Abstracts

Integrated Model Parameter Extraction Using Large-Scale Optimization Concepts

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This paper presents a robust approach to model parameter extraction. The approach not only attempts to match dc and ac measurements under different bias conditions simultaneously, but also employs the dc characteristics of the device as constraints on bias-dependent parameters, hence improving the uniqueness and reliability of the solution. The approach is an expansion of the hierarchical modeling techniques recently proposed by Bandler and Chen. Based on Bandler and Zhang's automatic decomposition concepts for large-scale optimization, a sequential model building method is proposed which combined with powerful l/sub /1 optimization techniques, can be used to establish a model with simple topology and sufficient accuracy. Practical FET models proposed by Materka and Kacprzak and by Curtice and Ettenberg are used to illustrate our formulation. A detailed numerical example based on the Materka and Kacprzak model is presented which has up to 28 optimization variables and 414 nonlinear error functions. The results show that a unique solution can be reached even after perturbing the original starting point (initial model parameter values) by 20 to 200 percent. The results also demonstrate the effectiveness of applying the sequential model building method to the FET modeling problem.

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