

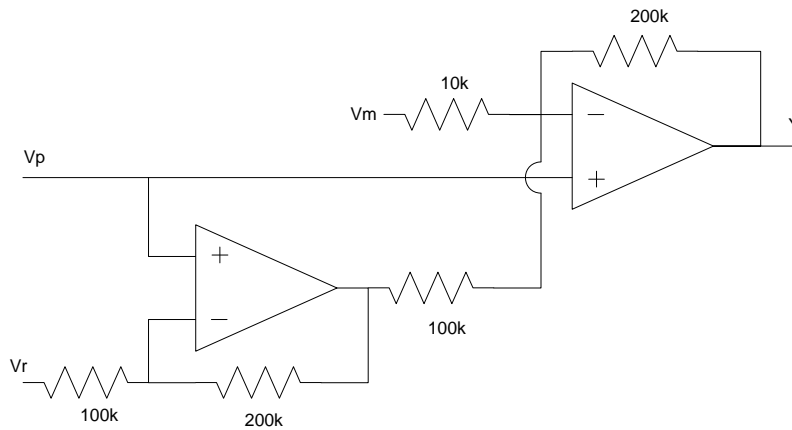
ECE 321 - Homework #1

Op-Amp Amplifiers, Push-Pull Amplifiers. Due Monday April 3, 2017

1) Design an op-amp amplifier to implement the following functions:

- a) $y = 7x$
- b) $y = -7x$
- c) $y = 7x - 3$

2) Write N equations to solve for N unknown voltage nodes. Assume ideal op-amps.

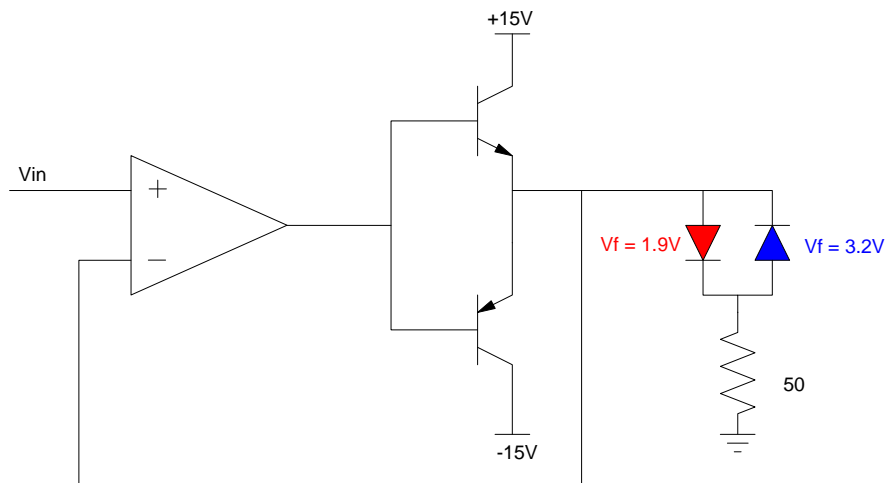


3: Push-Pull Amplifier (voltage output): Find the voltages for the following push-pull amplifier when

- a) $V_{in} = +5V$
- b) $V_{in} = -5V$

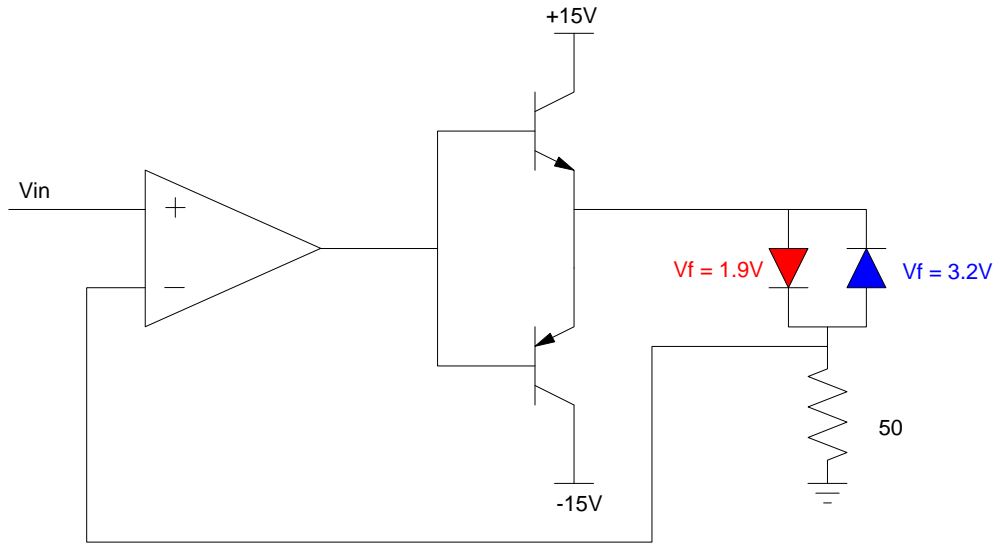
Assume the transistors are Darlington pairs (TIP)

- $\beta = 1000$
- $|V_{be}| = 1.4V$
- $|V_{ce:sat}| = 0.9V$



4: Push Pull Amplifier (Current Output): Find the voltages for the following push-pull amplifier when

- a) $V_{in} = +5V$
- b) $V_{in} = -5V$



Design a push-pull amplifier

5) Requirements: Specify the

- Input (voltage, range, current),
- Output (8 Ohms speaker, LED, etc)
- Relationship (current = voltage / 50, $V_{out} = V_{in}$)
- Tolerance

6) Analysis: Give a circuit to meet your requirements. Calculate the voltages and currents for several input voltages

- Input = min / max / one or two points inbetween

7) Simulation: Test your design in simulation via PartSim or similar program

8) Validation: Build your circuit in lab. Collect data to verify your analysis and simulation results.