Abstracts

A fast finite-element-based field optimizer using analytically calculated gradients

P. Harscher, S. Amari and R. Vahldieck. "A fast finite-element-based field optimizer using analytically calculated gradients." 2002 Transactions on Microwave Theory and Techniques 50.2 (Feb. 2002 [T-MTT]): 433-439.

A novel and efficient gradient-based optimization technique for the finite-element method (FEM) is described. In contrast to the standard approach in which finite differences are used to determine the gradient of a cost function, the new technique calculates the gradient analytically. This offers many advantages, the most prominent of which are that only a single FEM analysis is necessary to find the gradient and no mesh readjustment is required. Thus, computer resources like memory and CPU time are reduced significantly. The analytically calculated gradient is exact and singularities (as in the finite-difference technique) are eliminated.

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