Abstracts

Circuit Optimization: The State of the Art

J.W. Bandler and S.H. Chen. "Circuit Optimization: The State of the Art." 1988 Transactions on Microwave Theory and Techniques 36.2 (Feb. 1988 [T-MTT] (Special Issue on Computer-Aided Design)): 424-443.

This paper reviews the current state of the art in circuit optimization, emphasizing techniques suitable for modern microwave CAD. It is directed at the solution of realistic design and modeling problems, addressing such concepts as physical tolerances and model uncertainties. A unified hierarchical treatment of circuit models forms the basis of the presentation. It exposes tolerance phenomena at different parameter/response levels. The concepts of design centering, tolerance assignment, and postproduction tuning in relation to yield enhancement and cost reduction suitable for integrated circuits are discussed. Suitable techniques for optimization oriented worst-case and statistical design are reviewed. A generalized l/sub p/ centering algorithm is proposed and discussed. Multicircuit optimization directed at both CAD and robust device modeling is formalized. Tuning is addressed in some detail, both at the design stage and for production alignment. State-of-the-art gradient-based nonlinear optimization methods are reviewed, with emphasis given to recent, but well-tested, advances in minimax, l/sub 1/, and l/sub 2/ optimization. Illustrative examples as well as a comprehensive bibliography are provided.

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