Experiment 6

Op-Amp Circuits I

Pre-Lab Report

Question 1:

Prove theoretically that for an ideal op-amp, the relation between the output voltage and the input voltage of the inverting amplifier shown in part A of this experiment is $V_o = -\frac{R_2}{R_1} V_I$.

(Vp-V1)/R1+(Vp-V0)/R2 but V(p)=V(n)=0
then -V1/R1-V0/R2=0
V(0)= -(R2*V1)/R1

Question 2:

Prove theoretically that for an ideal op-amp, the relation between the output voltage and the input voltage of the non-inverting amplifier shown in part B of this experiment is $V_o = \left(1 + \frac{R_2}{R_1}\right) V_I$.

V(p)/R1+[V(p)-V(0)]/R2=0, but V(p)=V1
V(1)/R1+[V(1)-V(0)]/R2=0
V0/R2=V(1)/R1+V(1)/R2
V(0)/R2=V(1)*(1/R1+1/R2)
V(0)=V(1)*(1+R2/R1)

Question 3:

Prove theoretically that for an ideal op-amp, the relation between the output voltage and the input voltage of the unity gain non-inverting amplifier shown in part C of this experiment is ***Vo = Vi.***

V(p)=V(0)
V(p)=V(n)
V(n)=V(1)
V(1)=(V0)
Gain=V(0)/V(1)=1