



Exp.No.3

## SUMMING AMPLIFIER-ADDER

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### AIM:

To design and construct a Summing amplifier or Adder using IC741.

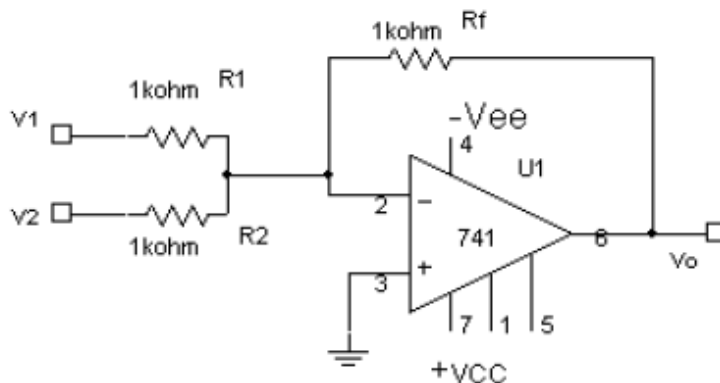
### APPARATUS:

1. Operational Amplifier mA 741 IC
2. Resistors 1KOhm
3. Dual Power supply( 0-20V)
4. Regulated Power Supply.(0-20V)
5. Multimeter
6. Bread board
- 7.Connecting wires

### THEORY:

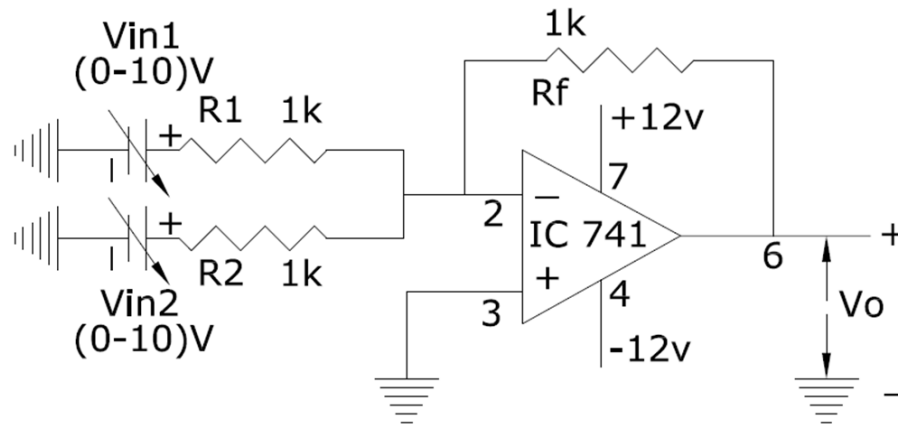
Op-amp can be used to design a circuit whose output is the sum of several input signals. Such a circuit is called a summing amplifier or an adder. Summing amplifier can be classified as inverting & non-inverting summer depending on the input applied to inverting & non-inverting terminals respectively.

The summing amplifier has two or more inputs, and its output voltage is proportional to the algebraic sum of its input voltages. Below figure shows a two-input inverting summing amplifier.



If all the three resistors are equal ( $R_1=R_2=R_f=R$ ) then  $V_O = - (V_{in1} + V_{in2})$   
The above equation shows that the output voltage has the same magnitude as the sum of two input voltages but with a  $-ve$  sign indicating inversion. If we connect the inputs to non inverting terminal then the adder is non inverting adder.

### CIRCUIT DIAGRAM:



### PROCEDURE:

1. Initially set  $+V_{cc} = 12$  volts and  $-V_{cc}$  to -12 volts.
2. Measure all resistors that are used in the amplifier circuits using the multimeter and record these values
3. As shown in the circuit diagram connect the circuit for Summing amplifier on a breadboard
4. Before turning any power on, double check the wiring to make sure that it is correct. Make sure that the power supply to the op-amp is correctly wired as not to apply the incorrect polarity to the op-amp.
5. Apply dc voltages at each input terminal for  $V_1$  and  $V_2$  from the dc supply and check the output voltage  $V_o$  at the output terminal using the multimeter.
6. Tabulate 3 different sets of readings by repeating the above step.
7. Compare practical  $V_o$  with the theoretical output voltage  $V_O = - (V_{in1} + V_{in2})$

**TABULAR COLUMN:**

$V_1$ (Volts)	$V_2$ (Volts)	Theoretical $V_o = -(V_1 + V_2)$	Practical $V_o = -(V_1 + V_2)$

**RESULT:**

The Practical Values of  $V_o$  observed are equal to the theoretical values and output is a true replica of addition of two input values. From this we can conclude that the Summing Amplifier or Adder using 741 OP-AMP is satisfying its function properly.