Abstracts

GaAs MESFET Characterization Using Least Squares Approximation by Rational Functions

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We propose a new method to characterize active devices such as the FET by describing S-parameters with a set of rational functions of angular frequency. The set of rational functions is uniquely determined by only 27 coefficients, while the conventional method using tabulated S-parameters requires 8 times the number of sampling points (a typical case might require 404 data points in floating point notation). This drastically reduces the database size required to give adequate information for circuit design. We also describe a method for determining the equivalent circuit. Since the equivalent circuit is determined from the set of rational functions, no additional measurements are needed to determine extrinsic elements. In conventional methods, selection of initial values affects the final results. In our method, reliable initial values are extracted from the rational functions' coefficients. The calculated S-parameters of three GaAs MESFET's having different gate widths agree closely with those measured by wafer-probe.

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