Low-power active-RC LPF with an ADCOC method applied to a 5.8-GHz Doppler radar sensor system in 55 nm CMOS

Liu Liangningyi[1], Lei Chen[1], Jie Su[1], and Dongwei Song[1]

[1]Shanghai University of Electric Power

December 5, 2022

Abstract

Radar is an important means of wireless detection. Current doppler radar technology has the problems of poor linearity, large DC offset, and large power consumption. To solve the DC offset and reduce power consumption, this letter presents a 5.8-GHz low-power Doppler radar sensing system and an active-RC low-pass filter (LPF) with automatic DC offset calibration (ADCOC). The proposed ADCOC comprises a comparator, SAR logic, and an IDAC. The proposed LPF is capable of operating in the interrupt mode and can reduce power consumption by 99% when the duty cycle is set to 1%. The system uses a 55-nm CMOS process, and the LPF enables gain adjustment from 0 to 45 dB. ADCOC enables calibration of DC offset within 500 mV and DC offset within 9.8 mV after calibration. The overall power consumption of the LPF is 1.914 mW, with an area of 0.15 mm2. The proposed design is of great significance for improving the performance of radar systems.

Hosted file

`Low-power active-RC LPF with an ADCOC method applied to a 5.8-GHz Doppler radar sensor system in 55 nm C` available at https://authorea.com/users/562899/articles/610142-low-power-active-rc-lpf-with-an-adcoc-method-applied-to-a-5-8-ghz-doppler-radar-sensor-system-in-55-nm-cmos

Hosted file

`Figure.docx` available at https://authorea.com/users/562899/articles/610142-low-power-active-rc-lpf-with-an-adcoc-method-applied-to-a-5-8-ghz-doppler-radar-sensor-system-in-55-nm-cmos