

EXPERIMENT 9

OPERATIONAL AMPLIFIER(OP-AMP)

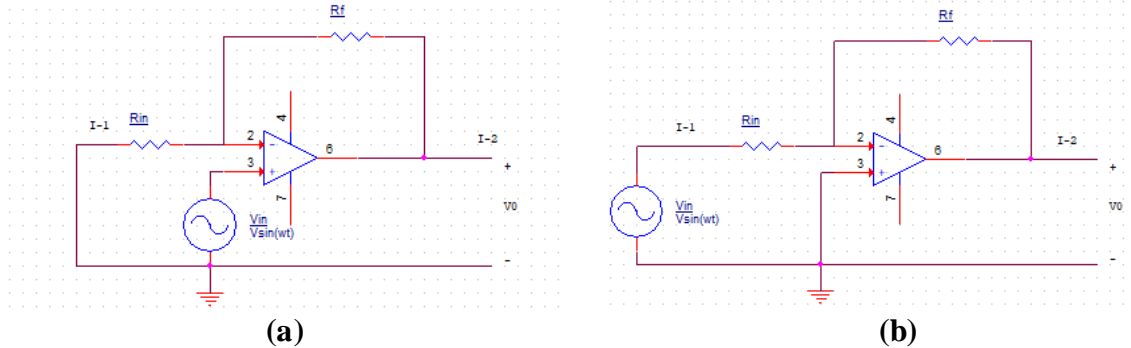
OBJECTIVE: Obtain output voltage due to input voltage for OP-AMPS.

EQUIPMENT

Digital Multimeter (DMM)
Avometer (AVO8)
Oscilloscope
Function Generator
Analog Lab-Kit from Texas Instrument
Jumper

PRELIMINARY WORK

P1 Derive an equation for output voltage with respect to input voltage related with each element in the circuit given in figures (a,b) with nodal analysis or mesh analysis.



P2 Determine the OPAMP types for deriving equation.

P3 Plot V_{out} - V_{in} to graph paper for each figure. Take V_{in} ; -8 to 8 increasing 2 Voltage.

EXPERIMENTAL WORK

WARNING!

- 1- Do not take input voltage more than 10 Volt for embedded system.
- 2- Do not take input frequency more than 1 kHz for embedded system.
- 3- In system, OPAMP's are locating symmetric. When only one OPAMP needed, make sure that the other OPAMP output goes to ground.

E1 Setup the circuit given in Figure **a** (For $R_{in}=1000$, $R_f=2000$)

- a) Measure V_o , I_1, I_2 shown in figure a and b both for -8 to 8 Voltages.
- b) Obtain V_{in} for saturated output both a and b.

E2 Setup the circuit given in Figure **b** (For $R_{in}=1000$, $R_f=2000$)

- a) Keep source at $5\sin\omega t$, measure V_o , I_1, I_2 shown in figure c for between 100-Hz to 1kHz.
- b) Obtain V_{in} for saturated output at figure b.
- c) What is the gain of this OPAMP.

CONCLUSIONS

C1 Plot V_i-V_o relations on digital platform.

C2 Compare the graphs and determine. What is the differences between preliminary work graph and experimental graph.

C3 What can be the usage of thus OPAMP's in engineering area ? Give some examples.