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Logic Synthesis for FSM-Based Control Units Alexander Barkalov, Larysa Titarenko, 2009-11-25 This book presents the hardware implementation of control algorithms represented by graph schemes of algorithm It includes new methods of logic synthesis and optimization for logic circuits of Mealy and Moore FSMs oriented on both ASIC and FPLD

Logic Synthesis and Optimization Benchmarks User Guide Saeyang Yang, 1991

Logic Synthesis for Low Power VLSI Designs Sasan Iman, Massoud Pedram, 2012-12-06 Logic Synthesis for Low Power VLSI Designs presents a systematic and comprehensive treatment of power modeling and optimization at the logic level More precisely this book provides a detailed presentation of methodologies algorithms and CAD tools for power modeling estimation and analysis synthesis and optimization at the logic level Logic Synthesis for Low Power VLSI Designs contains detailed descriptions of technology dependent logic transformations and optimizations technology decomposition and mapping and post mapping structural optimization techniques for low power It also emphasizes the trade off techniques for two level and multi level logic circuits that involve power dissipation and circuit speed in the hope that the readers can better understand the issues and ways of achieving their power dissipation goal while meeting the timing constraints Logic Synthesis for Low Power VLSI Designs is written for VLSI design engineers CAD professionals and students who have had a basic knowledge of CMOS digital design and logic synthesis

Logic Synthesis and Optimization Benchmarks User Guide Robert Lisanke, 1988

Advanced Techniques in Logic Synthesis, Optimizations and Applications Kanupriya Gulati, 2010-11-25 This book covers recent advances in the field of logic synthesis and design including Boolean Matching Logic Decomposition Boolean satisfiability Advanced Synthesis

Techniques and Applications of Logic Design All of these topics are valuable to CAD engineers working in Logic Design Logic Optimization and Verification Engineers seeking opportunities for optimizing VLSI integrated circuits will find this book as an invaluable reference since there is no existing book that covers this material in a systematic fashion Logic Synthesis and Optimization Algorithms Kuang-Chien Chen,1991 As VLSI integration size and chip complexity keep increasing logic design is becoming more complex and it must be automated The increasing demand for ASIC Application Specific Integrated Circuits also needs design efficiency and cost effectiveness which can only be achieved by effective automatic logic synthesis tools In this thesis two important network realization means PLA s and multi level networks i e random logic networks are studied and effective algorithms are developed for the use as automatic logic synthesis tools For the design based on PLA s an absolute PLA minimization algorithm PMIN is presented PMIN can handle a much larger range of functions than previous absolute minimization algorithms because it incorporated new algorithms for prime implicant generation and the extraction of a minimal subset of prime implicants Also a heuristic input variable assignment algorithm for the design of decoded PLA s using multi input decoders is incorporated in PMIN and experimental results show that significant saving in area can be achieved for many functions For the design of multi level networks a synthesis and optimization algorithm SYLON DREAM is presented which includes algorithms for network design area optimization and timing optimization Extensive experimental results are shown to demonstrate the capabilities of these algorithms *Algorithms for Multi-level Logic Synthesis and Optimization* Robert King Brayton,1986 Layout Driven Logic Synthesis and Optimization Techniques for FPGA Shih-Chieh Chang,1994 Logic Synthesis and SOC Prototyping Vaibbhav Taraate,2020-01-03 This book describes RTL design synthesis and timing closure strategies for SOC blocks It covers high level RTL design scenarios and challenges for SOC design The book gives practical information on the issues in SOC and ASIC prototyping using modern high density FPGAs The book covers SOC performance improvement techniques testing and system level verification The book also describes the modern Xilinx FPGA architecture and their use in SOC prototyping The book covers the Synopsys DC PT commands and use of them to constraint and to optimize SOC design The contents of this book will be of use to students professionals and hobbyists alike **Finite State Machine Logic Synthesis for Complex Programmable Logic Devices** Robert Czerwinski,Dariusz Kania,2013-01-12 This book is a monograph devoted to logic synthesis and optimization for CPLDs CPLDs macrocell can also be interpreted as programmable AND fixed OR structure well known as PAL based structure The question is what should be done when the number of implicants representing function exceeds the number of product terms available in a logic block The answer is in the book Logic synthesis and optimization methods dedicated for PAL based structures are proposed The methods strive to find the optimum fit for the combinational logic and finite state machines to the structure of the logic device and aim at area and speed optimization The theoretical background and complete strategies are richly illustrated with examples and figures *Synthesis and Optimization of FPGA-Based Systems* Valery Sklyarov,Iouliia

Skliarova,Alexander Barkalov,Larysa Titarenko,2014-03-14 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

Advanced Techniques in Logic Synthesis, Optimizations and Applications Kanupriya Gulati,2011-03-30 VHDL: A Logic Synthesis Approach D. Naylor,S. Jones,1997-07-31 This book is structured in a practical example driven manner The use of VHDL for constructing logic synthesizers is one of the aims of the book the second is the application of the tools to the design process Worked examples questions and answers are provided together with do and don ts of good practice An appendix on logic design the source code are available free of charge over the Internet

Synthesis of Finite State Machines Tiziano Villa,Timothy Kam,Robert K. Brayton,Alberto L. Sangiovanni-Vincentelli,2012-12-06 Synthesis of Finite State Machines Logic Optimization is the second in a set of two monographs devoted to the synthesis of Finite State Machines FSMs The first volume Synthesis of Finite State Machines Functional Optimization addresses functional optimization whereas this one addresses logic optimization The result of functional optimization is a symbolic description of an FSM which represents a sequential function chosen from a collection of permissible candidates Logic optimization is the body of techniques for converting a symbolic description of an FSM into a hardware implementation The mapping of a given symbolic representation into a two valued logic implementation is called state encoding or state assignment and it impacts heavily area speed testability and power consumption of the realized circuit The first part of the book introduces the relevant background presents results previously scattered in the literature on the computational complexity of encoding problems and surveys in depth old and new approaches to encoding in logic synthesis The second part of the book presents two main results about symbolic minimization a new procedure to find minimal two level symbolic covers under face dominance and disjunctive constraints and a unified frame to check encodability of encoding constraints and find codes of minimum length that satisfy them The third part of the book introduces

generalized prime implicants GPIs which are the counterpart in symbolic minimization of two level logic to prime implicants in two valued two level minimization GPIs enable the design of an exact procedure for two level symbolic minimization based on a covering step which is complicated by the need to guarantee encodability of the final cover A new efficient algorithm to verify encodability of a selected cover is presented If a cover is not encodable it is shown how to augment it minimally until an encodable superset of GPIs is determined To handle encodability the authors have extended the frame to satisfy encoding constraints presented in the second part The covering problems generated in the minimization of GPIs tend to be very large Recently large covering problems have been attacked successfully by representing the covering table with binary decision diagrams BDD In the fourth part of the book the authors introduce such techniques and extend them to the case of the implicit minimization of GPIs where the encodability and augmentation steps are also performed implicitly Synthesis of Finite State Machines Logic Optimization will be of interest to researchers and professional engineers who work in the area of computer aided design of integrated circuits

Logic Synthesis and Verification Soha Hassoun, Tsutomu

Sasao, 2001-11-30 Research and development of logic synthesis and verification have matured considerably over the past two decades Many commercial products are available and they have been critical in harnessing advances in fabrication technology to produce today's plethora of electronic components While this maturity is assuring the advances in fabrication continue to seemingly present unwieldy challenges Logic Synthesis and Verification provides a state of the art view of logic synthesis and verification It consists of fifteen chapters each focusing on a distinct aspect Each chapter presents key developments outlines future challenges and lists essential references Two unique features of this book are technical strength and comprehensiveness The book chapters are written by twenty eight recognized leaders in the field and reviewed by equally qualified experts The topics collectively span the field Logic Synthesis and Verification fills a current gap in the existing CAD literature Each chapter contains essential information to study a topic at a great depth and to understand further developments in the field The book is intended for seniors graduate students researchers and developers of related Computer Aided Design CAD tools From the foreword The commercial success of logic synthesis and verification is due in large part to the ideas of many of the authors of this book Their innovative work contributed to design automation tools that permanently changed the course of electronic design by Aart J de Geus Chairman and CEO Synopsys Inc

Sequential

Logic Synthesis Pranav Ashar, S. Devadas, A. Richard Newton, 2012-12-06

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VLSI Systems to Silicon: A Practical Guide to Advanced Chip Design and Integration 2025 Author:1-Ujjwal Singh, Author:2-Dr. Abhishek Jain, PREFACE The rapid advancement of Very Large Scale Integration VLSI technology has profoundly impacted the world of electronics driving innovation and enabling the creation of increasingly sophisticated chips that power a wide array of applications from smartphones to supercomputers The integration of millions and sometimes billions of transistors onto a single chip has unlocked the potential for next generation technologies facilitating new frontiers in computational power miniaturization and energy efficiency VLSI Systems to Silicon A Practical Guide to Advanced Chip Design and Integration is intended to provide a comprehensive understanding of the core principles and practical techniques involved in modern VLSI design With contributions from leading experts in the field this book offers readers a holistic approach to VLSI systems from the foundational concepts of digital logic design and circuit analysis to the intricate details of chip integration and silicon fabrication The book is structured to serve both as a practical guide for industry professionals and as a valuable textbook for students pursuing advanced studies in VLSI design It bridges the gap between theoretical knowledge and real world implementation providing in depth insights into the design flow integration challenges and cutting edge technologies that shape the development of integrated circuits today The chapters are carefully crafted to cover key topics including CMOS technology low power design techniques hardware description languages system on chip SoC design and the latest trends in chip scaling and integration By offering both theoretical concepts and hands on design examples this book aims to equip readers with the skills required to address the complexities of modern chip design The journey from VLSI systems to silicon is one that demands not only a strong grasp of digital and analog circuit design but also a deep understanding of the tools and methodologies that make chip integration feasible This guide is written with the intent to help both newcomers and seasoned engineers navigate these challenges and to inspire innovation in the ongoing evolution of VLSI technologies We hope that this book serves as an essential resource for your learning and professional growth enabling you to contribute to the ongoing revolution in chip design and integration Authors Ujjwal Singh Dr Abhishek Jain

Springer Handbook of Automation Shimon Y. Nof, 2009-07-16 Automation is undergoing a major transformation in scope and dimension and plays an increasingly important role in the global economy and in our daily lives Engineers combine automated devices with mathematical and organizational tools to create complex systems for a rapidly expanding range of applications and human

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