

ECE 3042

Homework Assignment No. 2

Spring 2013 Homework for Experiment No. 2

Due Week of January 28

1. Shown below in Figs. 1 and 2 are two noninverting op amp amplifiers. The components have been selected so that the dc gain of each is 100. The first, shown in Fig. 1, is realized as the cascade combination of two inverting op amp amplifiers. The second uses one op amp in the noninverting amplifier configuration. For the circuit in Fig. 1 use $R_1 = 1 \text{ k}\Omega$ and $R_F = 10 \text{ k}\Omega$. For the circuit in Fig. 2 use $R_1 = 1 \text{ k}\Omega$ and $R_F = 99 \text{ k}\Omega$.

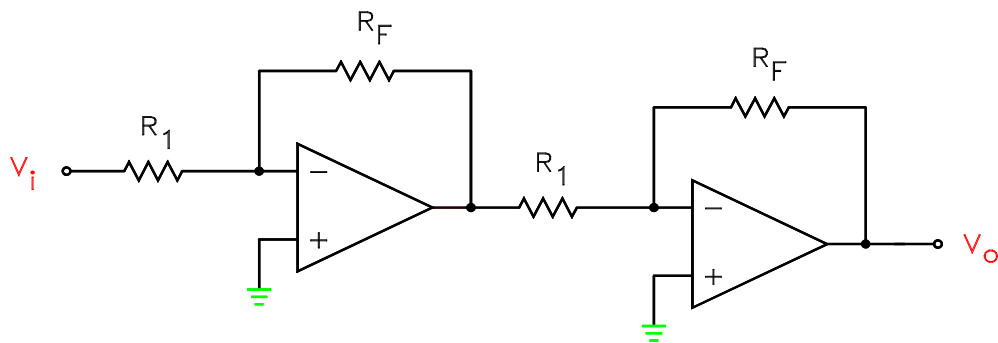


Fig. 1

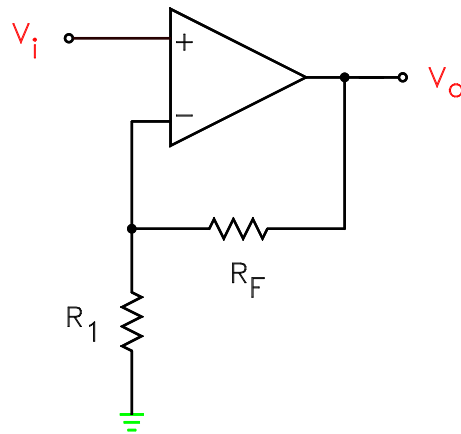


Fig. 2

Use either National Instruments SPICE to plot the small signal gain versus frequency as the frequency varies from 1 kHz to 10 MHz. Assume that each op amp is a 741. Use the dominant pole model for the op amp which assumes that the unity gain frequency is 1 MHz. Plot the frequency response for the two amplifiers on the same sheet of graph paper.

2. Shown in Fig. 3 is a T Feedback op amp amplifier. Design a T Feedback op amp amplifier with a dc gain of -100 . The input impedance is specified to be $10\text{ k}\Omega$. Use either National Instruments SPICE to plot the gain versus frequency as the frequency varies from 1 kHz to 10 MHz . Assume that the op amp is a 741 and use the dominant pole model for the op amp for which the unity gain frequency is 1 MHz . Determine the 3 dB bandwidth and compare it to the theoretical value.

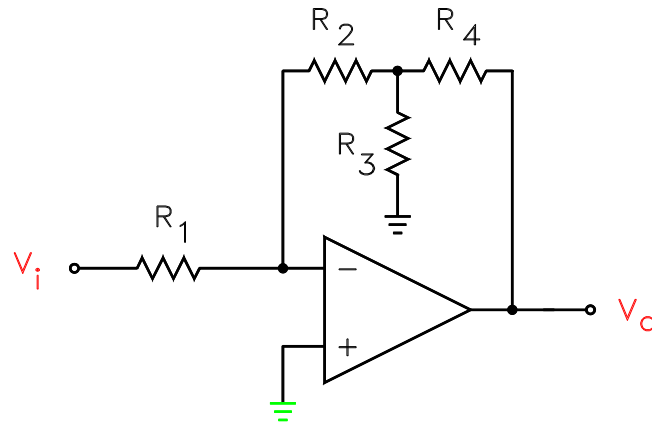


Fig. 3