Abstracts

Theoretical and experimental study of amplifier linearization based on harmonic and baseband signal injection technique

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This paper presents a novel linearization scheme for RF amplifiers based on simultaneous harmonic and baseband signal injection. In this method, second-order frequency components generated by predistortion circuits are fed to the input of the main amplifier to mix with the fundamental signal for third-order intermodulation distortion (IMD) cancellation. A general and rigorous analytical formulation of baseband, harmonic, and the proposed injection techniques is presented, and from these derived expressions, the optimum conditions for IMD suppression are developed. The result also reveals the practical limitation of the proposed method subject to gain and phase error associated with the RF and baseband circuitry. For comparison purposes, an amplifying system is constructed for the experimental investigation of second-order signal injection approach. Both two-tone and digitally modulated waveforms are employed in these measurements.

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