

Lab 7 (Rev.1) Differential Amplifier, Op-Amp Null

1. Assemble the circuit in Fig. 1; note that Pin 1 and Pin 5 are contained on the op-amp. Place the two power supply "by-pass" capacitors as close as possible to the op-amp.

2. Connect the wiper of the potentiometer to the -12V supply.

3. A differential amplifier must be "nulled" so that there is very little "output offset voltage." Connect a voltmeter to the output of the op-amp. Adjust the potentiometer until the output is almost 0V.

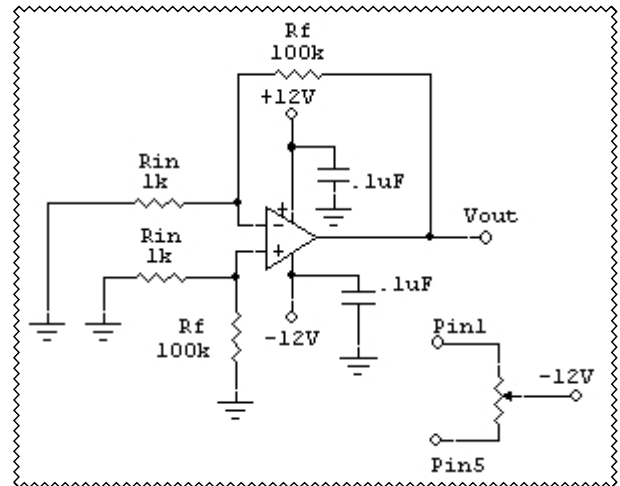


Fig. 1

4. Assemble the circuit in Fig. 2 (Do not remove the by-pass capacitors or the null potentiometer.)

5. Calculate the voltage gain: $A_V = \frac{R_F}{R_{IN}} =$

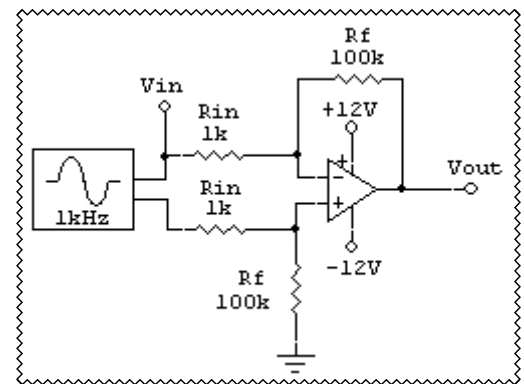


Fig. 2

6. Connect channel 1 of the oscilloscope to V_{IN} and channel 2 to V_{OUT} .

7. Set to signal generator to 1kHz; adjust the amplitude until V_{OUT} equals $4V_{PP}$.

8. Measure voltage gain: $A_V = \frac{V_{OUT}}{V_{IN}} =$

9. Do the calculated and measure values match; is there any distortion observed; are the two signals in-phase?

10. Modify the previous circuit as in Fig.3; remove the signal generator and replace it with a microphone.

11. Connect Ch.1 to V_{IN} and Ch. 2 to V_{OUT} . Speak into the microphone and observe your voice. Measure V_{OUT} in peak to peak: $V_{OUT_P} = \underline{\hspace{2cm}}$

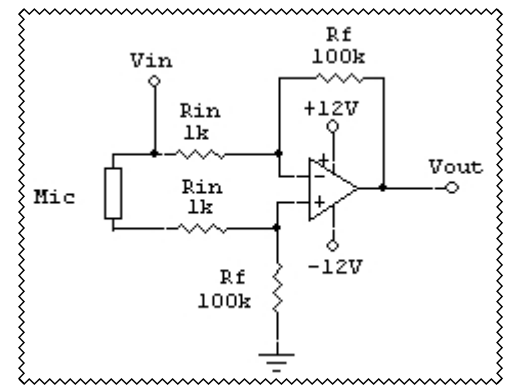


Fig. 3

12. Based the previous measurement, what must be the output of the microphone?