Abstracts

Novel third-order distortion generator with residual IM2 suppression capabilities

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Commonly used diode-based third-order distortion generators produce residual second-order distortion signals due to the unmatched statistical characteristics of the diodes. In this paper, a novel circuit technique is presented by which, in theory, the suppression of undesirable residual second-order distortion is achieved. A theoretical analysis of the proposed novel circuit topologies is carried out using Volterra series analysis. The residual second-order intermodulation distortions (IM2) of conventional antiparallel and bridge configurations are compared with the modified versions presented in the paper. Simulated results show that the modified antiparallel configuration possess a maximum residual IM2 46 dB lower than the one produced by the conventional configuration. The modified bridge configuration has a maximum residual IM2 36 dB lower than the one of the conventional configuration. A sensitivity analysis of the modified configurations is also presented. Experimental results indicate that 20 dB cancellation is achievable.

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