Abstracts

Optimization of Microwave Networks by Razor Search (Aug. 1969 [T-MTT])

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A new optimization method called razor search is presented. The method, which is based on pattern search, was specifically developed for the automatic optimization by computer of networks for which the objective is to minimize the maximum deviation of some response from a desired ideal response specification. Minimax response objectives, which can lead to equal-ripple optima, will in general give rise to discontinuous partial derivatives of the objective function with respect to the network parameters. Otherwise efficient optimization methods may slow down or even fail to reach an optimum in such circumstances, particularly when the response hypersurface has a narrow curved valley along which the path of discontinuous derivatives lies. Another direct search method called ripple search is also presented. This method was developed to locate the extrema of multimodal functions of one variable in an efficient manner, and is used to determine the maximum deviation of the response from the desired response. Sufficiently detailed flow diagrams are available so that the methods can be readily programmed. The razor search strategy (with ripple search) has been successfully applied to the optimization of inhomogeneous waveguide transformers. It is illustrated in this paper by examples of cascaded commensurate and noncoummensurate transmission lines acting as impedance transformers for which the optima are known.

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