40dB Non-inverting Amplifier Offest Nulling

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Introduction and Aim

The graph above did not give a zero output for a zero input and so we must provide the amplifier with a null offset. Offset voltage, caused by imperfections in the operational amplifier, can lead to inaccuracies in signal amplification. The goal of this section is to minimize or eliminate this offset using offset nulling techniques. By carefully adjusting the circuit, we aim to achieve high precision and accurate amplification, ensuring the output signal remains faithful to the input, free from unwanted DC bias or drift.

Theory

For an input of 0 V the output voltage value should also be zero, however, the circuit does not give a zero output because of input offset voltages i.e. the gain of the non-inverting terminal may not be exactly equal to the gain of the inverting terminal. The 741 operational amplifier has internal circuitry to balance out this offset (null offset circuitry) which is set up as follows:

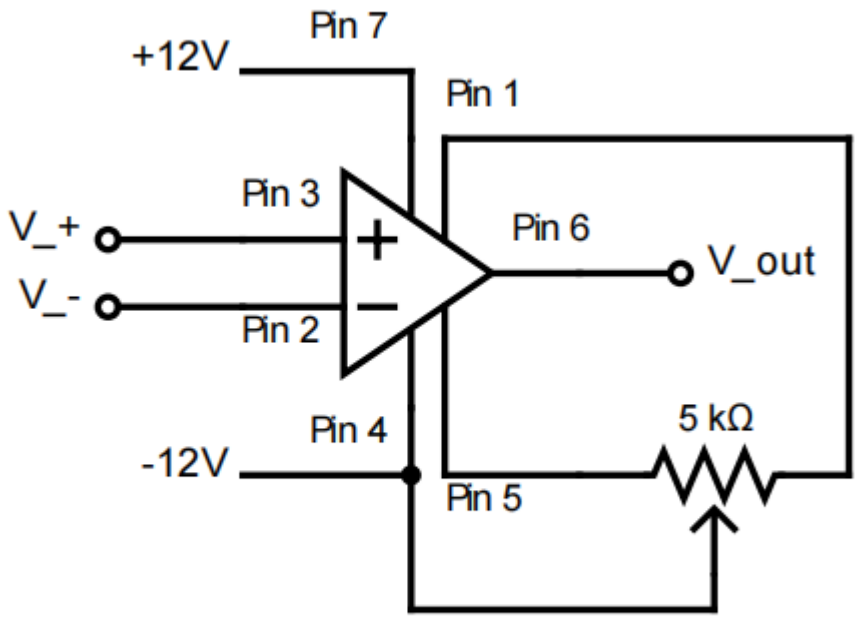
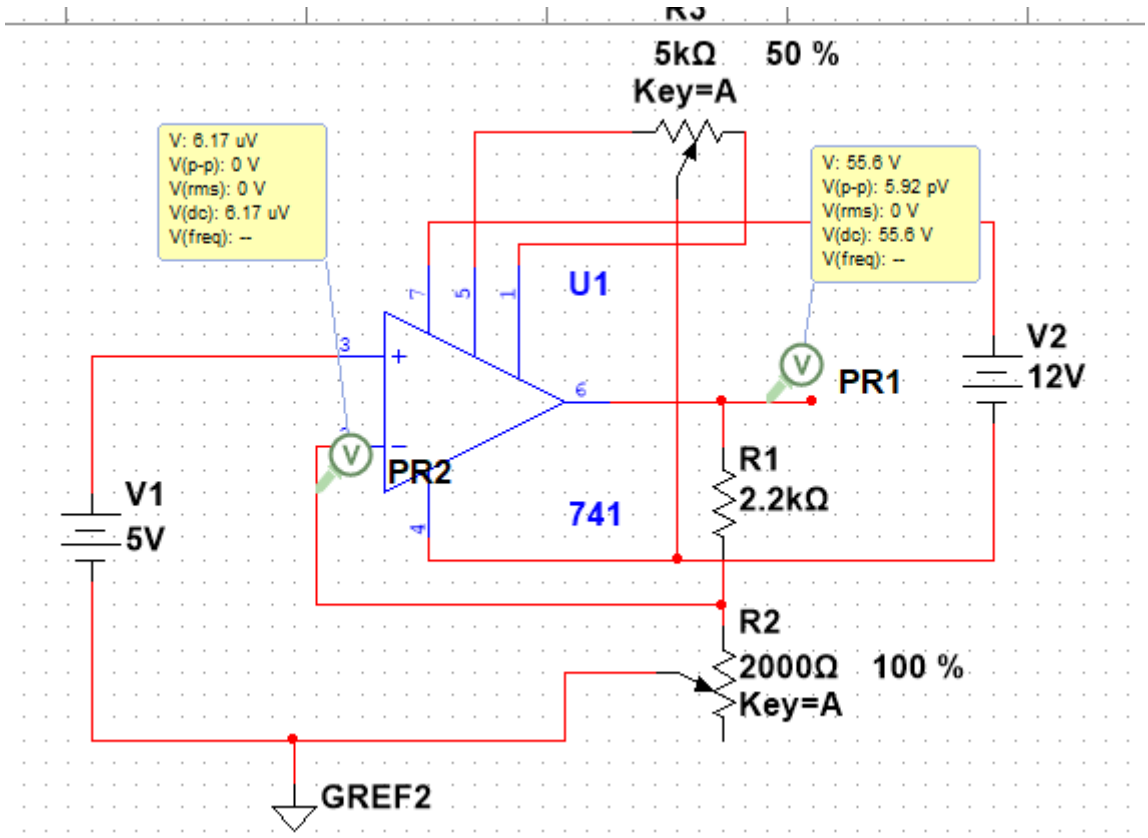


Figure 5: Op amp with null offset connected.

Experiment Methordd and Results

Using the circuit from Part 3, connect a $10k\Omega$ potentiometer across Pin 1 and Pin 5 of op-amp and the centre point (Pin 2) of the potentiometer to V_cc , as shown in Figure 5.

circuit diagram



Data table

$V_in	R_2	$V_out
0.05	100	-2.27mV
0.5	200	-45.5mV
1	500	-227mV
1.5	800	-546mV
2.0	1000	-910mV
2.5	1200	-1.36V
3.0	1400	-1.91V
3.5	1600	-2.54V
4.0	1800	-3.27V

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