Abstracts

Behavioral Modeling of Narrowband Microwave Power Amplifiers with Applications in Simulating Spectral Regrowth

A new behavioral model for narrowband microwave power amplifiers is proposed. Analytic expressions for the gain compression (AM-AM) and amplitude dependent phase distortion (AM-PM) of a nonlinear amplifier are derived from a third-order Volterra series model. The cases of a single-tone and of a two-tone signal are explored. We show that the gain compression characteristics of nonlinear amplifiers depend on the amplitude modulation characteristics of the signal. Further more, we show that the time-averaged phase deviation is independent of the modulation envelope. This justifies the new model proposed for obtaining the envelope transfer characteristics by applying the Bessel-Fourier technique only to the AM-AM characteristic. This model is verified by comparing spectral regrowth simulations of digitally modulated signals to those measured in a 1.9 GHz GaAsFET power amplifier.

❑ Return to main document.