Introduction to the special issue on SM2ACD 2010

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Welcome to the Special Issue of SM2ACD 2010 workshop (initially SMACD). This workshop is the XIth International Workshop on Symbolic and Numerical Methods, Modeling and Applications to Circuit Design held on 4–6 October 2010 in Gammarth—Tunisia. The history of SM(2)ACD workshops goes back to the early nineties. The first SMACD was held in 1991 in France. Throughout the past 20 years, SMACD has been organized at various European locations: Italy (1992), Spain (1994), Belgium (1996), Germany (1998), Portugal (2000), Romania (2002), Poland (2004), Italy (2006), and Germany (2008).

This Special Issue of the Analog Integrated Circuits and Signal Processing consists of the expanded and carefully revised version of papers presented at SM2ACD 2010. Based on workshop review scores and feedback from the sessions chairs on the presentations, nine best papers were selected for publication in this issue from all the contributions at the workshop, and were subject to the normal journal review and refereeing process. These papers cover a large variety of the SM2ACD topics.

(Eleven invitations for contribution to this special issue were sent. Ten were received. After the assessment of the reviewers, nine of them have been accepted for publication).

The first paper, by Zhigang Hao, Sheldon X.-D. Tan, Esteban Tlelo-Cuautle, Jacob Relles, Chao Hu, Wenjian Yu, Yici Cai and Guoyong Shi, presents a novel method for statistical inductance extraction and modeling for interconnects considering process variations. The proposed method uses the collocation-based spectral stochastic method where orthogonal polynomials are used to represent the statistical processes.

The second paper, by Francesco Grasso, Antonio Luchetta, Stefano Manetti and Maria Cristina Piccirilli, presents a novel identification technique for lumped models of general distributed circuits (microwave transmission lines, monolithic integrated circuits and filters) that is based on a hybrid multi-valued neuron neural network with a modified layer and learning process.

The third paper, by David Guilherme, Jorge Guilherme and Nuno Horta, presents an optimization methodology for continuous time loop-filters design applied to class-D amplifiers. The proposed methodology is based on an evolutionary optimization approach which integrates both the topology selection and circuit sizing by automatically generating optimal sized topologies and performance tradeoffs.

The fourth paper, by Antonietta De Nardo, Nicola Femia and Walter Zamboni, presents a new symbolic method for the design of filter capacitors in DC–DC switching converters, using a combination of a ceramic and an electrolytic capacitor; an effective method for the design of mixed electrolytic/ceramic capacitor-based passive filters.

The fifth paper, by Pedro Pereira, Maria Helena Fino, Fernando Coito and Mário Ventim-Neves, addresses a technology-aware modified genetic optimization-based approach for the design of RF integrated inductors where the double π -model is used for the characterization of the inductor's behavior.

The sixth paper, by Florin Constantinescu, Miruna Nitescu, Alexandru Gabriel Gheorghe, Aurelian Florea and Olivier Llopis, presents a nonlinear circuit model of power BAW resonators and filters, which takes into account the parasitic of the resonator connection to the measurement bench. New models for the anti-series and the anti-parallel connections of two resonators are also proposed.

The seventh paper, by Elisenda Roca, Manuel Velasco-Jiménez, Rafael Castro-López and Francisco V. Fernández,

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highlights limitations of the use of the Pareto fronts in analog circuit design (dependence on the a priori unknown surrounding circuitry). The paper proposes generating performance fronts for a new context of use of a given circuit. A transformation methodology for performance objectives of operational amplifiers is developed.

The eighth paper, by Dharmendar Boolchandani, Lokesh Garg, Sapna Khandelwal and Vineet Sahula, presents a variability aware support vector machine macro-model based design centering of analog circuits. The proposed model enables efficient evaluation of performance of such circuits of different sizing during yield optimization loops.

The ninth paper, by Mourad Fakhfakh, Marian Pierczala and Benedykt Rodanski, presents a novel method of designing active inductors using current-controlled voltage sources. The signal-flow graph technique and the newly proposed ‘active’ switches are used for this purpose. In addition, a novel design of simulated inductors using operational trans-resistance amplifiers is proposed.

Finally, I am very grateful to Professor Mohammed Ismail for his support and for the opportunity to present this Special Issue, and to Professor Mourad Loulou for his help.

I am also thankful to all the reviewers for the comments and suggestions that have improved the quality of the papers. Their names are listed in alphabetical order in the Appendix.

Thanks to the Springer personnel for the competent and efficient support provided while putting together this Special Issue.

I hope that this issue will provide the reader new insights.

Please enjoy the reading of these contributions.

Guest Editor

Mourad Fakhfakh

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Appendix: The SI reviewers

Francizek Balik (Wroclaw University of Technology, Poland), Samir Ben Salem (University of Sfax, Tunisia), Arjuna Bin Marzuki (Universiti Sains Malaysia), Dharmendar Boolchandani (Malaviya National Institute of Technology, Jaipur India), Georgio Cappuccino (University of Calabria, Italy), Rafael Casro-Lopez (IMSE-CNM, CSIC and University of Sevilla, Spain), Florin Constantinescu (Politehnica University of Bucharest, Romania), Lucia Dimitriu (Politehnica University of Bucharest, Romania), Francisco V. Fernandez (IMSE-CNM, CSIC, and

University of Sevilla, Spain), Maria Helena Fino (FCT/UNL, Portugal), Ali Gharsallah (University of Tunis El-Manar, Tunisia), Francesco Grasso (Università degli Studi di Firenze, Italy), Tara Julia Hamilton (University of NSW, Sydney Australia), Nuno Horta (Instituto Superior Técnico, Instituto de Telecomunicações, Lisbon, Portugal), Ramy Iskander (Université Pierre et Marie Curie, Paris, France), Jean-Daniel Lan Sun Luk (University of la Réunion), Antonio Luchetta (Università degli Studi di Firenze, Italy), Ahmed Madian (German University in Cairo, Egypt), Mohammed Masmoudi (University of Sfax, Tunisia), Jacques Michel (University of Strasbourg, France), Miruna Nutescu (Politehnica University of Bucharest, Romania), Cristian Onete (NXP Semiconductors, Eindhoven, The Netherlands), Daniel Pasquet (LaMIPS and ENSEA, France), Maria Cristina Piccirilli (Università degli Studi di Firenze, Italy), Marian Pierczala (Wroclaw University of Technology, Poland), Zbynek Raida (Brno University of Technology, CZE), Benedykt Rodanski (University of Technology, Sydney, Australia), Carlos Sánchez-López (Autonomous University of Tlaxcala, México and IMSE-CNM, CSIC and University of Sevilla, Spain), Ralf Sommer (Ilmenau University of Technology and Institute for Microelectronic and Mechatronic Systems GmbH, Germany), Giovanni Stracquadanio (University of Catania, Italy), Sheldon Tan (University of California, Riverside, CA), Esteban Tlelo-Cuautle (INAOE, Mexico), Mustapha Yagoub (University of Ottawa, Canada), Fan Yang (Tsinghua University, Beijing, China).

Mourad Fakhfakh was born in Sfax—Tunisia in 1969. He received the engineering and the PhD degrees from the national engineering school of Sfax, Tunisia, in 1996 and 2006 respectively. From 1998 to 2004 he worked in the Tunisian National Company of Electricity and Gas (STEG) as the head of the technical intervention department. In September 2004, he joined the high institute of electronics and communications (ISECS) where he is working as an Assistant Professor. Dr. Fakhfakh is an IEEE senior member. He has (co)authored one book and around 100 papers in high impact journals, international conferences and book chapters. He regularly serves as a reviewer in high impact-factor international journals and conferences. Dr. Fakhfakh research interests include symbolic analysis, analog and RF circuit design automation, and optimization techniques.