EE 230 — HW 1.4 Name_____

A. An amplifier has a non-linear transfer characteristic described by the the function

$$v_o\left(v_i\right) = (100\,\text{V}) \sin\left[\frac{v_i}{1.0\,\text{V}} \cdot \frac{\pi}{4}\right]$$

for $-1.0\ \text{V} \le v_i \le 1.0\ \text{V}$. (It never hurts to make a plot of the function so that you can see what is going on.) Calculate the differential open-loop gain as a function of input voltage: $A(\,v_i\,) = dv_o\,/\,dv_i$. Calculate the gain at the specific points $v_i = 0$ V and $v_i = 1$ V. Compute the percentage change of the open-loop gain between those two points. Then calculate the differential closed-loop gain $G(\,v_i\,)$, if the amp is used in a feedback configuration with a feedback factor, $\beta = 0.1$. Calculate the closed-loop gain at $v_i = 0$ V and $v_i = 1$ V. Compute the percentage change of the closed-loop gain between those two points.

B. An amplifier has the open-loop transfer function shown graphically at right.

If the amplifier is used in a feedback configuration with a feedback factor, $\beta = 0.05$, make a plot of the corresponding closed-loop transfer function.