Abstracts

Intermodulation Distortion Analysis of Reflection-Type IMPATT Amplifiers Using Volterra Series Representation

A. Javed, B.A. Syrett and P.A. Goud. "Intermodulation Distortion Analysis of Reflection-Type IMPATT Amplifiers Using Volterra Series Representation." 1977 Transactions on Microwave Theory and Techniques 25.9 (Sep. 1977 [T-MTT]): 729-734.

Intermodulation distortion generated in a stable IMPATT amplifier is analyzed using Volterra series representation. An IMPATT amplifier model, which takes into account the interaction between the nonlinearities of the diode and its embedding circuitry, is described. The Volterra transfer functions are derived for this model. Nonlinear terms up to and including the fifth order are considered. Intermodulation distortion products are calculated for a low-level input signal consisting of two tones. The results of this analysis are extrapolated into the direction of increasing output power in order to obtain the third-order intercept point. Further, closed form expressions for the third-order intermodulation IM/sub 3/ and intercept point P/sub I/ are derived. The distortion of a specific 6-GHz IMPATT amplifier is evaluated for illustrative purposes; the predicted distortion behavior compares favorably with experimental results.

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