

Preface

Simulation is a fundamental capability for understanding, analyzing and designing an extremely wide range of engineering and biological circuits and systems. As an example, electronic circuit simulation techniques and tools such as SPICE have been a fundamental workhorse to enable the development of integrated circuits in the past several decades. As design complexity drastically rises and manufacturing technologies evolve into the nanometer regime, there is an unsaturated demand for delivering higher accuracy, faster speed and novel simulation capabilities. As such, the notion of simulation should also be interpreted broadly to include complementary modeling and verification techniques that serve the same goal of facilitating complex system design. On a broader horizon, interesting new simulation challenges emerge in biological applications, whose solutions may be assisted by exploiting analysis and tools in electrical engineering and contribute to the development of simulation techniques at large.

With this theme, this book showcases selected works presented at the Circuit and Multi-Domain Simulation Workshop, co-located with the IEEE/ACM International Conference on Computer-Aided Design (ICCAD) in San Jose, California, USA, on November 5, 2009. The workshop drew a large audience from academia, industry and national research laboratories and forged stimulating discussions in the community. The nine chapters of this book provide a comprehensive discussion of recent developments in simulation, modeling and verification of integrated circuits and biological systems. Specific topics include large scale parallel circuit simulation, industrial practice of fast SPICE simulation, structure-preserving model order reduction of interconnects, advanced simulation techniques for oscillator networks, dynamic stability of static memories and biological systems as well as verification of analog integrated circuits.

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