Abstracts

Efficient Minimax Design of Networks without Using Derivatives

K. Madsen, O. Nielsen, H. Schjaer-Jacobsen and L. Thrane. "Efficient Minimax Design of Networks without Using Derivatives." 1975 Transactions on Microwave Theory and Techniques 23.10 (Oct. 1975 [T-MTT]): 803-809.

A new minimax network optimization algorithm not requiring derivatives has been developed. It is based on successive linear approximations to the nonlinear functions defining the problem. Adequate modeling of distributed parameter circuits for optimization purposes often involves parasitic, etc., which makes the gradient computation by the adjoint network method or related methods rather complicated, and often numerical errors are introduced in the gradients. Consequently, the algorithm is found to be of particular relevance in optimum design of practical microwave networks. The relative advantages of the proposed algorithm are established by comparison with known gradient and nongradient algorithms based on optimization of cascaded transmission-line transformers. The relevance to microwave filter design is demonstrated by an example which represents an improvement of analytical filter design results. Finally, optimum broad-band design of a practical coaxial transferred-electron reflection-type amplilier is carried out by means of the proposed method. The results are supported by experimental verification.

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