Abstracts

A New Technique for Synthesis of Broad-Band Parametric Amplifiers

G.R. Branner and S.-P. Chan. "A New Technique for Synthesis of Broad-Band Parametric Amplifiers." 1973 Transactions on Microwave Theory and Techniques 21.7 (Jul. 1973 [T-MTT]): 437-444.

A new synthesis technique for providing precise design values for the realization of broad-band parametric amplifiers incorporating practical varactor diode models is presented. The method provides the designer considerable flexibility in choosing the topology of matching networks employed. An integral part of the synthesis scheme is the application of a least-squares optimization procedure which employs exact partial derivatives of the objective function. The partial derivatives are used in the optimization to compute the gain sensitivity of the amplifier with respect to all matching network and diode parameters. For the first time, sensitivity data is presented which quantitatively shows the effect of the device and matching network parameter variations on overall amplifier response. This permits the determination of critical parameters and provides a means for establishing tolerances for various circuit parameters. In comparison with conventional procedures, significantly improved broad-band designs are shown to result.

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