ANALOG DEVICE-LEVEL LAYOUT AUTOMATION

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Kluwer Academic Publishers

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Analog Device Level Layout Automation:

Analog Device-Level Layout Automation John M. Cohn,David J. Garrod,Rob A. Rutenbar,Rick Carley,2012-12-06 This book presents a detailed summary of research on automatic layout of device level analog circuits that was undertaken in the late 1980s and early 1990s at Carnegie Mellon University We focus on the work behind the creation of the tools called KOAN and ANAGRAM II which form part of the core of the CMU ACACIA analog CAD system KOAN is a device placer for custom analog cells ANANGRAM II a detailed area router for these analog cells We strive to present the motivations behind the architecture of these tools including detailed discussion of the subtle technology and circuit concerns that must be addressed in any successful analog or mixed signal layout tool Our approach in organizing the chapters of the book has been to present our algo rithms as a series of responses to these very real and very difficult analog layout problems Finally we present numerous examples of results generated by our algorithms This research was supported in part by the Semiconductor Research Corpora tion by the National Science Foundation by Harris Semiconductor and by the International Business Machines Corporation Resident Study Program Finally just for the record John Cohn was the designer of the KOAN placer David Garrod was the designer of the ANAGRAM II router and its predeces sor ANAGRAM I This book was architected by all four authors edited by John Cohn and Rob Rutenbar and produced in finished form by John Cohn Electronic Design Automation for IC Implementation, Circuit Design, and Process Technology Luciano Lavagno,Igor L. Markov,Grant Martin,Louis K. Scheffer,2017-02-03 The second of two volumes in the Electronic Design Automation for Integrated Circuits Handbook Second Edition Electronic Design Automation for IC Implementation Circuit Design and Process Technology thoroughly examines real time logic RTL to GDSII a file format used to transfer data of semiconductor physical layout design flow analog mixed signal design physical verification and technology computer aided design TCAD Chapters contributed by leading experts authoritatively discuss design for manufacturability DFM at the nanoscale power supply network design and analysis design modeling and much more New to This Edition Major updates appearing in the initial phases of the design flow where the level of abstraction keeps rising to support more functionality with lower non recurring engineering NRE costs Significant revisions reflected in the final phases of the design flow where the complexity due to smaller and smaller geometries is compounded by the slow progress of shorter wavelength lithography New coverage of cutting edge applications and approaches realized in the decade since publication of the previous edition these are illustrated by new chapters on 3D circuit integration and clock design Offering improved depth and modernity Electronic Design Automation for IC Implementation Circuit Design and Process Technology provides a valuable state of the art reference for electronic design automation EDA students researchers and professionals *EDA for IC Implementation, Circuit Design, and Process Technology* Luciano Lavagno,Louis Scheffer,Grant Martin,2018-10-03 Presenting a comprehensive overview of the design automation algorithms tools and methodologies used to design integrated circuits the Electronic Design Automation for

Integrated Circuits Handbook is available in two volumes The second volume EDA for IC Implementation Circuit Design and Process Technology thoroughly examines real time logic to GDSII a file format used to transfer data of semiconductor physical layout analog mixed signal design physical verification and technology CAD TCAD Chapters contributed by leading experts authoritatively discuss design for manufacturability at the nanoscale power supply network design and analysis design modeling and much more Save on the complete set *Principles of VLSI Design - Symmetry, Structures and Methods* Hongjiang Song,2016-06-03 This is the textbook for Dr Hongjiang Song s EEE598 VLSI Analog Circuit Design Based Symmetry class in Ira A Fulton Schools of Engineering at Arizona State University The course introduces structural VLSI analog circuit design concepts and techniques for analog circuit blocks and systems such as the operational amplifiers PLL DLL bandgap reference A D D A converters Symmetry principles and associated circuit constraints structures and methods are adopted to mitigate VLSI PVT and other variations for better circuit performance functionality and design productivity across multiple VLSI process nodes **The Arts of VLSI Circuit Design - Symmetry Approaches toward Zero PVT Sensitivity** Hongjiang Song,2018-02-26 This is one of a book in a VLSI circuit design book series Dr Hongjiang Song published under the VLSI signal processing circuit techniques This text covers various state of the arts circuit design techniques based on VLSI symmetry principles These methods offer inherently low PVT sensitivity for VLSI analog circuit design with superior scalability and performance *Analog Layout Generation for Performance and Manufacturability* Koen Lampaert,Georges Gielen,Willy M.C. Sansen,2013-04-18 Analog integrated circuits are very important as interfaces between the digital parts of integrated electronic systems and the outside world A large portion of the effort involved in designing these circuits is spent in the layout phase Whereas the physical design of digital circuits is automated to a large extent the layout of analog circuits is still a manual time consuming and error prone task This is mainly due to the continuous nature of analog signals which causes analog circuit performance to be very sensitive to layout parasitics The parasitic elements associated with interconnect wires cause loading and coupling effects that degrade the frequency behaviour and the noise performance of analog circuits Device mismatch and thermal effects put a fundamental limit on the achievable accuracy of circuits For successful automation of analog layout advanced place and route tools that can handle these critical parasitics are required In the past automatic analog layout tools tried to optimize the layout without quantifying the performance degradation introduced by layout parasitics Therefore it was not guaranteed that the resulting layout met the specifications and one or more layout iterations could be needed In Analog Layout Generation for Performance and Manufacturability the authors propose a performance driven layout strategy to overcome this problem In this methodology the layout tools are driven by performance constraints such that the final layout with parasitic effects still satisfies the specifications of the circuit The performance degradation associated with an intermediate layout solution is evaluated at runtime using predetermined sensitivities In contrast with other performance driven layout methodologies the tools proposed in this book operate directly on the performance constraints without an intermediate parasitic constraint generation step This approach makes a completeand sensible trade off between the different layout alternatives possible at runtime and therefore eliminates the possible feedback route between constraint derivation placement and layout extraction Besides its influence on the performance layout also has a profound impact on the yield and testability of an analog circuit In Analog Layout Generation for Performance and Manufacturability the authors outline a new criterion to quantify the detectability of a fault and combine this with a yield model to evaluate the testability of an integrated circuit layout They then integrate this technique with their performance driven routing algorithm to produce layouts that have optimal manufacturability while still meeting their performance specifications Analog Layout Generation for Performance and Manufacturability will be of interest to analog engineers researchers and students *VLSI: Integrated Systems on Silicon* Ricardo A. Reis,Luc Claesen,1997-08-31 VLSI very large scale integration technology is evolving to the point where complete systems are being integrated on a single chip including ASICs embedded processing hardware and software control analog and digital signal processing sensors and actuators In addition there is a demand for many systems to be compact portable with wireless communication efficient production and low battery power operation This book presents novel developments addressing the conception design CAD and realization of such new systems Among the important issues presented are VLSI systems on a chip electronic design automation ultra low voltage and low power automatic synthesis VLSI applications The book comprises the selected proceedings of the International Conference on Very Large Scale Integration VLSI 97 which was sponsored by the International Federation for Information Processing IFIP and was held in Gramado Brazil in August 1997 It is a state of the book for researchers and managers working on system integration design and CAD **Proceedings of the ... Midwest Symposium on Circuits and Systems** ,2000 Generating Analog IC Layouts with LAYGEN II Ricardo M. F. Martins,Nuno C. C. Lourenço,Nuno C.G. Horta,2012-12-16 This book presents an innovative methodology for the automatic generation of analog integrated circuits ICs layout based on template descriptions and on evolutionary computational techniques A design automation tool LAYGEN II was implemented to validate the proposed approach giving special emphasis to reusability of expert design knowledge and to efficiency on retargeting operations *Aslib Book Guide* ,1994

APCCAS ... ,1996 *Proceedings of Technical Papers* ,2005 **Proceedings** ,2005 **Evaluation of Computer Aided Software as a Space Analysis Tool for Outfit Unit Design and Planning** Patrick D. Cahill,1995 Mixed-Signal Systems Andrzej Handkiewicz,2002-08-08 A practical guide to the successful integration of digital and analog circuits Mixed signal processing the integration of digital and analog circuitry within computer systems enables systems to take signals from the analog world and process them within a digital system In fact recent advances in VLSI technology performance now allow for the integration of digital and analog circuits on a single chip a process that requires the use of analog pre and post processing systems such as converters filters sensors drivers buffers and actuators However the lack of universal CAD tools for the synthesis simulation and layout of the analog part of the chip represents a design bottleneck of today s VLSI circuits Mixed Signal Systems A Guide to CMOS Circuit Design presents a comprehensive general overview of the latest CMOS technology and covers the various computer systems that may be used for designing integrated circuits Taking an original approach to one and two dimensional filter design the author explores the many digital oriented design systems or silicon compilers currently being used and presents the basic methods procedures and tools used by each In a thorough and systematic manner the text Presents common features of digital oriented design systems Describes methods and tools that are not yet being applied in any compiler Illustrates image processing systems that can be implemented on a single chip Demonstrates the path from synthesis methods to the actual silicon assembly Essential reading for integrated circuit designers and developers of related computer programs as well as advanced students of system design this book represents an invaluable resource for anyone involved in the development of mixed signal systems **Formal Semantics for VHDL** Carlos Delgado Kloos,P. Breuer,1995-02-28 Research papers from a January 1994 workshop put forth a cohesive set of semantics for the VHDL language and describe semantics based on Petri nets as target language higher order logic functional concepts and evolving algebras Quotes from Lewis Caroll s Alice Through the Looking Glass introduce each paper For researchers in formal methods and advanced students No index Annotation copyright by Book News Inc Portland OR

Cad Frameworks Pieter van der Wolf,1994 Since the early 1980s CAD frameworks have received a great deal of attention both in the research community and in the commercial arena It is generally agreed that CAD framework technology promises much advanced CAD frameworks can turn collections of individual tools into effective and user friendly design environments But how can this promise be fulfilled CAD Frameworks Principles and Architecture describes the design and construction of CAD frameworks It presents principles for building integrated design environments and shows how a CAD framework can be based on these principles It derives the architecture of a CAD framework in a systematic way using well defined primitives for representation This architecture defines how the many different framework sub topics ranging from concurrency control to design flow management relate to each other and come together into an overall system The origin of this work is the research and development performed in the context of the Nelsis CAD Framework which has been a working system for well over eight years gaining functionality while evolving from one release to the next The principles and concepts presented in this book have been field tested in the Nelsis CAD Framework CAD Frameworks Principles and Architecture is primarily intended for EDA professionals both in industry and in academia but is also valuable outside the domain of electronic design Many of the principles and concepts presented are also applicable to other design oriented application domains such as mechanical design or computer aided software engineering CASE It is thus a valuable reference for all those involved in computer aided design **Proceedings of the ... IEEE Conference on Evolutionary Computation** ,1995

Journal of VLSI Signal Processing Systems for Signal, Image, and Video Technology ,1999 **Tsinghua**

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Analog Device Level Layout Automation Book Review: Unveiling the Power of Words

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