Abstracts

Resistive FET mixer conversion loss and IMD optimization by selective drain bias (Dec. 1999 [T-MTT])

J.A. Garcia, J.C. Pedro, M. L. De La Fuente, N.B. De Carvalho, A.M. Sanchez and A.T. Puente. "Resistive FET mixer conversion loss and IMD optimization by selective drain bias (Dec. 1999 [T-MTT])." 1999 Transactions on Microwave Theory and Techniques 47.12 (Dec. 1999 [T-MTT] (Special Issue on 1999 International Microwave Symposium)): 2382-2392.

This paper describes a dedicated nonlinear MESFET model, which was used to accurately represent the device's drain-source current nonlinearity. An analytical expression is proposed, based on the Shockley approach, with good derivative reproduction. The evolution of the Ids(Vgs, Vds) Taylor-series-expansion coefficients across V/sub GS/ and V/sub DS/ revealed not only the presence of important minimum conversion loss bias, but also of in-band intermodulation distortion sweet spots that have been used to optimize an FET resistive mixer performance. Some previously reported experimental results are also discussed through the use of the derivatives, and an alternative topology is considered for resistive mixers working on the border between the linear and saturated regions.

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