Experiment 4

Basic Electronics Circuits, IIIT Chittoor.

Design of Operational Amplifier Configurations

The objective of the experiment is to design (finding appropriate values for resistors and voltages) following OP Amp Configurations.

1. Design an inverting amplifier.
2. Design a Non-inverting amplifier.
3. Design Summing Amplifier using Inverting Amplifier.
4. Design an Instrumentation Amplifier.

You have to get your design verified before proceeding with the experiment. The pin diagram for op-amp 741 is shown in Fig. 4.1. The circuit configurations for Inverting Amplifier, Non-Inverting Amplifier, Summing Amplifier and Instrumentation Amplifier are shown in Figs. 4.2 – 4.5.

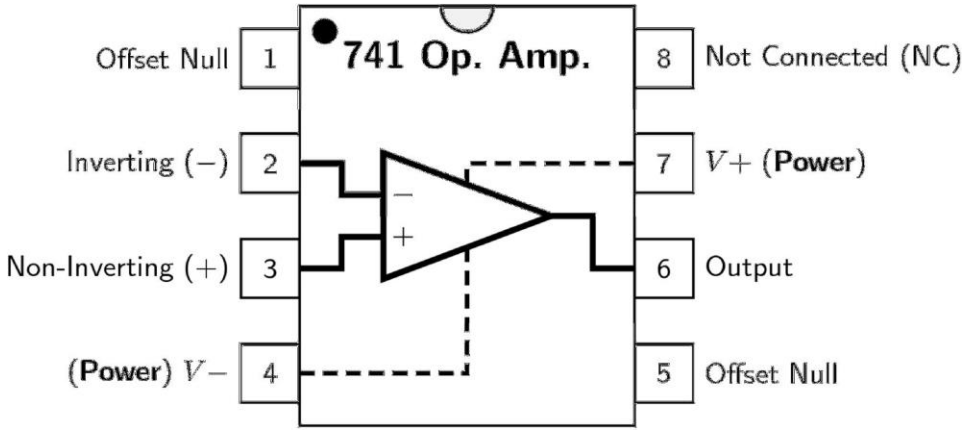
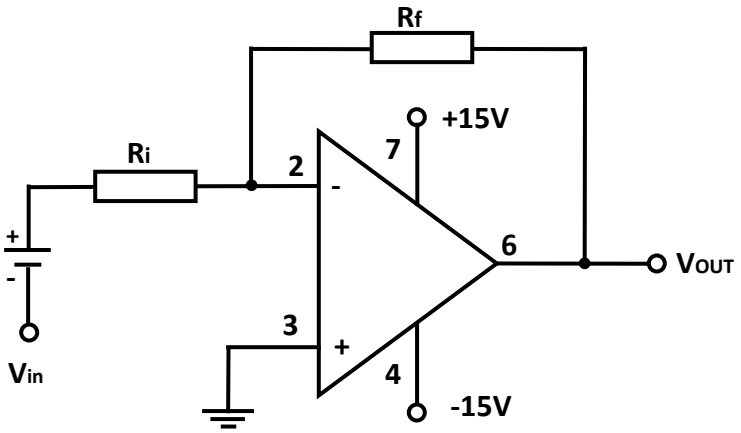
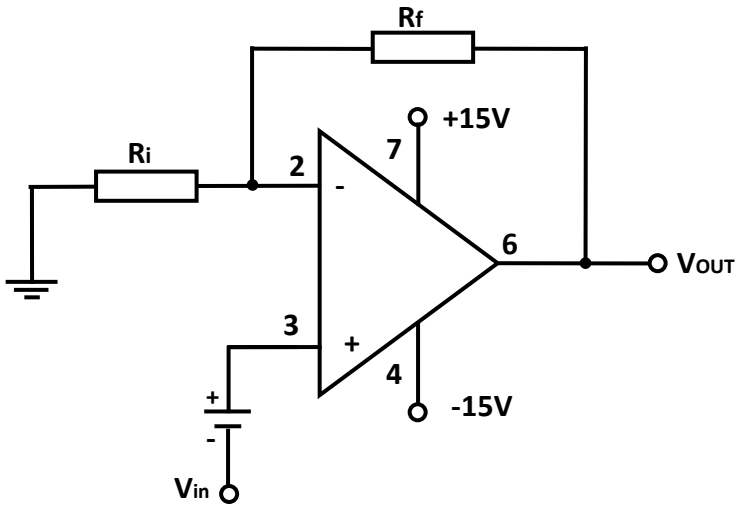


Fig. 4.1: Pin diagram for 741 op-amp



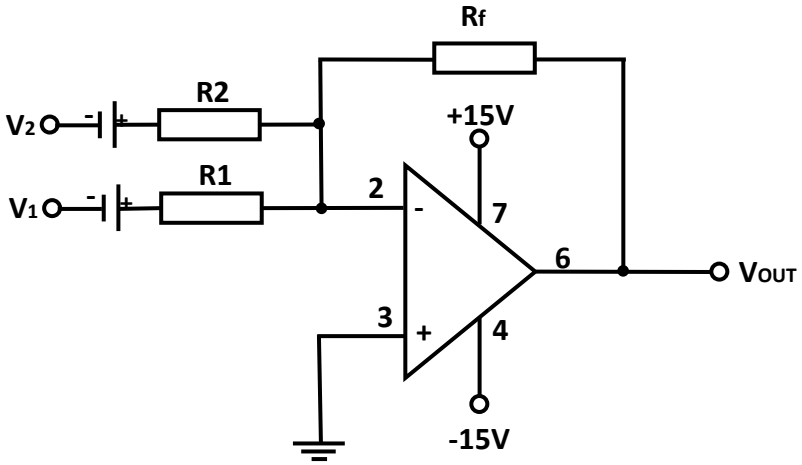
$$\text{Gain Av} = \frac{Vout}{Vin} = -\frac{Rf}{Ri}$$

Fig. 4.2: Inverting Amplifier



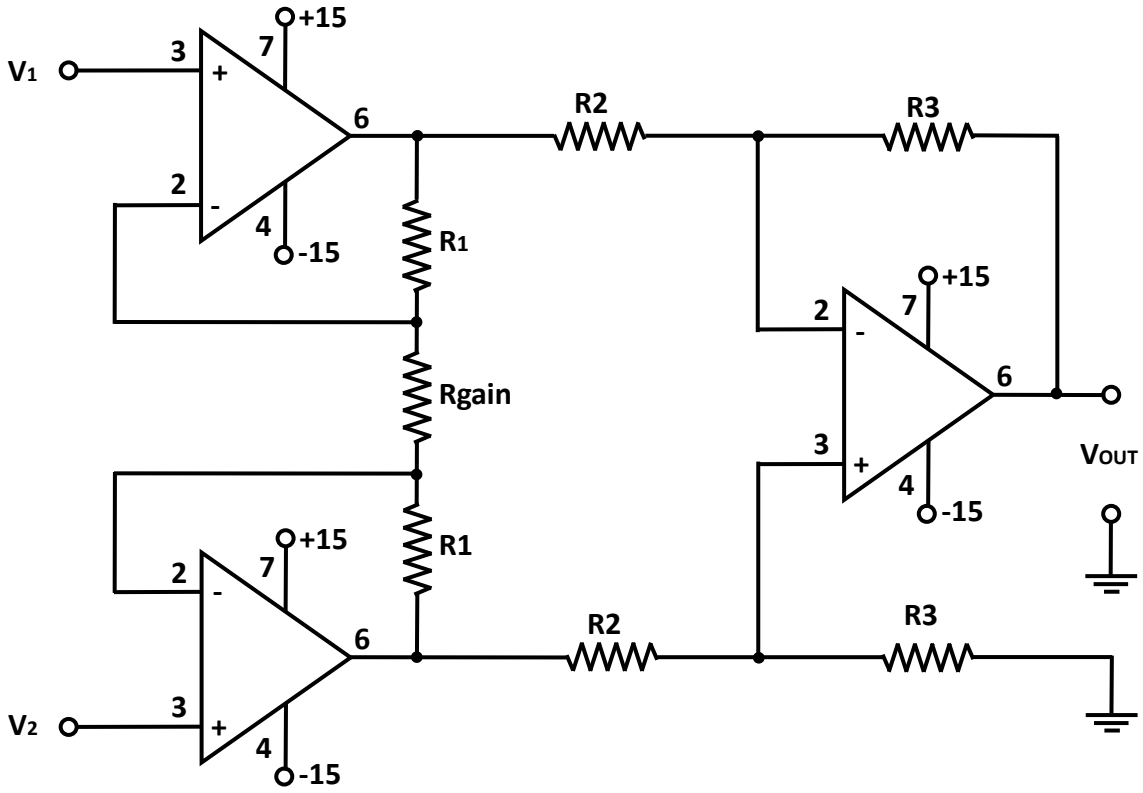
$$\text{Gain Av} = \frac{Vout}{Vin} = 1 + \frac{Rf}{Ri}$$

Fig. 4.3: Non - Inverting Amplifier



$$V\,out = -\left[V1\left(\frac{Rf}{R1}\right) + V2\left(\frac{Rf}{R2}\right)\right]$$

Fig. 4.4: Summing amplifier



$$\text{Gain Av} = \frac{Vout}{V2 - V1} = \left(1 + \frac{2R1}{Rgain}\right)\frac{R3}{R2}$$

Fig. 4.5: Instrumentation Amplifier