Abstracts

A comprehensive explanation of distortion sideband asymmetries

N. Borges de Carvalho and J.C. Pedro. "A comprehensive explanation of distortion sideband asymmetries." 2002 Transactions on Microwave Theory and Techniques 50.9 (Sep. 2002 [T-MTT]): 2090-2101.

This paper presents a comprehensive study of intermodulation-distortion response asymmetries often observed in microwave nonlinear systems subject to a two-tone or multitone test. The reasons for the different amplitudes of the two adjacent tones are first investigated under small- and large-signal regimes, using a general circuit with frequency-dependent embedding impedances and resistive and reactive nonlinearities. It is shown that this intriguing phenomenon can be mainly attributed to the terminating impedances at the baseband or difference frequencies. Multitone behavior is also addressed and its main differences from the two-tone case explained. Those theoretical conclusions are then extrapolated for real circuits and validated by measured results obtained from microwave power amplifiers of two different technologies, i.e., a GaAs MESFET and an Si bipolar junction transistor.

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