ABSTRACT

Design of large time constant switched-capacitor filters for biomedical applications

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This thesis investigates the various techniques to achieve large time constants and the ultimate limitations therein. A novel circuit technique for the realization of large time constants for high pass corners in switched-capacitor filters is also proposed and compared with existing techniques. The switched-capacitor technique is insensitive to parasitic capacitances and is area efficient and it requires only two clock phases. The circuit is used to build a typical switched-capacitor front end with a gain of 10. The low pass corner is fixed at 200 Hz. The high pass corner is varied from 0.159Hz to 4 Hz and various performance parameters, such as power consumption, silicon area etc., are compared with conventional techniques and the advantages and disadvantages of each technique are demonstrated. The front-ends are fully differential and are chopper stabilized to protect against DC offsets and 1/f noise. The front-end is implemented in AMI0.6um technology with a supply voltage of 1.6V and all transistors operate in weak inversion with currents in the range of tens of nano-amperes.