

Experiment-9

Aim: To study the op amp as an inverting and non- inverting amplifier.

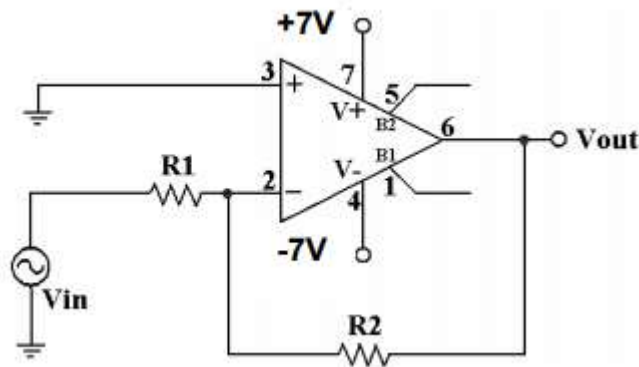
Apparatus: DSO, Function Generator, Bread Board, 741 IC, $\pm 12V$ supply, resistors $1K\Omega$, $10K\Omega$, and connecting leads.

Theory:

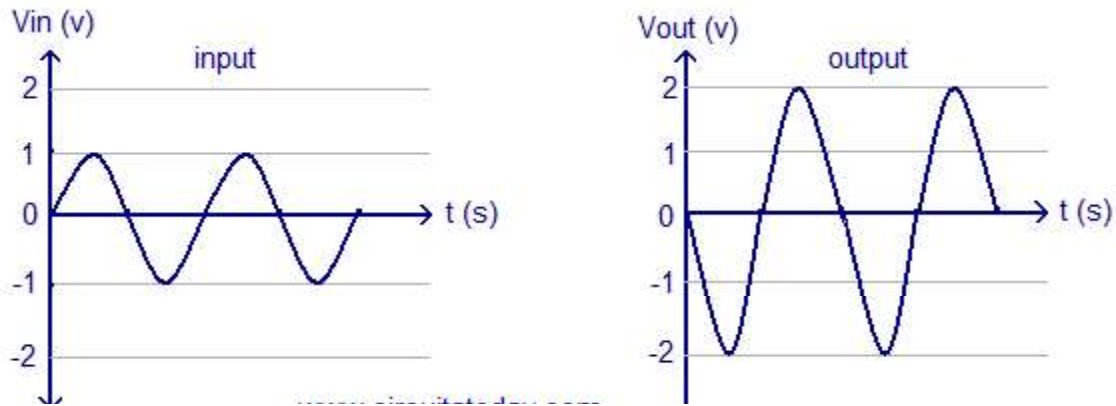
Inverting Amplifier: The input signal V_i is applied to the inverting input terminal through R_1 and the non-inverting input terminal of the op-amp is grounded. The output voltage V_o is fed back to the inverting input terminal through the R_f - R_1 network, where R_f is the feedback resistor. The output voltage is given as,

$$V_o = - A_{CL} V_i$$

Here the negative sign indicates that the output voltage is 180° out of phase with the input signal.



Inverting Amplifier

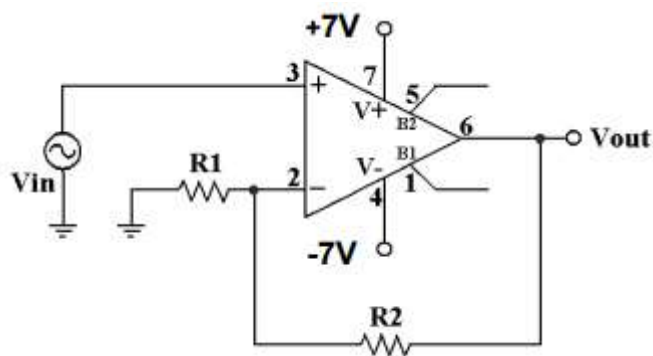


Input and output waveform

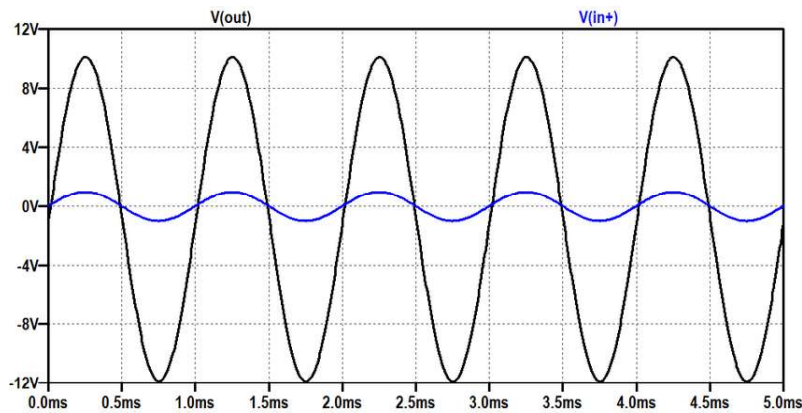
Non-Inverting Amplifier: The input signal V_i is applied to the non - inverting input terminal of the op-amp. This circuit amplifies the signal without inverting the input signal. It is also called negative feedback system since the output is feedback to the inverting input terminals. The differential voltage V_d at the inverting input terminal of the op-amp is zero ideally and the output voltage is given as,

$$V_o = A_{CL} V_i$$

Here the output voltage is in phase with the input signal.



Non-inverting Amplifier

**Procedure:**

1. Connections are given as per the circuit diagram.
2. $+V_{cc}$ and $-V_{cc}$ supply is given to the power supply terminal of the Op-Amp IC.
3. By adjusting the amplitude and frequency knobs of the function generator, appropriate input voltage is applied to the inverting input terminal of the Op-Amp.
4. The output voltage is obtained in the CRO and the input and output voltage waveforms are plotted in a graph sheet.

Result: The design and testing of the inverting amplifier is done and the input and output waveforms were drawn.

Precaution:

1. All connection should be made right and tight.
2. While making connection main voltage should be kept switched off.