Abstracts

A Large-Signal Physical MESFET Model for Computer-Aided Design and its Applications

R.R. Pantoja, M.J. Howes, J.R. Richardson and C.M. Snowden. "A Large-Signal Physical MESFET Model for Computer-Aided Design and its Applications." 1989 Transactions on Microwave Theory and Techniques 37.12 (Dec. 1989 [T-MTT] (1989 Symposium Issue)): 2039-2045.

A quasi-static, large-signal MESFET circuit model has been developed. It is based on a comprehensive quasi-two-dimensional semiclassical device physical simulation where its unique formulation and efficiency make it suitable for the computer-aided design of nonlinear MESFET subsystems. Using this approach the semiconductor equations are reduced to a consistent one-dimensional approximation requiring substantially less computing resources than a full two-dimensional simulation. CPU time is typically reduced by a factor of 1000. A single/two-tone harmonic balance analysis procedure which employs the describing frequency concept has also been developed and combined with the MESFET model. Numerical load-pull contours, as well as intermodulation distortion contours, have been simulated and comparison of these with measured results validates the approach taken.

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