

# Applications in circuit simulation (C. Tischendorf)

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The further technological development of integrated circuits requires new approaches for the mathematical modeling and the numerical simulation.

The increasing dominance of parasitic effects implies very stiff DAE systems of more than  $10^5$  equations. For certain types of transistors, a correct reflection of the complexity of geometrical and physical effects demands more and more comprehensive compact models with an unacceptable number of parameters. Therefore, one is interested in the inclusion of semiconductor modeling into circuit simulation which implies DAEs coupled with PDEs of parabolic type. The high performance density of current networks is accompanied by strong thermic stress. The consideration of the interaction of electrical and thermic effects leads to DAEs coupled with PDEs of hyperbolic type. Finally, the inherent noise of basic elements have an increasing influence onto the system behavior. Regarding this element noise one has to solve DAEs including stochastic parts.

Stimulated by these application problems, the talks in this minisymposium deal with the numerical analysis of stiff DAEs, PDAEs as well as stochastic DAEs.