Course Name:	**Elements of Electrical and Electronics Engineering**	**Semester:**	**I/II**
Date of Performance:		**Batch No:**	**G3**
Faculty Name:	**Milind Marathe**	**Roll No:**	**16010421063**
Faculty Sign & Date:		**Grade/Marks :**	**/ 25**

Experiment No: 10

Title: Inverting and Non-inverting amplifier using OPAMP

Aim and Objective of the Experiment:

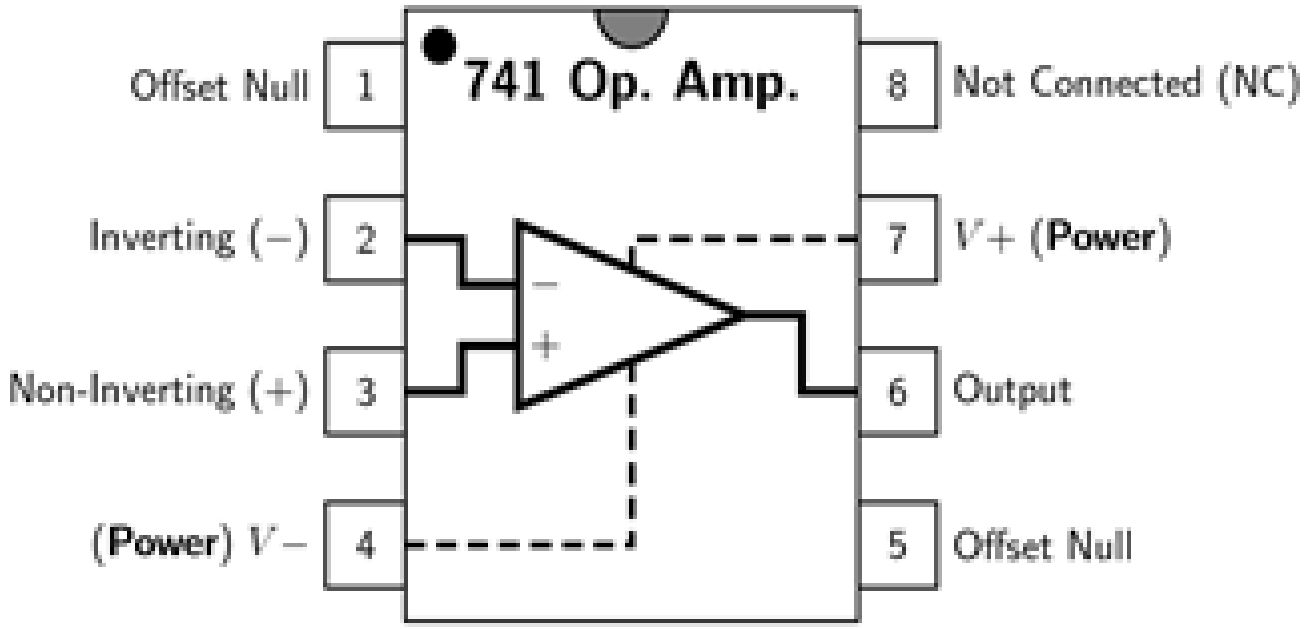
- To understand the open loop configuration of OPAMP
- To understand the concept of negative feedback and closed loop configuration of OPAMP.
- To understand inverting and Non-inverting amplifier of OPAMP
- To find gain of inverting and non-inverting amplifiers

COs to be achieved:

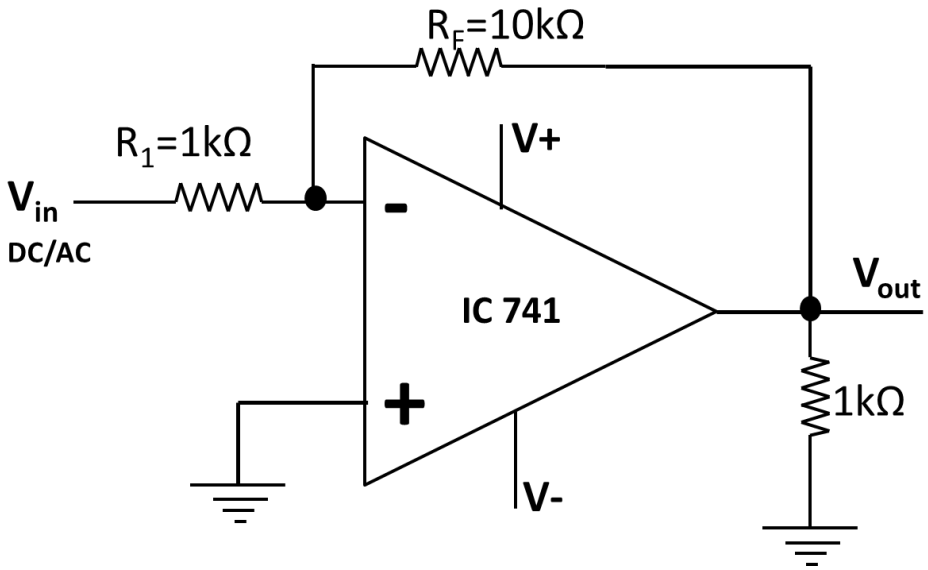
CO5: Understand operational amplifier and its applications

Circuit Diagram/ Block Diagram:

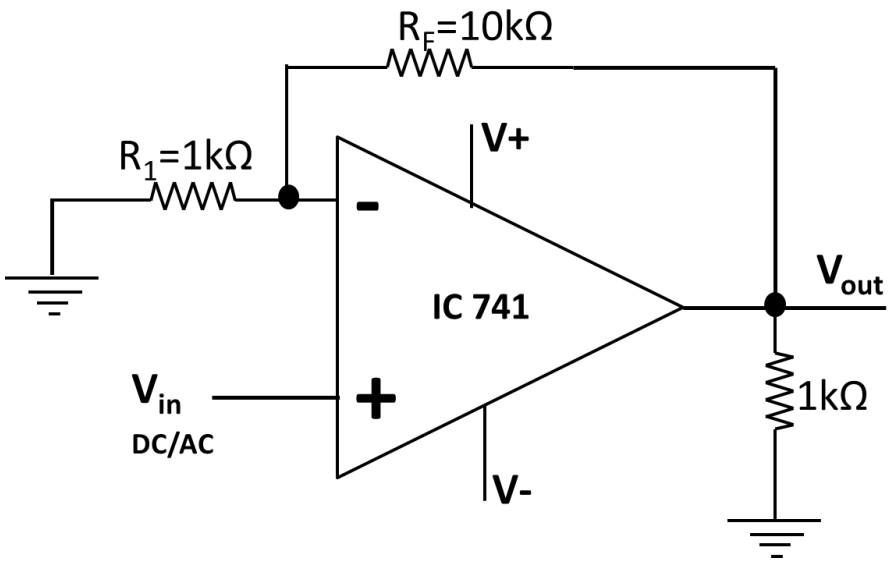
Pin diagram of IC 741



1. Inverting Amplifier



2. Non-inverting Amplifier



Observation Table:

1. A. Inverting Amplifier: DC input Voltage

Sr.No.	Vin (V)	Vout (V)	Practical Gain = Vout/Vin	Theoretical Gain=-RF/R1
1.	0.9	-4.49294	-4.99215555556	5
2.	0.65	-3.24302	-4.98926153846	5
3.	3.1	-10.4979	-3.38641935484	5
4.	-2.1	10.5061	-5.0029047619	5

In observation 3 the output will never cross 11 because of saturation as the value of VCC and VEE is 12.

1. B. Inverting Amplifier: AC input Voltage

Sr.No.	Frequency (Hz)	Vin(p-p) (V)	Vout(p-p) (V)	Practical Gain = Vout/Vin	Theoretical Gain=-RF/R1
1.	1K	3	15	5	5
2.	1K	4	20	5	5
3.	1K	5	22	4.4	5
4.	1K	2	10	5	5

In observation 3 the output will never cross 22 because of saturation as the value of VCC and VEE is 12.

2. A. Non-inverting Amplifier: DC input Voltage

Sr.No.	Vin (V)	Vout (V)	Practical Gain = Vout/Vin	Theoretical Gain=1+RF/R1
1.	2	10.9978	5.4989	6
2.	1	6.00619	6.00619	6
3.	1.5	9.00591	6.00394	6
4.	-1.2	-7.19254	5.99378333333	6

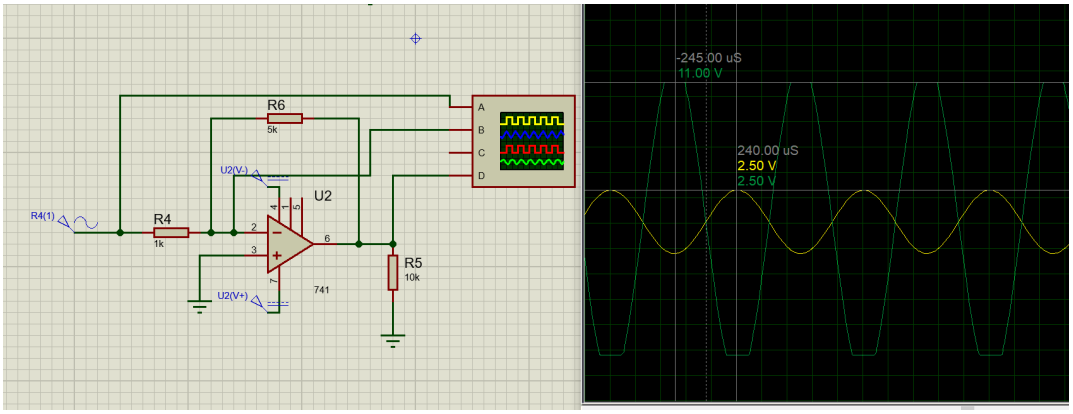
2. B. Non-inverting Amplifier: AC input Voltage

Sr.No.	Frequency (Hz)	Vin(p-p) (V)	Vout(p-p) (V)	Practical Gain = Vout/Vin	Theoretical Gain=1+RF/R1
1.	1K	1	6	6	6
2.	1K	1.5	9	6	6
3.	1K	4	22	5.5	6

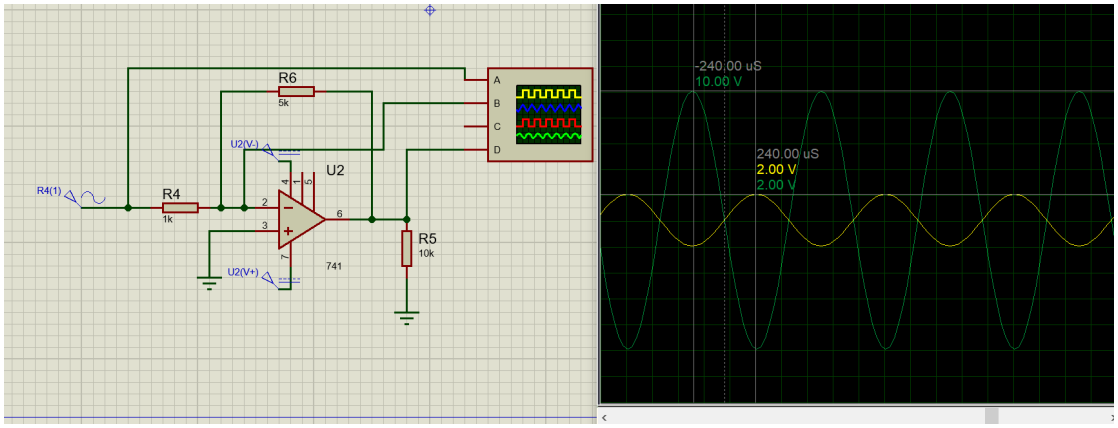
Screenshots

1. Inverting AC amplifier

a. Saturation

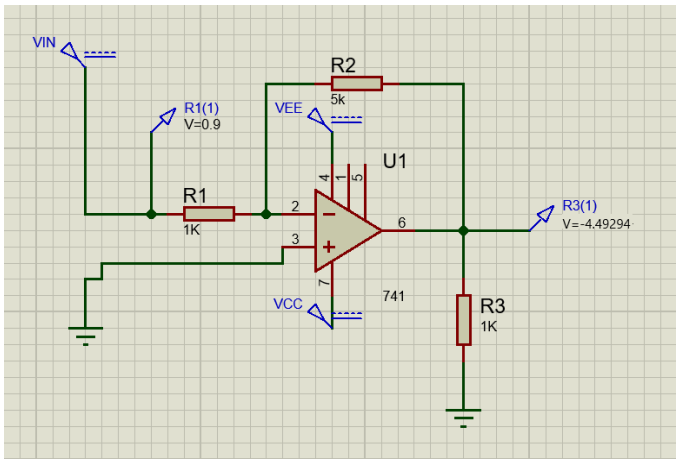


b. Unsaturated

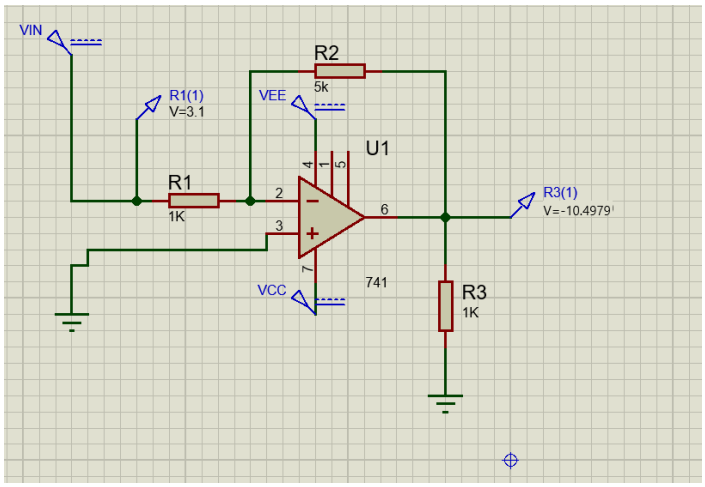


2. Inverting Amplifier DC

a. Unsaturated

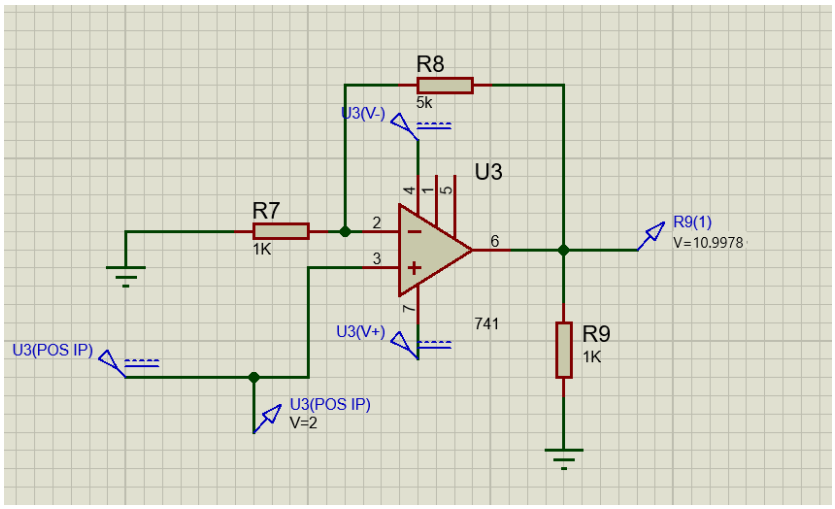


b. Saturated

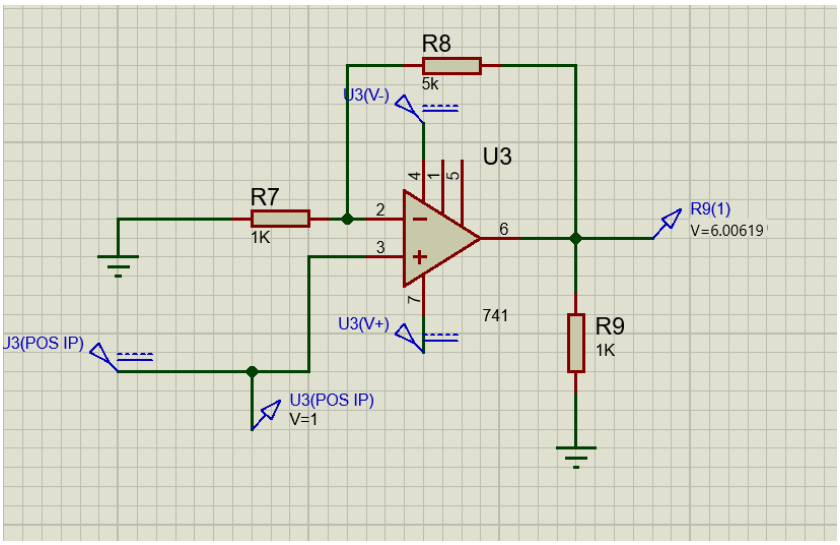


3. Non Inverting DC Amplifier

a. Saturated

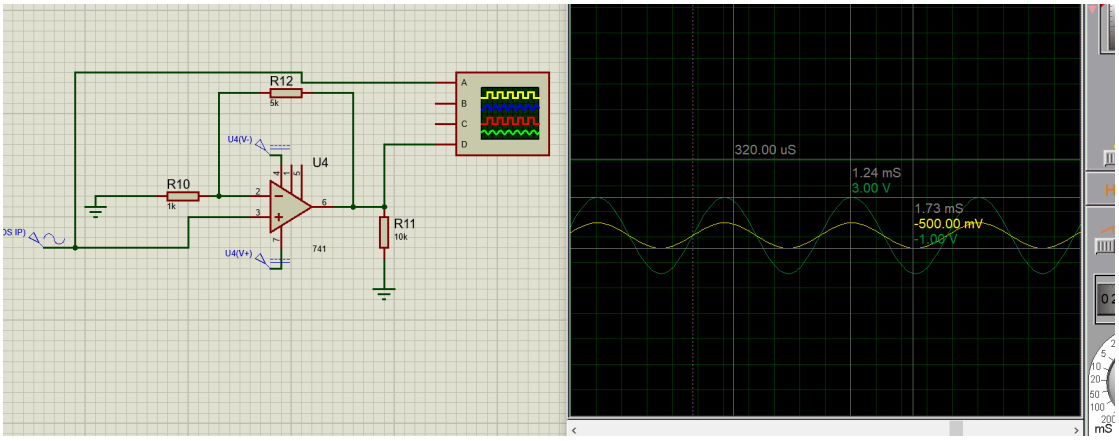


b. Unsaturated

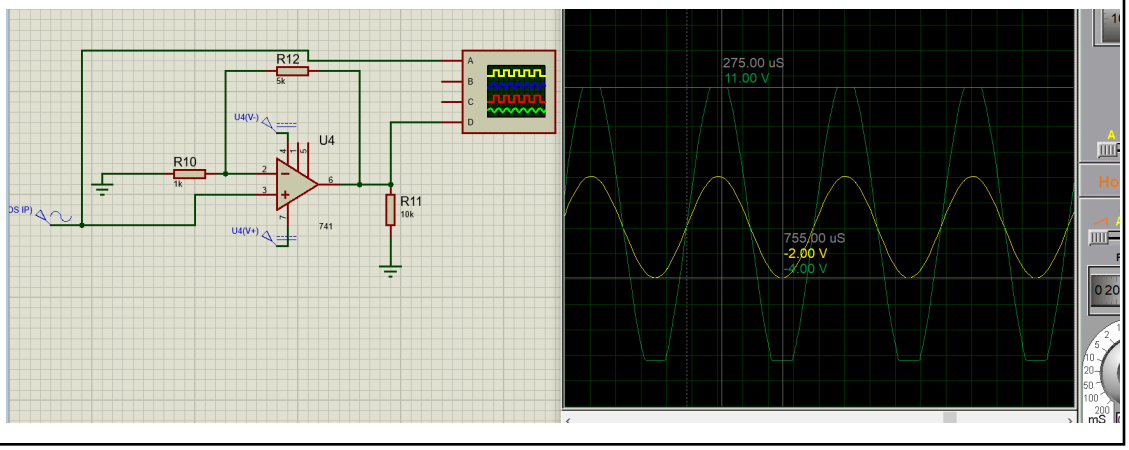


4. Non Inverting AC Amplifier

a. Unsaturated

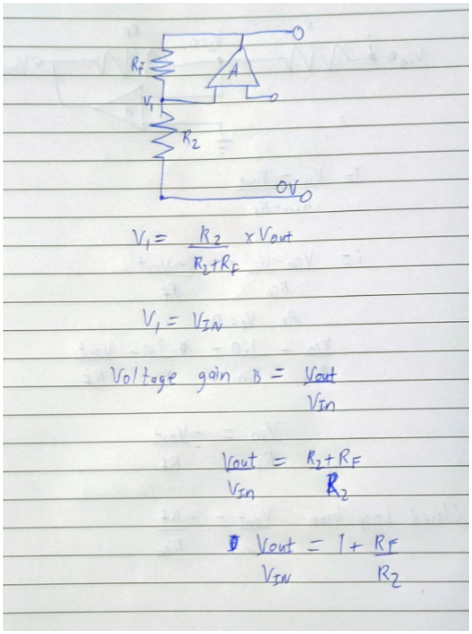


b. Saturated

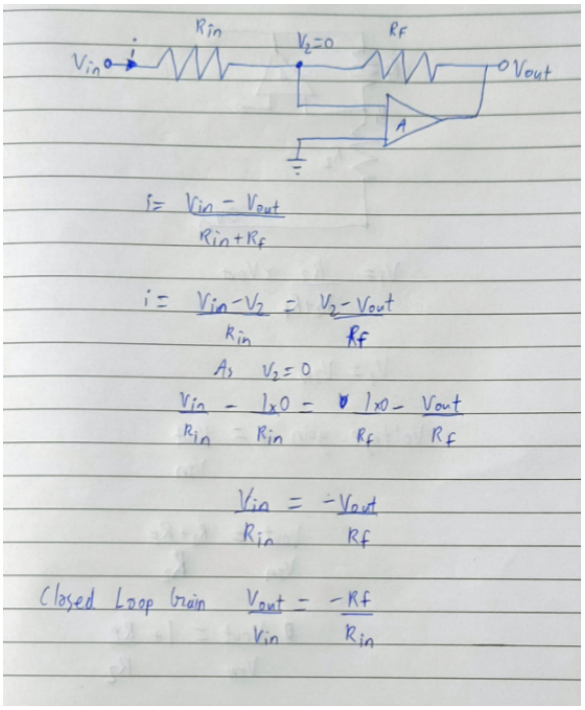


Theoretical calculation-

Non-Inverting-



Inverting



Post Lab Subjective/Objective type Questions:

1. **List the characteristics of an Ideal operational amplifier.**

Ans-

1. Infinite input impedance
2. Zero output impedance
3. Zero common-mode gain, or, infinite common-mode rejection
4. Infinite open-loop gain A
5. Infinite bandwidth

2. **List the important parameters of the IC 741 operational amplifier.**

Ans- Important Parameters are-

1. Open Loop Gain-10^5 to 10^8
2. Input Resistance- 10^5 to 10^{13}
3. Output Resistance- 10 to 100

Conclusion:

We successfully understood the inverted as well as non inverted amplification IC 741

Signature of faculty in-charge with Date: