Results Sheet for Laboratory Exercises

NAME: LAB SECTION:

* Open Loop Characteristics
* *R*1 = , *R*2 =

*k* =

* Attach HP 4155B plot, annotated with *Voffset* and *Ao*. Show all calculations on the plot.

*Voffset* = , *Ao* =

* Closed Loop Characteristics
* *Vo* = What is the source of this voltage?



Contrast the value of *Voffset* measured in this way to *Voffset* estimated from the open loop plot measured in Part 1. What factors induce error in each measurement?

* 3dB Frequency (attach oscilloscope plot) =

What is the open loop gain of the op amp at this frequency?

* Slew Rate (attach oscilloscope plot with *V*/*t* markers)

Was the distortion on the output totally due to slew rate limitations? How can you tell the difference between a square wave limited by slew rate and one limited by frequency response? Sketch an example of each below.



* 3dB Frequency (attach oscilloscope plot) =

Define  as the voltage *V*-/*Vo* of the resistive feedback network. What is the loop gain  at the 3dB frequency measured above?



* 3dB Frequency (attach oscilloscope plot) =

What is the open-loop gain of the op amp at this frequency?



* GENERAL QUESTIONS
* Using the DC open loop gain and all the 3dB frequencies measured above:
* Create a detailed plot of the open loop frequency response of the op amp. Be sure to indicate all the above data points on your plot. You should additionally indicate the dominant pole frequency and unity gain frequency on your plot. You may assume a single pole model of the op amp.
* Based on your gain plot, create an open-loop phase plot of the 741 op amp. Compare your results to a simulation of the phase plot for the open-loop op amp modeled by ‘lm741.mod’ using SPICE. How well does your plot agree with the data sheet plots? *Analytically* explain any discrepancies between your plot and the data sheet plots. (You should estimate the location of any additional poles or zeros that you postulate.)
* Could you conveniently make a slew rate measurement using a sinusoidal input for the 741 op amp used in this lab with the circuit given below? Why or why not?

