

EE112 Analog Integrated Circuits I

Homework 2

Due: Oct. 18th before lecture

Read the chapter 2.

- Assuming ideal op amps, find the voltage gain v_o/v_i and input resistance R_{in} of each of the circuits in Fig. 1.

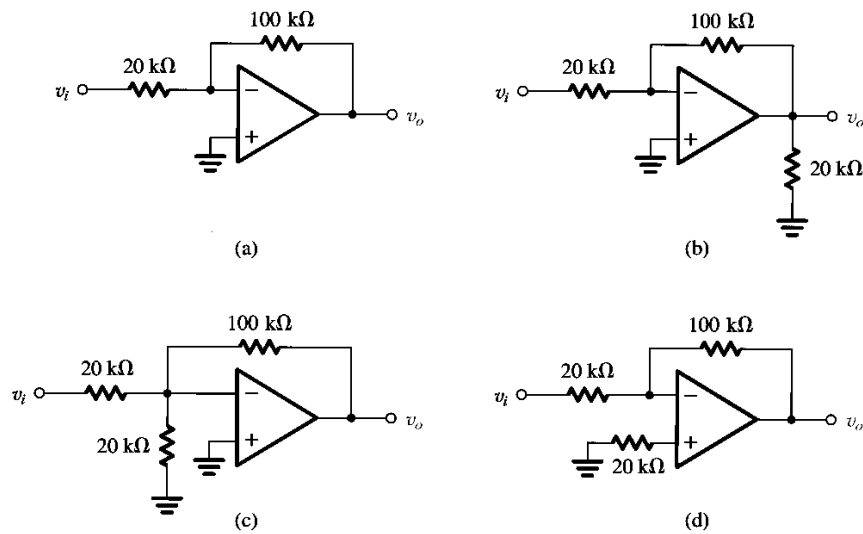


Figure 1

- Derive an expression for the voltage gain, v_o/v_i , of the circuit in Fig. 2.

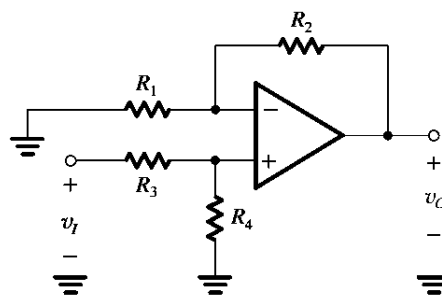


Figure 2

- An op amp connected in a closed-loop inverting configuration having a gain of 1000 V/V and using relatively small-valued resistors is measured with input grounded to have a dc output voltage of -1.8 V. What is its input offset voltage? Prepare an offset-voltage-source sketch resembling that in Fig. 3. Be careful of polarities.

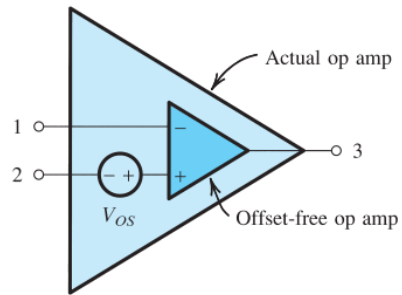


Figure 3: Circuit model for an op amp with input offset voltage V_{OS} .

4. An inverting amplifier with nominal gain of -50 V/V employs an op amp having a dc gain of 10^4 and a unity-gain frequency of 10^6 Hz. What is the 3 dB frequency f_{3dB} of the closed-loop amplifier? What is its gain at $0.1f_{3dB}$ and at $10f_{3dB}$?
5. What is the highest frequency of a triangle wave of 10 V peak-to-peak amplitude that can be reproduced by an op amp whose slew rate is 20 V/ μ s? For a sine wave of the same frequency, what is the maximum amplitude of output signal that remains undistorted?