

Comprehensive High-Accuracy Modelling of Electromagnetic Effects in Complete Nanoscale RF blocks

W.H.A. Schilders, NXP Semiconductors (Eindhoven, NL)

W. Schoenmaker, MAGWEL (Leuven, B)

L.M. Silveira, INESC-ID (Lisboa, PO)

IC design automation tools are indispensable for RF designers in the transition to the nano-scale era. These tools are needed to develop nano-scale designs of unprecedented complexity and performance and, in addition, enable the achievement of single-pass design success to avoid costly re-spins and the loss of market opportunities.

Next generation designs will be challenged by an increased number of trouble spots, many of which negligible at lower frequencies but representing a significant limitation for future designs. These trouble spots will have to be accounted for during the design phase in order to avoid costly mishaps that can originate potential failures and additional design and silicon iterations, and must be addressed in future design automation tools.

The key to the avoidance of these trouble spots is the recognition that devices can no longer be treated in isolation. Complete RF blocks must be considered as one entity. Today, it is not possible to perform such analyses of complete RF blocks. The CHAMELEON RF project will deliver the methodologies and prototype tools to make this possible.

The results will lead to design automation tools, in particular design verification tools, that can be used for comprehensive and highly accurate modeling of electromagnetic effects and other trouble spots in complete nano-scale RF blocks, thereby enabling designers to minimize turnaround time without compromising design quality and first-time-right requirements.

In the presentation, an overview will be given of the methods and tools that are being developed within the CHAMELEON-RF project (see: <http://www.chameleon-rf.org>), and that will enable a fully coupled solution of RF blocks. In addition, initial results on the use of model order reduction techniques for interconnected and parametrized systems will be presented.