

ABSTRACT

Design of a High Frequency Continuous-Time Filter
and an Automatic Tuning Scheme. (December 2001)
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On-chip continuous time filters are essential for many applications. The transconductor-C filters with their programmability have become almost indispensable in applications like Hard Disk Read Channel. Larger bandwidth and better performance are pushing these filters to have higher frequencies and higher quality factors. In this research, a new architecture for a pseudo-differential fully-symmetric high frequency transconductor is proposed. It combines CMFF and CMFB to achieve a faster common mode response. An improved tuning scheme for continuous-time high-Q biquad filters is also proposed. An improvement over the existing implementation of the modified-LMS Q-tuning scheme is combined with frequency tuning using PLL. The scheme has less area overhead, consumes lesser power and is more robust to offsets in the building blocks without compromising the accuracy achieved previously. A bandpass filter with center frequency 100 MHz and Q of 20 is built using the proposed OTA. The proposed tuning scheme is used to tune the filter. The circuit is fabricated in standard CMOS 0.5u technology and the experimental results show that the Q tuning error is around 1%.