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Homework 4
Due Thrs., November 1, 2001

EECS 247
Fall 2001

Note: This homework requires you use Spectre to simulate the TF of your SC filter design. Spice cannot perform this simulation. You must use Spectre.

1. Design a SC biquad realization of an elliptic low-pass filter with the following specifications:

f_s	10 MHz
f_{corner}	1 MHz
f_{stop}	1.5 MHz
ripple	< 0.1 dB
attenuation	> 60 dB

a) What is the required filter order? Use the bilinear transform to convert a continuous time prototype to a sampled data filter.

b) Compute and pair the poles and zeros for the biquad realization. There are many solutions.

c) Realize the biquads (many solutions, differing in element spread and sensitivity). Use 1pF integrating capacitors and amplifiers with openloop gain 10^6 . Scale the components for unity gain in the passband. Verify with Spectre.

d) Using Spectre, determine the minimum amplifier voltage gain (all amplifiers have the same gain) required that results in less than a 0.12dB ripple in the passband, and at least 55dB rejection in the stopband.