

Electrical & Electronics Engineering

EEE Lab Report

Course: Electronic Devices and Circuits & Pulse Techniques Lab

Course Code: EEE 204

Experiment No: 04

Experiment Name: Non-Inverting Amplifier

Date of Performance: 11/03/2021

Date of Submission: 02/04/2021

Submitted By: Md. Omor Faruk Id No: 192002006 Section: 192 DB Department of Computer Science & Engineering Green University of Bangladesh	Submitted To: Mr. Sharif Nafis Mahmood Lecturer Department of EEE Green University of Bangladesh
--	--

Signature and Date

Mr. Sharif Nafis Mahmood

Lecturer

Department of EEE

Green University of Bangladesh

Experiment No: 04

Experiment Name: Non-Inverting Amplifier

Aim: To design and setup a non-inverting amplifier circuit - with OP AMP IC 741C for a gain of 11, plot the waveform, observe the phase reversal, measure the gain.

Objectives: After completion of this experiment, we will be able to design and setup a non-inverting amplifier using OP AMP. We will acquire skill to design and implement OP AMP non-inverting amplifier circuit.

Equipments/Components:

Sl. No.	Name and Specification	Quantity
01.	Dual Power supply $\pm 15V$	1
02.	Function generator (0-1 MHz)	1
03.	Oscilloscope	1
04.	Bread board	1
05.	IC 741C	1
06.	Resistors	2
07.	Probes and connecting wires	As required

Principle: It is a linear closed loop mode application of op-amp and employs negative feedback. The R_f and R_i are the feedback and input resistance of the circuit respectively. There will be no phase difference between the output and input. Hence it is called non-inverting.

amplifier.

$$A_v = \frac{V_o}{V_{in}} \\ = 1 + \frac{R_f}{R_i}$$

Here the +ve sign indicates the output will be an amplified wave in phase with the input. By varying the R_f or R_i , the gain of the amplifier can be varied to any desired value.

Procedure:

1. Check the components.
2. Setup the circuit on the breadboard and check the connections.
3. Switch on the power supply.
4. Give $1 V_{PP} / 1 KHz$ sine wave as input.
5. Observe input and output on the two channels of the CRO simultaneously.

6. Note down and draw the input and output waveforms on the graph.
7. Verify the input and output waveforms are in phase.
8. Verify the obtained gain is same as designed value.

Circuit Diagram:

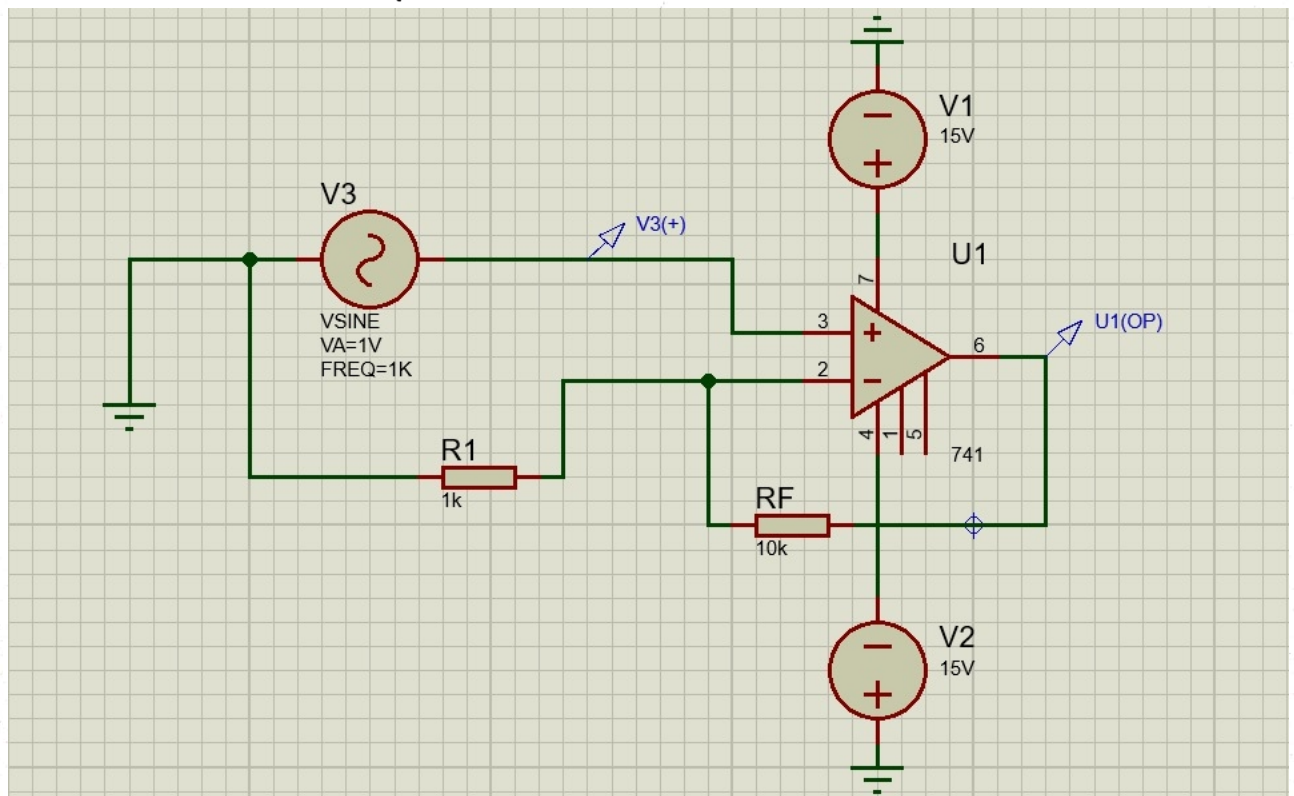


Figure: Non-Inverting Amplifier(Proteus)

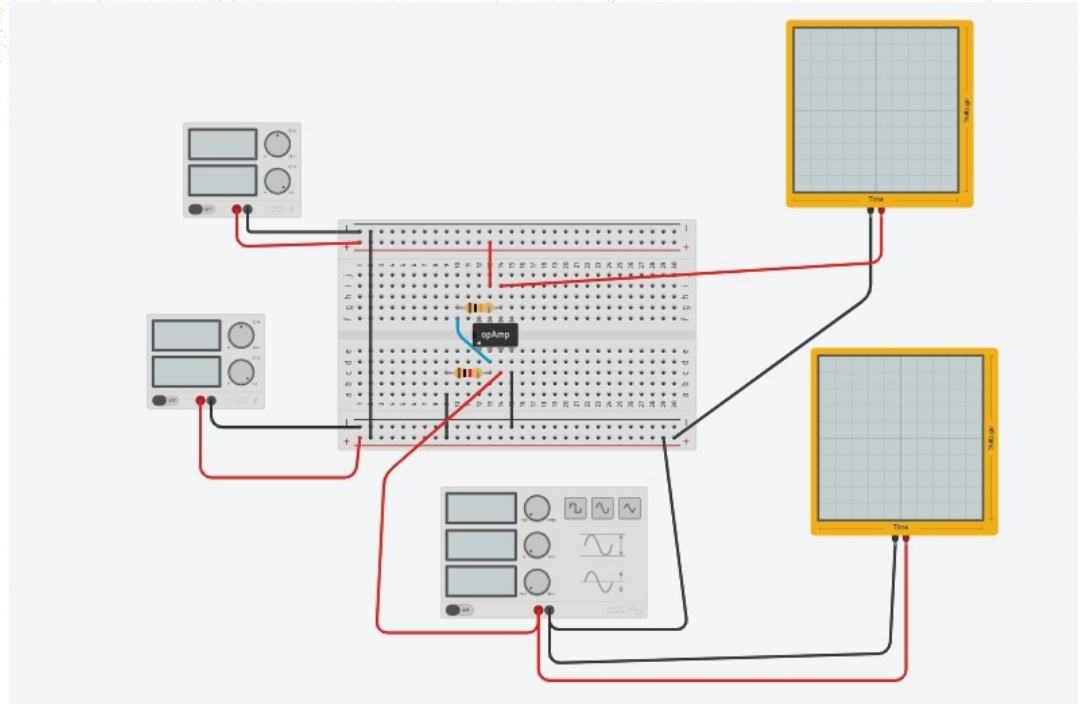
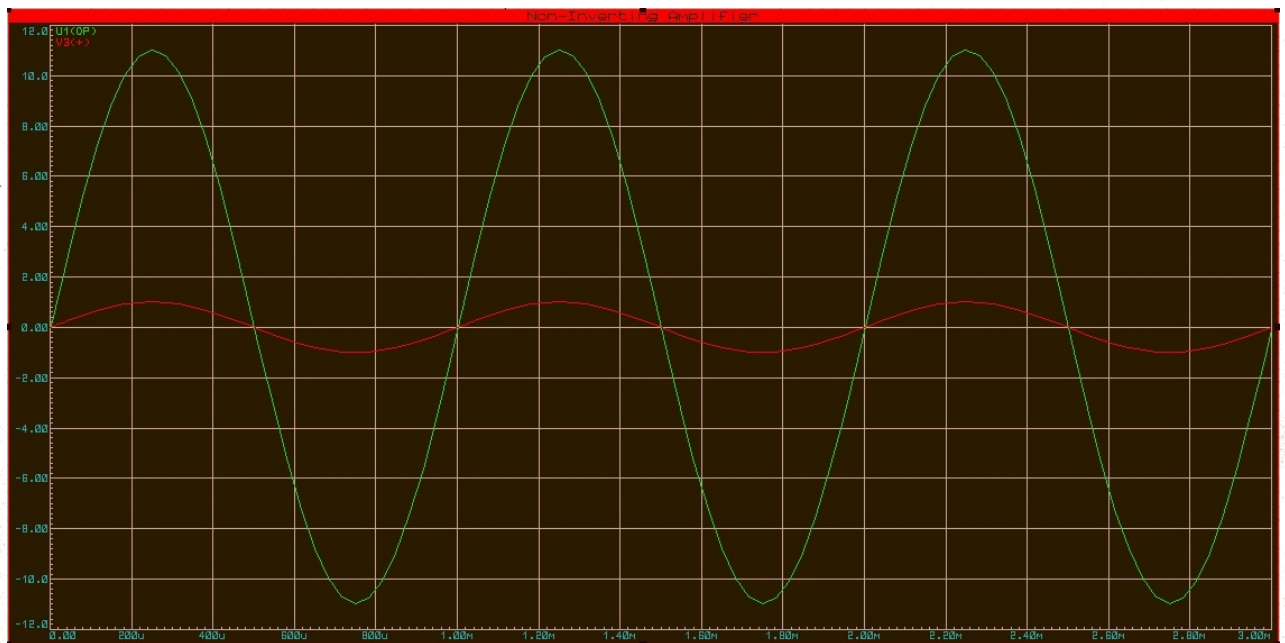


Figure: Non-Inverting Amplifier (TinkerCAD)

Graph:



Graph: Non-Inverting Amplifier

Result:

We know that,

Gain of a non-inverting amplifier,

$$A_v = \frac{V_o}{V_{in}} \\ = 1 + \frac{R_f}{R_i}$$

Here,

We let, $R_f = 10\text{K}\Omega$

and $R_i = 1\text{K}\Omega$

Therefore,

$$A_v = 1 + \frac{10}{1}$$

$$= 1 + 10$$

$$= 11$$

So, the ultimate gain is 11.

Discussion:

A non-inverting amplifier is an op-amp circuit configuration that produces an amplified output signal. This output signal of the non-inverting op-amp is in-phase with the input signal applied.

In other words, a non-inverting amplifier behaves like a voltage follower circuit.

A non-inverting amplifier also uses a negative feedback connection, but instead of feeding the entire output signal to the input, only a part of the output signal voltage is fed back as input to the inverting input terminal of the op-amp. The high input impedance and low output impedance of the non-inverting amplifier make the

Circuit ideal for impedance buffering applications.

During the experiment, when we tried to get the output sine waveform, we have encountered some problems. The sine waveform didn't show up at the oscilloscope. After some trial and error, we found out that the source of the problems are due to incorrect grounding. The connection of ground from bias voltage cannot be connected to the ground of the supply voltage. Thus, we have to make a new ground for each of bias voltages and supply voltages. Next, at DE bias voltage also have V_+ and V_- and both of it has been connected to positive supply, hence the flat sine waveform shown on the oscilloscope. To

combat this, we made sure that the DC bias voltage V_+ and V_- are connected to the correct terminals which are the positive and negative supply voltages.

Finally we can say that, this experiment is more effective to gain knowledge about a non-inverting amplifier and from this experiment we can realize that, how non-inverting amplifier works. So at last we can say that, this experiment is more important for us.

References:

[1] Lab Manual for EEE 204 Course

[Made & Edited by Mr. Md.

Sharif Nafis Mahmood, Lecturer.

Dept. of EEE, Green University
of Bangladesh]

[2] Electrical devices and circuit theory
by Robert L. Boylestad and
L. Nashelsky (7th Edition) [Page
no: 147-150]