

عنوان مقاله:

A low-power, wideband-tunable, nano-dimension based CMOS LC ladder filter designed using GmC

محل انتشار:

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خلاصه مقاله:

This paper proposed LC-ladder filter based on transconductance (GmC) with ۱۳۰ nm RF CMOS process technology node at ۱.۲ V. Further, a seventh-order low-pass filter prototype and a sixth-order band-pass filter prototype have been invented to prove high-frequency functioning in a way that is relatively suited for s-parameters modelling. The low pass and band pass elements of an LC filter have been successfully implemented with GmC, and high-frequency operation has been achieved with compact passive components. To perform simulations and validate s-parameters in the intended frequency range of ۲ GHz to ۶ GHz, an RF-simulation platform (ADS from Keysight) has been utilised. The ۸-bit capacitor-bank array used in this device allows the wideband adjustable function to be controlled by a digital or analogue signal from the external control. Due to the current mode multi-port GmC operation, an average selectivity with Q in the range of ۲۷ to ۳۹ has been achieved at ۴.۳mW, while maintaining low power consumption. By selecting the appropriate Gm and capacitive sizes for the cap-bank, it was feasible to achieve the broad operation required in the existing wireless range (۲GHz-۶GHz). SPICE and RF (s-parameter, harmonic balancer) simulations in ADS have been used in combination to examine the frequency response and noise performance of the proposed structure. When compared to state-of-the-art-work, the suggested Low power tunable filter stands out because to its improved frequency range, low supply voltage, better value of noise performance, and low power dissipation, which will be useful for complex analogue circuit design

کلمات کلیدی:

Circuit, CMOS, Filter, GmC, Inductor Emulation, Nano-Dimension, Signal processing

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