Abstracts

A new "active" predistorter with high gain and programmable gain and phase characteristics using cascode-FET structures

Junghyun Kim, Moon-Suk Jeon, Jaehak Lee and Youngwoo Kwon. "A new "active" predistorter with high gain and programmable gain and phase characteristics using cascode-FET structures." 2002 Transactions on Microwave Theory and Techniques 50.11 (Nov. 2002 [T-MTT] (Mini-Special Issue on the 2002 IEEE Radio Frequency Integrated Circuit (RFIC) Symposium)): 2459-2466.

A MMIC-compatible miniaturized "active" predistorter using cascode FET structures is presented. The predistorter has added functionality of gain, as well as programmable gain and phase variation characteristics, which are required to compensate or the nonlinear distortion of a wide range of power amplifiers (PAs). Thanks to the inherent gain of the predistorter, a need for an additional buffer amplifier is eliminated. Furthermore, it can eventually replace the first-stage amplifier in the multistage PAs, making this approach well suited to MMIC implementation. A simple analysis is performed to understand the phase variation mechanisms in the proposed predistorter and to identify the dominant sources of phase variation. To demonstrate the general usefulness of this predistorter, the cascode predistorter was applied to linearize watt-level MMIC amplifiers for CDMA handset applications, as well as 30 W high power amplifiers for base-station applications. Adjacent channel power ratio (ACPR) improvement of 3-5 dB was achieved with off-chip predistorter when applied to 0.9 W monolithic amplifiers. The predistorter was also integrated with a 1.6 W MMIC PA on a single chip, replacing the first-stage transistor of the amplifier.

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