A 100KHz – 20MHz source follower continuous time filter for SDR applications

Abstract

The source follower based filters are proposed in the literature for wireless LAN applications and are preferred as they dissipate lower power compared to the filters using other architectures. To comply with multitude standards, filters with bandwidth programmable from 100KHz – 20MHz are required. In this paper, a second order, composite source follower based filter is made to work in weak inversion in order to achieve wide tuning range and to minimize power consumption. The centre frequency of this filter is varied using current steering DAC. The proposed filter is designed and implemented on TSMC-0.18μm CMOS process with 1.2V supply. The simulation results demonstrate the tunability of the centre frequency from 100KHz to 20MHz which meets the requirements of zero IF receivers for SDR applications. The third order input intercept point (IIP3) is found to be 15 dBVp for an input signal of 200mVP. The power dissipated by the filter is 1μW and 20μW at 100 KHz and 20 MHz respectively. The proposed filter consumes 14 times less power than that proposed in the literature at the cost of 1.5 times increase in the noise. A 55μVRms noise gives a dynamic range of 66dB.
Reference

- P. Crombez, J. Craninckx, Piet Wambacq and M. Steyaert, “A 100-KHz to 20-MHz Reconfigurable Power-Linearity Optimized Gm–C Biquad in 0.13

Index Terms

Electronics Wireless Networks

Key Words

Wireless LAN