ABSTRACT

A Highly Linear Broadband LNA

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In this work, a highly linear broadband Low Noise Amplifier (LNA) is presented. The linearity issue in broadband Radio Frequency (RF) front-end is introduced, followed by an analysis of the specifications and requirements of a broadband LNA through consideration of broadband, multi-standard front-end design. Metal-Oxide- Semiconductor Field-Effect Transistor (MOSFET) non-linearity characteristics cause linearity problems in the RF front-end system. To solve this problem, feedback and the Derivative Superposition Method linearized MOSFET. In this work, novel linearization approaches such as the constant current biasing and the Derivative Superposition Method using a triode region transistor improve linearization stability against Process, Supply Voltage, and Temperature (PVT) variations and increase high power input capability. After analyzing and designing a resistive feedback LNA, novel linearization methods were applied. A highly linear broadband LNA is designed and simulated in 65nm CMOS technology. Simulation results including PVT variation and the Monte Carlo simulation are presented. We obtained -10dB S11, 9.77dB S21, and 4.63dB Noise Figure with IIP3 of 19.18dBm for the designed LNA.