Switched-Capacitor Filter Design (KW2-06)

Supervised by: Professor Ki Wing Hung
Student: TSE TAK HUNG (04008907)
TSOI SUN MIU (04121412)
Project Overview

Introduction

A Filter is a common micro-sensor application to analog signal processing. Historically, active-RC filters played an important role in it. However, the values of MOS resistors are inaccurate and non-linear, and therefore the delay time is very inaccurate.

Since the delay time of switched-capacitor filters depends on the capacitor ratio and clock frequency, as a filtering technique, switched-capacitor filters (SC filters) can be realized with a very high accuracy. It required less area as well. The working principle of SC circuits is to make use of the non-overlapping clocks which generate two non-overlapping signals to switch on and switch off different sets of MOSFET. The performance depends on the selection of different feedback paths.

Aim and Objective

The objective of this project is to design a low pass third order elliptic filter with cut-off frequency between 1kHz - 10kHz and a 2.2V - 5V supply voltage.

System Block Diagram

![Diagram of the system block diagram]

3rd Order Elliptic filter

Signal In → First Stage Linear Section → Second Stage Biquad → Signal Out

Clock
Schematics

First Stage (Linear Section) And Second Stage (Biquad)

Amplifier

Current Mirror  First Stage  Second Stage
Simulation Results

Output amplitude of Global-top, Local 1-middle, Local 2-bottom.

Overall Frequency Response