UNIVERSITY OF CALIFORNIA
College of Engineering
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	Homework 4	**EECS 247**
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1. An integrator-based filter is designed for ideal pole locations at $p_{ideal} = a_{ideal} + j\ b_{ideal}$. Now the filter is realized with integrators that have a finite low-frequency gain A_{v0}. Determine the approximate new pole locations in terms of p_{ideal} and A_{v0}. What would be the effect on a (2nd order) bandpass filter with Q=10 if A_{v0}=100?

2. Design an 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.