Abstracts

Nonlinear statistical modeling and yield estimation technique for use in Monte Carlo simulations [microwave devices and ICs]

J.F. Swidzinski and Kai Chang. "Nonlinear statistical modeling and yield estimation technique for use in Monte Carlo simulations [microwave devices and ICs]." 2000 Transactions on Microwave Theory and Techniques 48.12 (Dec. 2000 [T-MTT] (Special Issue on 2000 International Microwave Symposium)): 2316-2324.

A novel nonlinear statistical modeling technique for microwave devices and a new approach to yield estimation for microwave integrated circuits are presented. The statistical modeling methodology is based on a combination of applied multivariate methods with heuristic techniques. These include principal component analysis and factor analysis in conjunction with maximally flat quadratic interpolation and group method of data handling. The proposed modeling approach, when applied to the database of extracted equivalent circuit parameters (ECPs) for a pseudomorphic high electron mobility transistor device, has proven that it can generate simulated ECPs, S-parameters, that are statistically indistinguishable from measured ones. A new yield estimation technique based on a Latin hypercube sampling (LHS) is also demonstrated. The LHS-based simulation is utilized as an alternative to primitive Monte Carlo (PMC) simulation in yield analysis. An equally confident yield estimate based on the LHS method requires only one-fourth of those simulations needed when the PMC technique is used.

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