

ECE 3043

Homework Assignment No. 5

Spring 2020 Homework 5 for Experiment No. 6

Due Week of February 17

1. Design an inverting bandpass op amp amplifier/filter (Figure 1) with a midband voltage gain with a magnitude of 10, a lower -3dB frequency of 100 Hz , and an upper -3dB frequency of 100 kHz . The circuit shown in Fig. 1 is suggested. Pick the capacitor $C_1 = 0.1\ \mu\text{F}$ and compute the other components. Perform an ac analysis with Multisim to plot the magnitude of the complex transfer function in db and the phase in degrees as a function of frequency as the frequency ranges from one tenth of the lower critical frequency to ten times the highest. Assume that the op amp is ideal. This is the Bode plot. Also, plot the Bode plots with either Matlab or Mathcad.

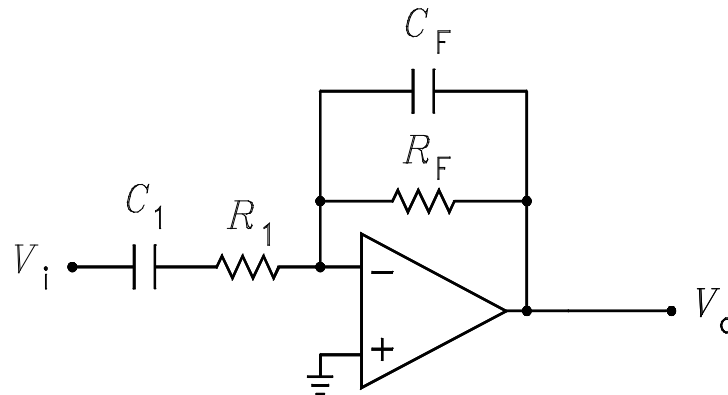


Fig. 1

2. Design an op amp noninverting high pass shelving amplifier/filter (Figure 2). The dc gain is to be 1, the infinite frequency gain 10, and the pole frequency 43 kHz . The circuit shown in Fig. 2 is suggested. Pick $C_1 = 0.1\ \mu\text{F}$ and solve for the other circuit components. Perform the same analyses as for the circuit in Problem 1.

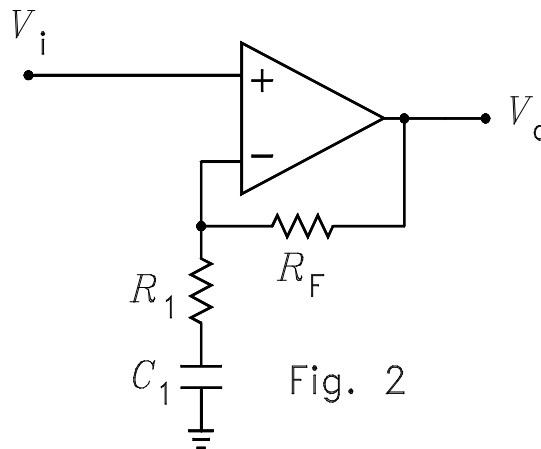


Fig. 2