The first part of the book covers research on applications in the emerging field of High-Performance Reconfigurable Computing. The first two chapters present work on FPGA-based financial computing, an application field which has grown considerably in the last decade in both research and industry. These are from de Schryver et al. of the University of Kaiserslautern, Germany, and Tian et al. from the University of Edinburgh, UK, respectively. These are followed by four chapter contributions on FPGA-based bioinformatics and computational biology (BCB), another application area which has attracted considerable attention in the last decade, mostly in academia but also industry. These are from Lars Wienbrandt of the Christian-Albrechts-University of Kiel, Germany, Herbordt et al. from Boston University, USA, Yamaguchi et al. from the Universities of Tsukuba, Ryukyu, Doshisha and Keio, in Japan, and Will Li et al. from the City University of Hong Kong, China. The following two contributions are on FPGA-based data search and processing, another interesting application in our information age characterised by an explosion of data. The two contributions are from Vanderbauwhede et al. of Glasgow University, UK, and the University of Massachussets, USA, and Sklyarov and Skliarova from the University of Aveiro, Portugal. The next two contributions are on FPGA-based stencil computations, a very important area with various applications in computational fluid dynamics, electromagnetic simulation based on the finite-difference time domain method, and iterative solvers e.g. for seismic modelling. The two contributions are from Kentaro Sano from Tohoku University, Japan, and Medeiros et al. from Universidad Federal de Pernambuco, Brazil. The following chapter from Gneysu et al. of Ruhr-University Bochum, Germany, Czech Technical University in Prague, Czech Republic, and the Christian-Albrechts-University of Kiel, Germany, presents dedicated FPGA-based cluster solutions for high performance efficient cryptanalysis. After this, Hamada and Shibata from Nagasaki University, Japan, present a contribution which deals with two floating point scientific applications, namely ocean model simulation with a particular emphasis on fast inter-task communications, and astronomical N-body simulations with a particular emphasis on performance per $ and performance
per Watt measures of FPGAs compared to ASICs, GPUs and general purpose processors. Finally, Kapre and DeHon from Imperial College London, UK, and the University of Pennsylvania, USA, present an FPGA-accelerated solution for the SPICE simulator, a widely used open-source tool for the simulation and verification of analog circuits.