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By Wiedong Liu, Chenming Hu

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This book presents the art of advanced MOSFET modeling for integrated circuit simulation and design. It provides the essential mathematical and physical analyses of all the electrical, mechanical and thermal effects in MOS transistors relevant to the operation of integrated circuits. Particular emphasis is placed on how the BSIM model evolved into the first ever industry standard SPICE MOSFET model for circuit simulation and CMOS technology development.

The discussion covers the theory and methodology of how a MOSFET model, or semiconductor device models in general, can be implemented to be robust and efficient, turning device physics theory into a production-worthy SPICE simulation model.

Special attention is paid to MOSFET characterization and model parameter extraction methodologies, making the book particularly useful for those interested or already engaged in work in the areas of semiconductor devices, compact modeling for SPICE simulation, and integrated circuit design.

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Editorial Review

About the Author

Dr. Weidong Liu is Director, R&D of Semiconductor Device Modeling, Analog Mixed- Signal Group, Synopsys, Inc. Previously he was post-doctoral researcher at Tsinghua University, China and University of California, Berkeley, where he co-developed the industry-standard CMOS transistor compact models, BSIM3v3, BSIMSOI, and BSIM4. He coauthored a book chapter on BSIM3v3 and 50 technical articles on CMOS scaling and reliability, compact modeling, and parameter extraction. He graduated with the Ph.D. degree in Electronic Engineering from Southeast University, China, in 1994. He received the Distinguished Graduate Student award in 1991 from the Ministry of Machinery and Electronic Industry, China. He received Excellence Award in 2006 from Synopsys, Inc.

Dr. Chenming Hu is TSMC Distinguished Professor at UC Berkeley. From 2001-2004, he was Chief Technology Officer of TSMC. He is a member of the US National Academy of Engineering, a foreign member of the Chinese Academy of Sciences, and a member of Academia Sinica. He has coauthored 4 books, over 800 technical articles and 100 US patents in the field of semiconductor devices and technology. Since 1996, he has led the development of BSIM, world's first industry standard transistor compact model for IC simulation. IEEE has awarded him the Jack Morton Award, Solid State Circuits Award, and Jun-ichi Nishizawa Medal. He also received the Berkeley Distinguished Teaching Award, UC Berkeley's highest honor for teaching.

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