Design Project 2 Report Template

Names:

|  |  |  |  |
| --- | --- | --- | --- |
| Open Loop Parameter | Analytical | Simulated | Measured |
| Input Common Mode Range |  |  |  |
| Output Swing |  |  |  |
| Open Loop Gain |  |  |  |
| Open Loop Time Constant |  |  |  |
| Output Resistance\* |  |  |  |
| Input Resistance\* |  |  |  |
| Input Bias Current\* |  |  |  |
| Power Consumption |  |  |  |

\* indicates that you can pull these numbers from previous labs.

|  |  |  |  |
| --- | --- | --- | --- |
| Closed Loop Parameter | Analytical | Simulated | Measured |
| Steady State Error |  |  |  |
| Gain-bandwidth Product |  |  |  |
| Slew Rate |  |  |  |
| Output Resistance |  |  |  |
| Input Resistance |  |  |  |

Schematic of your circuit with labeled component values and bias currents.  
(Draw by hand or use circuit program, LTSpice schematics are too hard to read)

Open-loop and closed-loop transfer characteristics. Include both simulated and measured.

Open-loop and closed-loop Bode plots. Include both simulated and measured. Indicate crossover and phase margin. Comment on expected stability.

Oscilloscope trace showing normal closed-loop operation on a sine wave. (Specify feedback factor)

Measured step responses for small steps and large, slew-limited steps.   
(Be sure to Zoom in so I can see the slew)

Optional: Description of special feature and desired effect (~ 1/2 page max)

Optional: Can you make your op-amp unstable? Under what conditions? Include a screenshot.

Screenshot of LTSpice schematic.

Picture of circuit

Describe any new circuits that you designed for this amplifier. Include design process, including analysis of large signal biasing (where possible) and small signal parameters. Also include discussion of modifications made to differential and output stages. (1-2 pages)

For each parameter in the table above, provide the following. If you have measured these quantities in a previous lab, you may copy those results here. (1 page per param):

* Calculations for analytical value. Reference earlier schematics and use equations as necessary.
* Brief explanation of how you measured the parameter. Specify test sources / attenuators (if used) / loads. Specify feedback factor for closed loop tests. Note that loads will often be “open circuit” for these tests. Be sure to include attenuator and balun schematics if you use them.
* Explanation of discrepancies between simulated, measured and calculated values. Reference earlier schematics or results and use equations as necessary.
* Special commentary for a few parameters:
  + Comment on relation between open and closed loop rin and rout.
  + Compare power consumption to your favorite IC op-amp.
  + Compare input common mode range to your favorite IC op-amp
* Relevant scope traces, simulated plots or other figures.