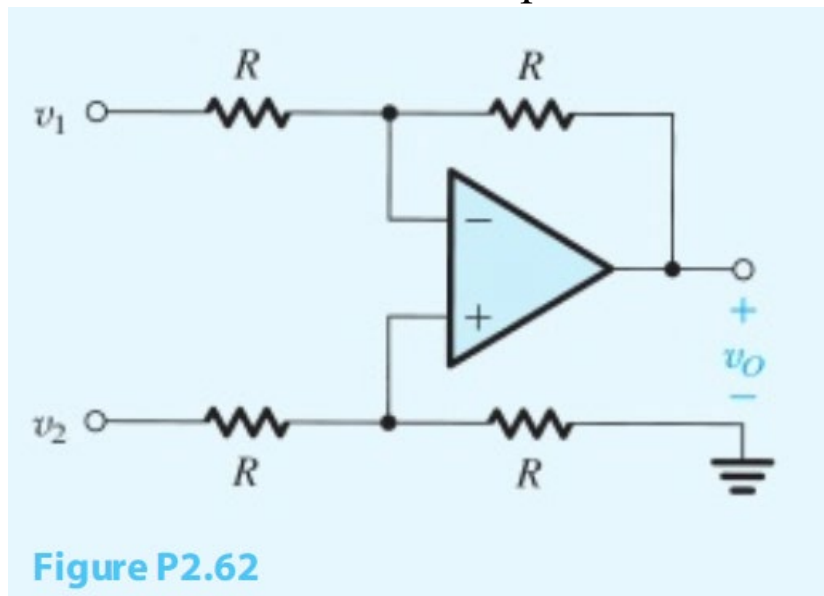


**Spring 2024 – ECE 3020**

**Homework 5**

**Due: 02/14/2024**

1. (P2.62) For the circuit shown in Fig. P2.62, express  $v_O$  as a function of  $v_1$  and  $v_2$ . What is the input resistance seen by  $v_1$  alone? By  $v_2$  alone? By a source connected between the two input terminals? By a source connected to both input terminals simultaneously?



2. (P2.95) A noninverting amplifier with a gain of 100 uses an opamp having an input offset voltage of  $\pm 2\text{mV}$ . Find the output when the input is  $0.01 \sin \omega t$ , volts.
3. (P2114) A noninverting op-amp circuit with a gain of  $96 \text{ V/V}$  is found to have a 3-dB frequency of  $8 \text{ kHz}$ . For a particular system application, a bandwidth of  $32 \text{ kHz}$  is required. What is the highest gain available under these conditions?
4. (P2111) An inverting amplifier with nominal gain of  $-50 \text{ V/V}$  employs an op amp having a dc gain of  $10^4$  and a unity-gain frequency of  $10^6 \text{ Hz}$ . What is the 3-dB frequency  $f_{3\text{dB}}$  of the closed-loop amplifier? What is its gain at  $0.1f_{3\text{dB}}$  and at  $10f_{3\text{dB}}$ ?