PART C: Pre-Lab

C.1 What is the gain of an entire amplifier circuit in closed, negative, loop and how is it different from the open loop gain of Op Amp?

The closed loop gain is the negative ratio of the feedback resistor and the source resistor. The open loop gain of an ideal Op Amp would be infinite, but in real life it is just a very high value.

C.2 For the circuit of Figure 3:

a. Calculate the gain $\boldsymbol{K}$ for the inverting amplifier if $\boldsymbol{R_s = 10k\Omega}$; $\boldsymbol{R_f = 20k\Omega}$; $\boldsymbol{+V_{CC} = 15V}$; $\boldsymbol{-V_{CC} = -15V}$. Assume that the Op Amp is ideal.

K = -2

b. Calculate the theoretical linear operating range of the input voltage for the circuit (before the output reaches saturation): for which values of $\boldsymbol{V_s}$ will the output $\boldsymbol{v_o}$ stays within the linear range.

-7.5 <= Vs <= 7.5

C.3 For the circuit of Figure 4:

a. Calculate the gain $\boldsymbol{K}$ for the non-inverting amplifier if $\boldsymbol{R_s = 10k\Omega}$; $\boldsymbol{R_f = 20k\Omega}$; $\boldsymbol{+V_{CC} = 15V}$; $\boldsymbol{-V_{CC} = -15V}$. Assume that the Op Amp is ideal.

K = 3

b. Calculate the theoretical linear operating range of the input voltage for the circuit (before the output reaches saturation): for which values of $\boldsymbol{V_g}$ will the output $\boldsymbol{v_o}$ stays within the linear range.

-5 <= Vs <= 5

C.4 Derive Equation 5 for the voltage output of a Inverting Summing Amplifier with three inputs Va, Vb, and Vc.

Vo = -Rf(Va/Ra + Vb/Rb + Vc/Rc)