Title: Comparison of Integrated vs. Discrete Op-Amps:

Lab Section: Friday Lab, Brauer

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Scientific Question:

Do discrete transistor op-amps perform comparably to integrated circuit op-amps across a wide frequency spectrum?

Hypothesized Answer:

No, we do not believe that the transistor op-amp will perform comparably to the integrated circuit op-amp due to parasitic resistances and capacitances in the breadboard.

Purpose:

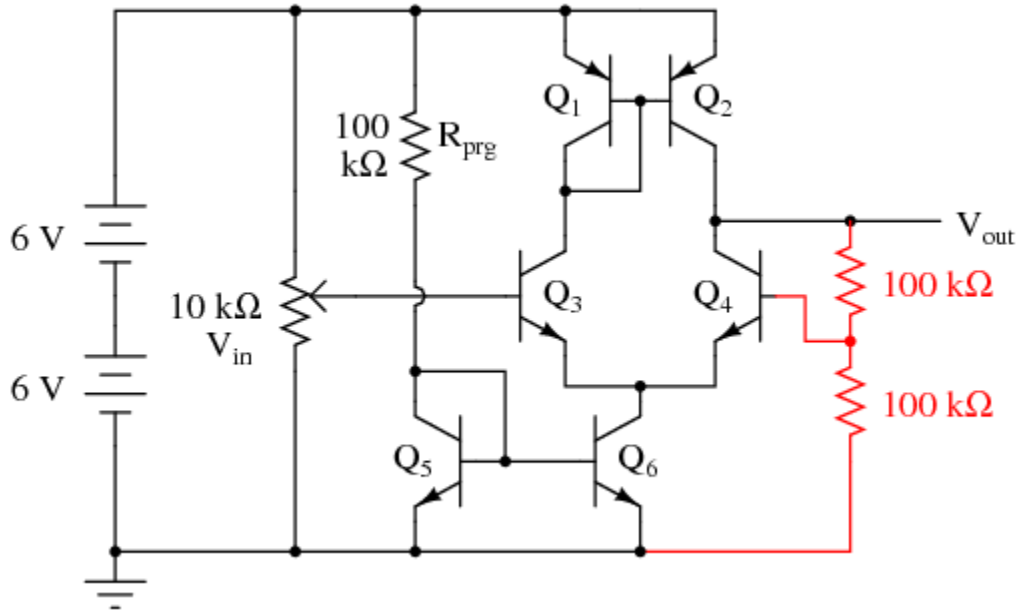
The scientific aim of this lab is to explore the differences between op-amp architectures and analyze the potential benefits and drawbacks of each op-amp choice. This experiment is important as it builds a deeper understanding of the underlying principals and intuition behind op-amps and the variations in op-amps.

Equipment:

- Four NPN transistors—models 2N2222 or 2N3403
- Two PNP transistors—models 2N2907 or 2N3906
- Two 10 kΩ potentiometers, single-turn, linear taper
- One 270 kΩ resistor
- Three 100 kΩ resistors
- One 10 kΩ resistor

Methods:

1. Build the discrete transistor op-amp circuit by following the schematic:



2. Setup the LM741 on the breadboard, same as PLab 1a setup
3. Follow PLab 1a methods procedure 2, however, repeat at various frequencies from .1 Hz to 2 MHz for both op-amps
4. Follow Procedure 4 from PLab 1a for both op-amps to measure input impedance for both op-amps
5. !!!MAYBE!!!
    a. Reconfigure the discrete transistor op-amp to be a differential input mode
    b. Test differential gain for both op-amps