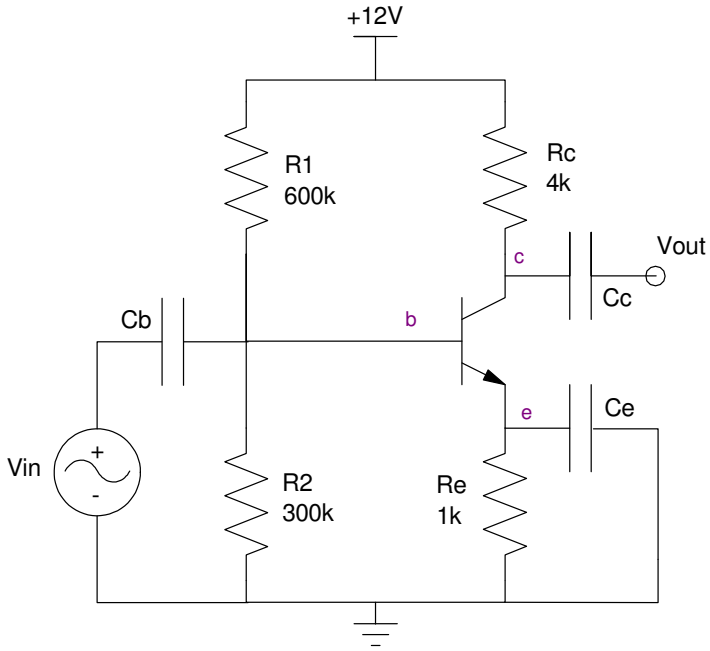
ECE 321 - Homework #4

2-Port Models. CE Amplifiers (DC and AC). Due Monday, December 7th

CE Amplifiers (DC Analysis)

1) Determine the Q-point for the following circuits. Assume 3904 NPN transistors

- β = 200
- | Vbe | = 0.7V



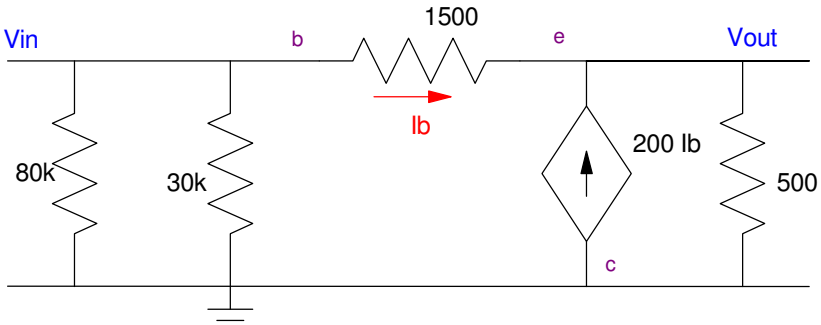
2) Modify this circuit so that

- Vce = 6.0V, and
- The Q-point is stabilized for variations in β

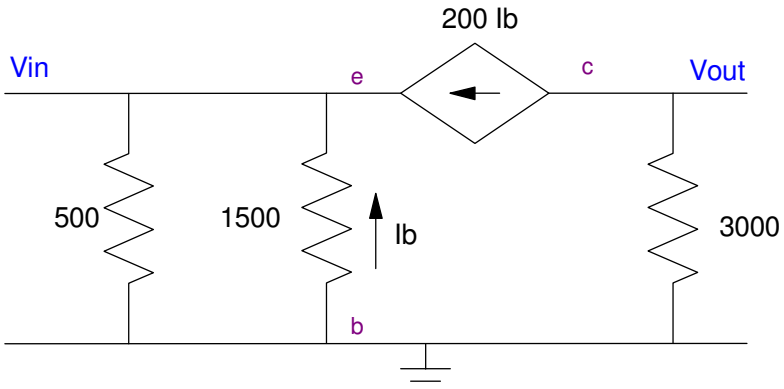
3) Check you answers in CircuitLab

2-Port Models

4) Determine the 2-port model for the following circuit



5) Determine the 2-port model for the following circuit



CE Amplifiers (AC Analysis)

6) Draw the small signal model for the CE amplifier used in problem #1

- Determine the resulting 2-port model

7) Check your answers for problem #6 (and #1) in CircuitLab

- Rin: If you add a resistor in series with Vs equal to Rin, the output drops by half
- Rout: If you load Vout with a resistor equal to Rout, the output drops by half
- Ao: Apply a 1mV, 1kHz sine wave at Vin. The output should be Ao*Vin

8) Determine the 2-port model for cascading three of these CE amplifers (CE : CE : CE)

9) Remove Ce. Determine the 2-port model of this CE amplifiers