Basic Electronics Circuit's Lab

Experiment no. 5

1. Design of Operational Amplifier Configurations

a) Inverting Amplifier
b) Non - Inverting Amplifier
c) Summing Amplifier
d) Differential Amplifier
e) Instrumentation Amplifier.

The pin diagram for op-amp 741 is shown in Fig. 5.1. The circuit configurations for inverting amplifier, non-inverting amplifier, summing amplifier, differential amplifier and instrumentation amplifier are shown in Figs 5.2 to 5.6.

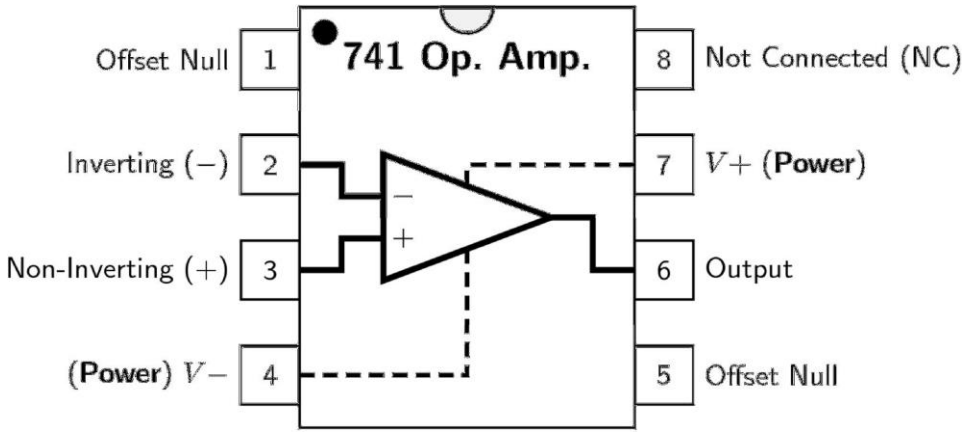
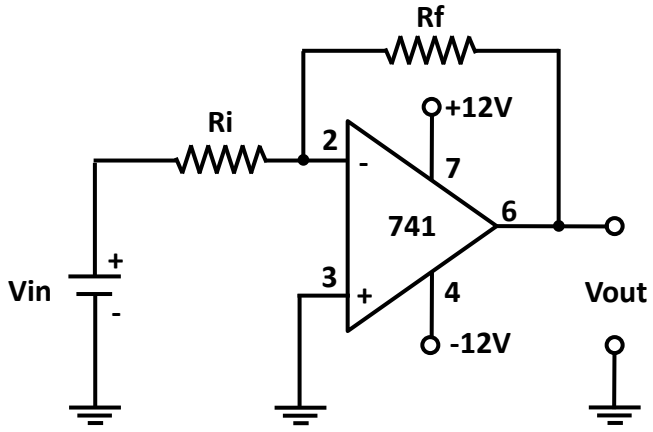
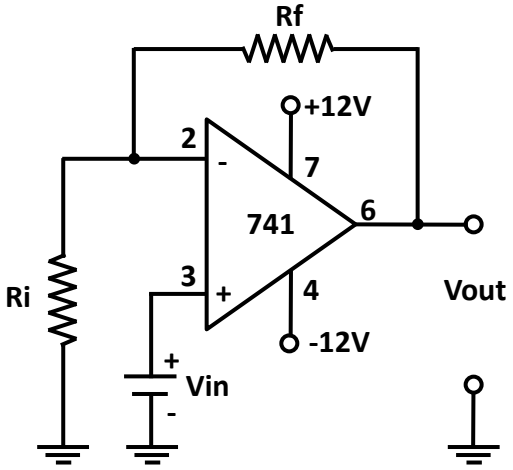


Fig. 5.1: Pin diagram for 741 op-amp



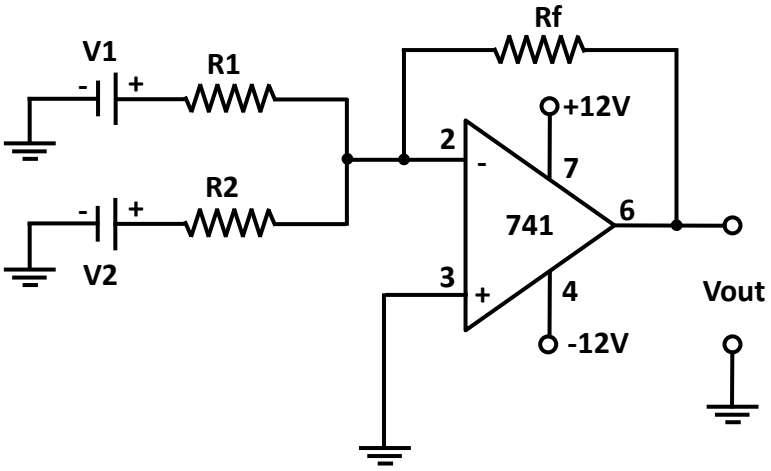
$$\text{Gain Av} = \frac{Vout}{Vin} = -\frac{Rf}{Ri}$$

Fig.5.2: Inverting Amplifier



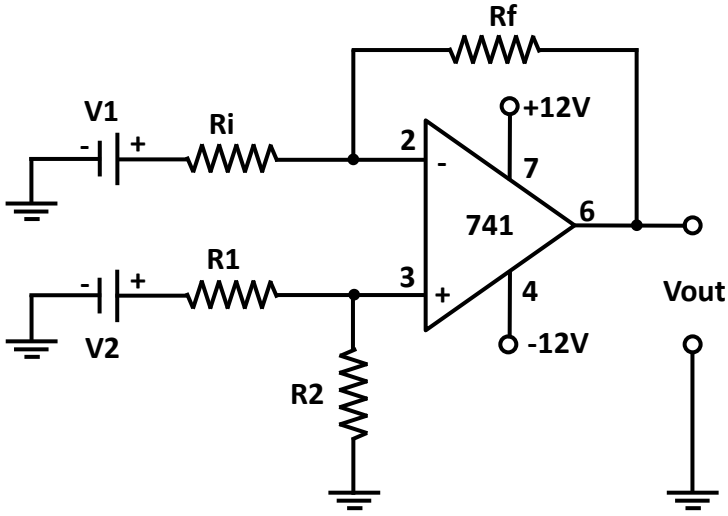
$$\text{Gain Av} = \frac{Vout}{Vin} = 1 + \frac{Rf}{Ri}$$

Fig. 5.3: Non-inverting Amplifier



$$Vout = -\left\{\frac{Rf}{R1} V_1 + \frac{Rf}{R2} V_2\right\}$$

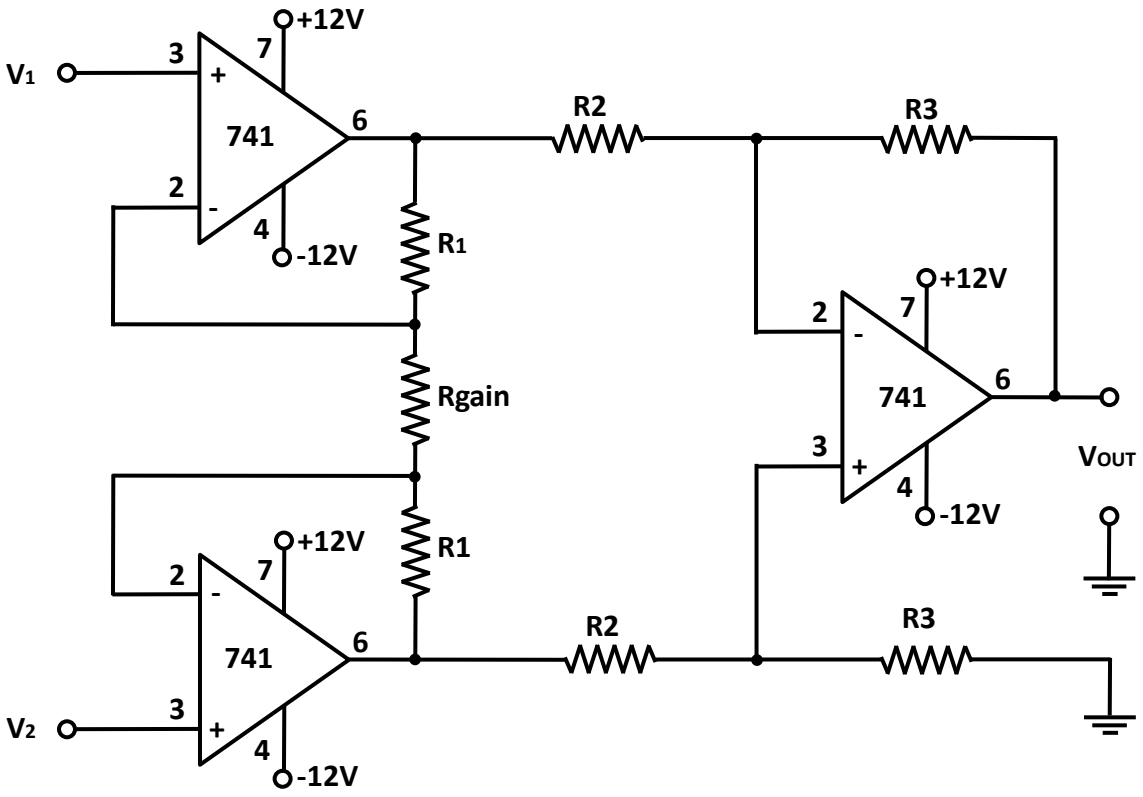
Fig. 5.4: Summing Amplifier



$$Vout = \frac{Rf}{Ri}\left[V_2 - V_1\right]$$

[When **R**i = **R**f = **R**1 = **R**2]

Fig. 5.5: Differential Amplifier



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

Fig. 5.6: Instrumentation amplifier

Note: Apply ac inputs from function generator and observe the wave forms and plot them.