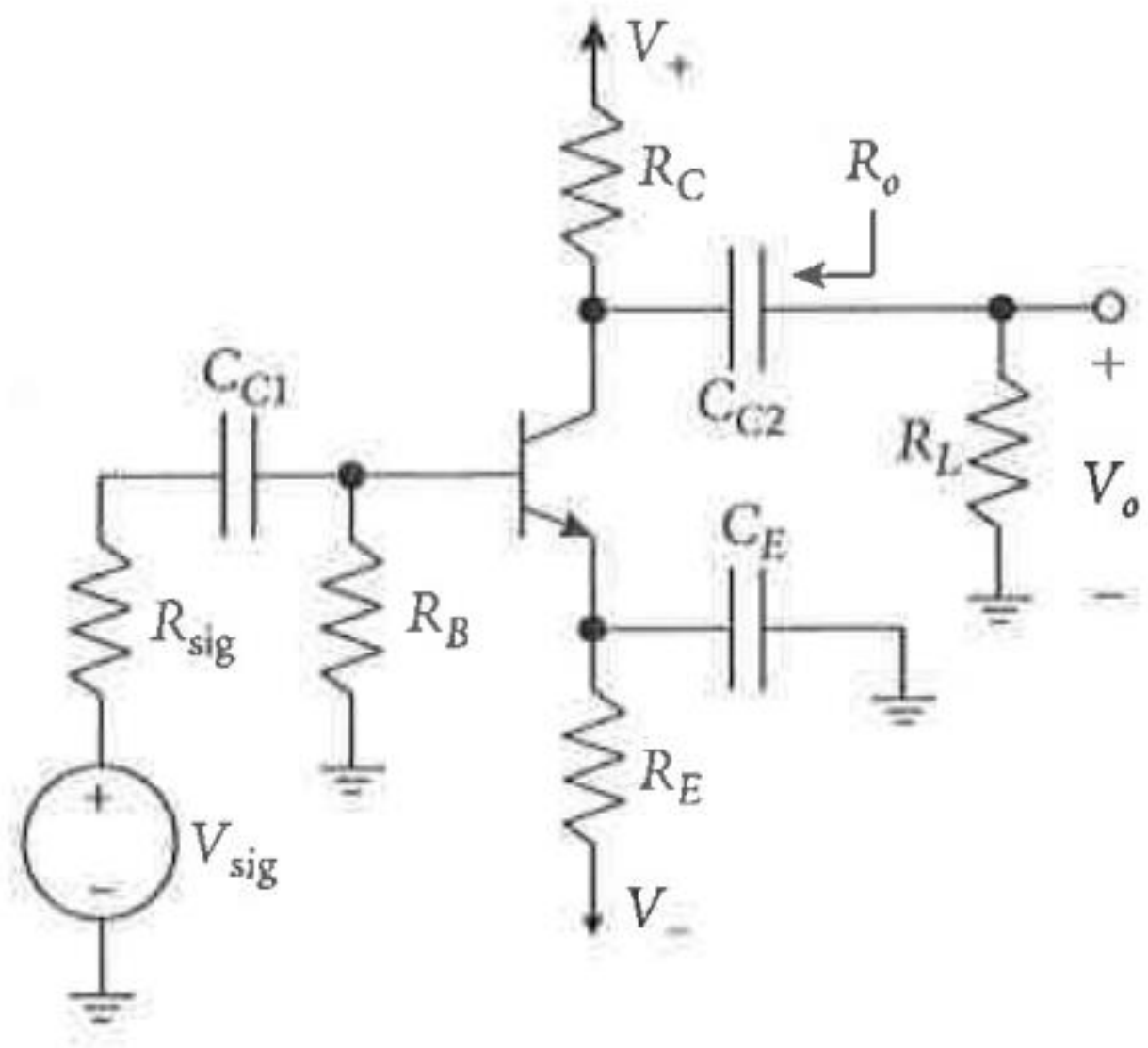


DC analysis – Find the Operating Point

What do we know:

- Vbe the voltage from the base to emitter is about 0.7 volts (a diode drop)
- The collector current (Ic) = Beta * Ib (the base current, assumes to be small at first)
- V+ ~ 15 volts
- V- ~ -15 volts
- Beta = !00 - 300

So Ve (The emitter voltage) is about -0.7 volts

So if we want Ic to be about 1 milliamp:

Re = Ic/Beta ~ 14volts/1.01 ma or about 14kohms (use a standard value, 12k)

Now choose an Rc to leave about half of the 15.7 volts across the transistor so

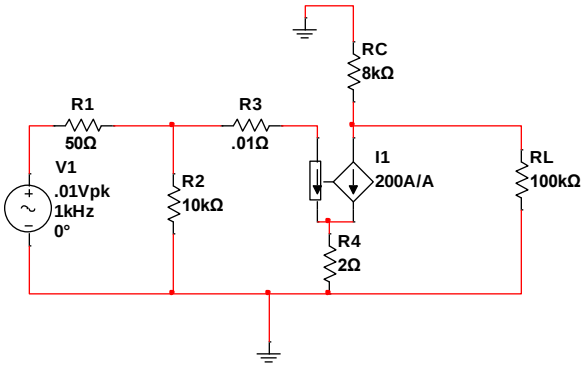
Rc = 15.7/1ma ~ 15kohms

The Biasing resistor Rb should be as high as reasonable give that Ib = Ic/Beta ~ 10 microamps and we do not want too high a voltage drop at the base so try Rb = 10k ohms (a 0.1 volt drop)

We now have set the Q-point of our amplifier.

Small Signal or AC analysis

Redraw the circuit shorting out all large capacitors and supply voltages are now at AC ground and replace the transistor with it's small signal model.
(I have added two small resistors R3 and R4 to make Multisim happy)



Now do a circuit analysis to calculate:

- The voltage gain
- The amplifier input impedance
- The amplifier output impedance