Abstracts

Physical Modeling of GaAs MESFET's in an Integrated CAD Environment: From Device Technology to Microwave Circuit Performance

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A CAD environment leading from technology to performance evaluation by integrating process, device, and circuit simulation would be a valuable tool for the development of monolithic microwave circuits. The paper focuses on the linkage between a physical device simulator for small- and Iarge-signal characterization, and CAD tools for both linear and nonlinear circuit analysis and design. Efficient techniques are presented for the physical dc and small-signal analysis of MESFET's; then, the problem of physical simulation in a circuit environment is discussed, and it is shown how such a simulation makes it possible to obtain small-signal models accounting for propagation and external parasitic. Finally, efficient solutions are proposed for physical Iarge-signal simulation, based on deriving large-signal equivalent circuits from small-signal analyses under different bias conditions. The small- and large-signal characterizations thereby obtained allow physical simulation to be performed, efficiently in a circuit environment. Examples and results are presented throughout the paper.

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