Abstracts

Optimization Methods for Computer-Aided Design

J.W. Bandler. "Optimization Methods for Computer-Aided Design." 1969 Transactions on Microwave Theory and Techniques 17.8 (Aug. 1969 [T-MTT] (Special Issue on Computer-Oriented Microwave Practices)): 533-552.

This paper surveys record automatic optimization methods which either have found or should find useful application in the optimal design of microwave networks by digital computer. Emphasis is given to formulations and methods which can be implemented in situations when the classical synthesis approach (analytic or numerical) is inappropriate. Objectives for network optimization are formulated including minimax and least pth. Detailed consideration is given to methods of dealing with parameter and response constraints by means of transformations or penalties. In particular, the formulation of problems in terms of inequality constraints and their solution by sequential unconstrained minimization is discussed. Several one-dimensional and multidimensional minimization strategies are summarized in a tutorial manner. Included are Fibonacci and Golden Section search, interpolation methods, pattern search, Rosenbrock's method, Powell's method, simplex methods, and the Newton-Raphson, Fletcher-Powell, and least squares methods. Relevant examples of interest to microwave circuit designers illustrating the application of computer-aided optimization techniques are presented. The paper also includes a classified list of references.

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