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(单人组)

EE204 Laboratory 5:

Introduction：

EQUIPMENT：

1. PoIr supplies
2. 741 Op- Amp
3. Assorted Resistors
4. Function Generator
5. Digital Multimeter

OBJECTIVE：

Preliminary study of the use of OP-AMP, using. 741 OP AMP to build op-AMP circuit.

Part 1

Graph:

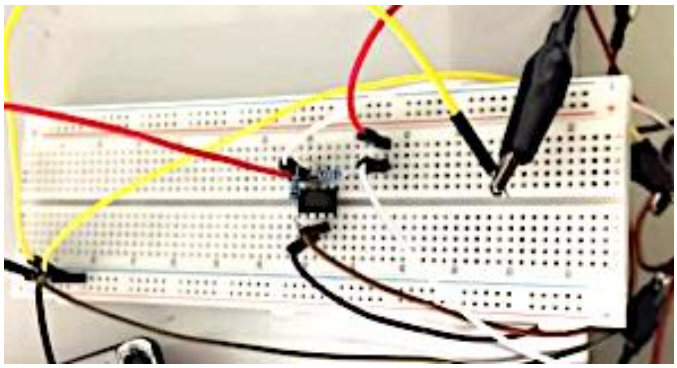


Fig1

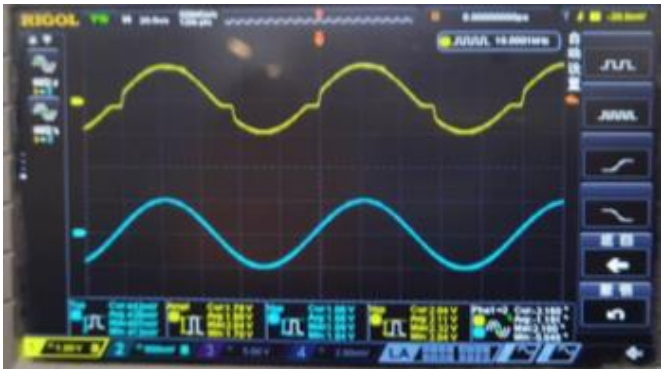


Fig2

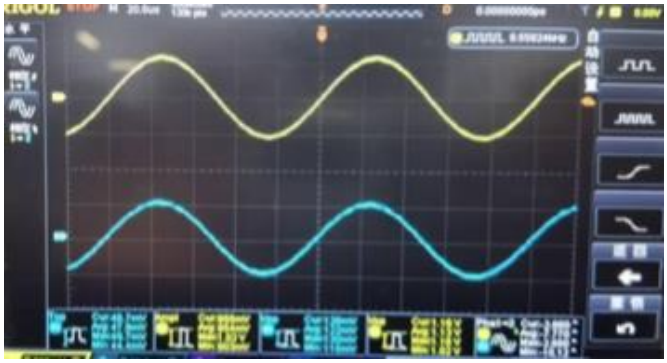


Fig3

Comment:

The input signal is represented by the blue line, while the output signal is represented by the yellow line.

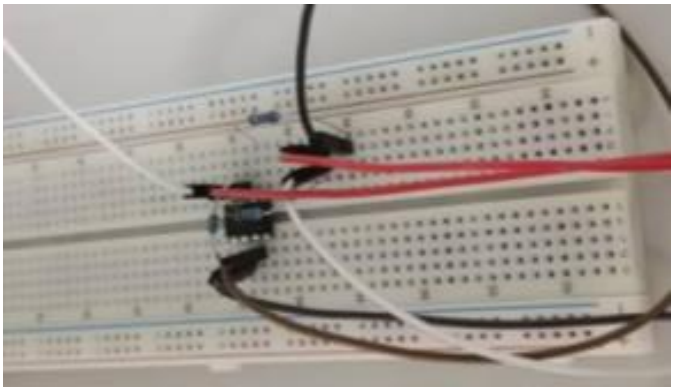
As seen in Figure 2, the output signal's VPP is equal to 2*VPP of the input signal, implying that their amplitudes are equal. The phase difference between the two signals is around 2 degrees, indicating that the two signals are traveling in the same direction.

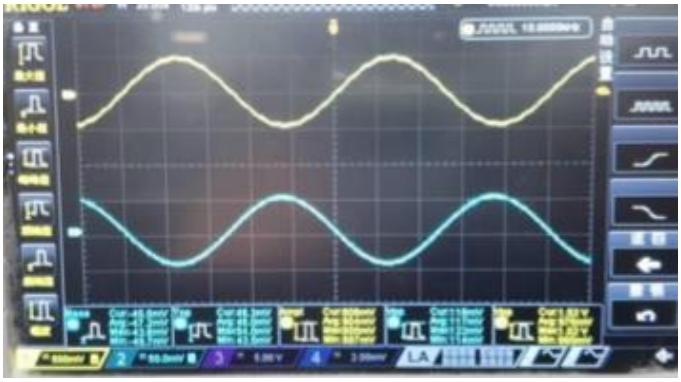
When we replace a resistor with an R2 of 10K, we adjust the input to 0.12V, as shown in Figure 3. The calculated benefit should be around 11 percent. The output has a VPP of 1.2 volts, which is 10 times the input. There is still a 2-degree phase discrepancy. In other words, it is consistent with the idea. The output signal and input signal waveforms are identical in terms of waveform, and they are sine waves.

Overall, this circuit is called the in-phase proportional circuit.

Part 2

Graph:





Comment:

The input signal is still blue, but the output signal is now yellow. The output voltage is Vmax=7.5V and Vmin is sinusoidal signal with Vpp of 1.4V when the input Vin1 is sinusoidal voltage with Vpp of 1V and Vin2 is 5V.

The phase of the output signal Vin1 is the inverse of the input signal Vin1. In other words, the output signal is the inverse of the sum of the two input signals. And, as can be shown, Vout=Vin1+Vin2.

Overall, this circuit is an addition circuit

Part 3

Graph:

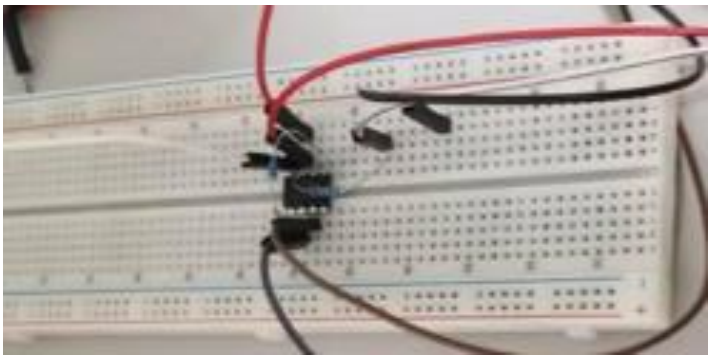


Fig6

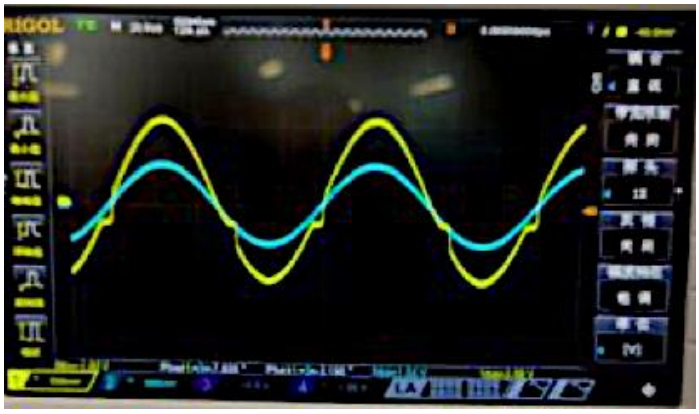


Fig7

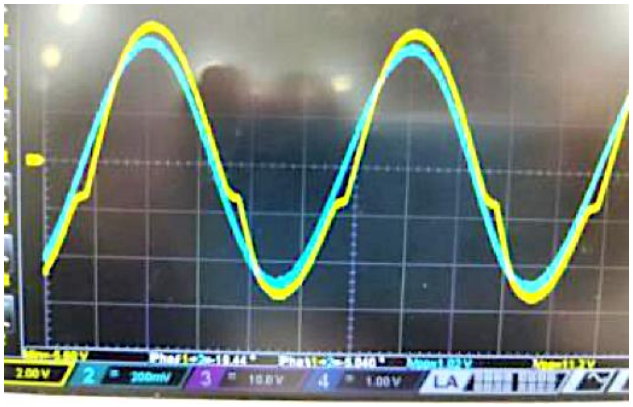


Fig8

Comment:

Figure 7 shows that when the input voltage matches the problem's criteria, the Vpp of the output signal voltage shown by the yellow line is 2V, implying that the gain is 2 and the output amplitude is twice the input amplitude. The phase difference between the two may be overlooked because it is so minor.

The Vpp of the output signal changes to roughly 11V when 10K is substituted, as shown in FIG. 8, although the phase difference is still minor enough to disregard. Determine the value of R1 with gain 1.

We may compute the theoretical gain using this formula: if you want the gain to be 1, R1 over R2 should be equal to 0, hence R1 should be equal to 0.

Part 4: A summary of what you gained in the lab.

In LAB5, by varying the circuit combination, I may produce many operational amplifier circuits and determine the gain of each circuit. Different operational circuits are studied and contrasted. In terms of amplitude, the amplitude is dictated by the circuit's gain, which is determined by the resistance ratio. The reverse phase in phase difference is near to 0°, which is connected to the circuit construction.

That's all, thank you for your patient examination !

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