Gil-Costa, National University of San Luis, Argentina
Romina Soledad Molina, National University of San Luis, Argentina
Ricardo Petrino, National University of San Luis, Argentina
Carlos Federico Sosa Paez, National University of San Luis, Argentina
Marcela Printista, National University of San Luis, Argentina
Julio Daniel Dondo Gazzano, University of Castilla-La Mancha, Spain

Chapter 8
Optimization of Advanced Signal Processing Architectures for Detection of Signals Immersed in Noise
Dr. Marcos A. Funes, Universidad Nacional de Mar del Plata – CONICET, Argentina
Dr. Matías N. Hadad, Universidad Nacional de Mar del Plata – CONICET, Argentina
Dr. Patricio G. Donato, Universidad Nacional de Mar del Plata – CONICET, Argentina
Dr. Daniel O. Carrica, Universidad Nacional de Mar del Plata – CONICET, Argentina

Chapter 9
Implementation of a Smart Sensor Node for Wireless Sensor Network Applications using FPGAs
Mr. Dilum Rukshan Perera, University of Sri Jayewardenepura, Sri Lanca
Mr. K. S. Mannathunga, University of Sri Jayewardenepura, Sri Lanca
Mr. R. A. Darmasiri, University of Sri Jayewardenepura, Sri Lanca
Prof. Ravinda Gayan Meegama, University of Sri Jayewardenepura, Sri Lanca
Dr. Kithsiri Jayananda, University of Colombo, Sri Lanca

Chapter 10
Hardware Implementation of a Genetic Algorithm for Motion Path Planning
Prof. Imbaby I. Mahmoud, Egyptian Atomic Energy Authority, Egipt.
Dr. May Salama, Benha University, Faculty of Eng. at Shoubra, Comp- Engineering Dept, Egypt.
Dr. Asmaa Abd El Tawab Abd El Hamid, Egyptian Atomic Energy Authority, Egypt.

Compilation of References

About the Contributors

Index