Abstracts

Systematic DC/Small-Signal/Large-Signal Analysis of Heterojunction Bipolar Transistors Using a New Consistent Nonlinear Model

R. Hajji, A.B. Kouki, S. El-Rabaie and F.M. Ghannouchi. "Systematic DC/Small-Signal/Large-Signal Analysis of Heterojunction Bipolar Transistors Using a New Consistent Nonlinear Model." 1996 Transactions on Microwave Theory and Techniques 44.2 (Feb. 1996 [T-MTT]): 233-241.

In this paper, a new systematic approach to heterojunction bipolar transistors (HBT's) characterization and modeling is presented. The proposed approach is based on a new compact HBT nonlinear circuit model which accounts for both self-heating and the temperature dependence effects. The model's parameters are extracted from measured dc-IV characteristics and S-parameters. The power characteristics of the device are then predicted using the extracted model without any further optimizations. The same model is also used for intermodulation distortion analysis. The model has been implemented in a number of commercial nonlinear simulators and in an in-house computer code. Results are presented for two different size devices showing good agreement with measurements.

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