Abstracts

A peeling algorithm for extraction of the HBT small-signal equivalent circuit

B. Sheinman, E. Wasige, M. Rudolph, R. Doerner, V. Sidorov, S. Cohen and D. Ritter. "A peeling algorithm for extraction of the HBT small-signal equivalent circuit." 2002 Transactions on Microwave Theory and Techniques 50.12 (Dec. 2002 [T-MTT] (Special Issue on 2002 International Microwave Symposium)): 2804-2810.

Direct extraction is the most accurate method for the determination of equivalent-circuits of heterojunction bipolar transistors (HBTs). The method is based on first determining the parasitic elements and then the intrinsic elements analytically. The accuracy and robustness of the whole algorithm therefore is determined by the quality of the extraction of the extrinsic elements. This paper focuses on a new extraction method for the extrinsic capacitances which have proven to be the main source of uncertainty compared to the other extrinsic parameters. Concerning the intrinsic parameters, all the elements are extracted using exact closed-form equations, including exact expressions for the base-collector capacitances, which model the distributed nature of the base. The expressions for the base-collector capacitances are valid for both the hybrid-/spl pi/ and the physics-based T-topology equivalent circuits. Extraction results for InP HBT devices on measured S-parameters up to 100 GHz demonstrate good modeling accuracy.

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