Abstracts

A robust integrated multibias parameter-extraction method for MESFET and HEMT models

C. van Niekerk, P. Meyer, D.M.M.-P. Schreurs and P.B. Winson. "A robust integrated multibias parameter-extraction method for MESFET and HEMT models." 2000 Transactions on Microwave Theory and Techniques 48.5 (May 2000 [T-MTT]): 777-786.

An integrated multibias extraction technique for MESFET and high electron-mobility transistor (HEMT) models is presented in this paper. The technique uses S-parameters measured at various bias points in the active region to construct one optimization problem, of which the vector of unknowns contains a set of bias-dependent elements for each bias point and one set of bias-independent elements. This problem is solved by an extremely robust decomposition-based optimizer, which splits the problem into n subproblems, n being the number of unknowns. The optimizer consistently converges to the same solution from a wide range of randomly chosen starting values. No assumptions are made concerning the layout of the device or the bias dependencies of the intrinsic model elements. It is shown that there is a convergence in the values of the model elements and a decrease in the extraction uncertainty as the number of bias points in the extraction is increased. Robustness tests using 100 extractions, each using a different set of random starting values, are performed on measured S-parameters of a MESFET and pseudomorphic HEMT device. Results indicate that the extracted parameters typically vary by less than 1%. Extractions with up to 48 bias points were performed successfully, leading to the simultaneous determination of 342 model elements.

❑ Return to main document.