Abstracts

Efficient Optimization with Integrated Gradient Approximations

J.W. Bandler, S.H. Chen, S. Daijavad and K. Madsen. "Efficient Optimization with Integrated Gradient Approximations." 1988 Transactions on Microwave Theory and Techniques 36.2 (Feb. 1988 [T-MTT] (Special Issue on Computer-Aided Design)): 444-455.

A flexible and effective algorithm is proposed for efficient optimization with integrated gradient approximations. It combines the techniques of perturbations, the Broyden update, and the special iterations of Powell. Perturbations are used to provide an initial approximation as well as regular corrections. The approximate gradient is updated using Broyden's formula in conjunction with the special iterations of Powell. A modification to the Broyden update is introduced to exploit possible sparsity of the Jacobian. Utilizing this algorithm, powerful gradient-based nonlinear optimization tools for circuit CAD can be employed without the effort of calculating exact derivatives. Applications of practical significance are demonstrated. The examples include robust small-signal FET modeling using the l/sub 1/ techniques and simultaneous processing of multiple circuits, worst-case design of a microwave amplifier, and minimax optimization of a five-channel manifold multiplexer. Computational efficiency is greatly improved as compared to estimating derivatives entirely by perturbations.

❑ Return to main document.