1. Design the series-series feedback transconductance amplifier shown above using BJTs. The input is the voltage $v_i$ and the output is the current $i_{e2}$. And the voltage gain $A_v = v_o/v_i$. Design specifications are closed loop gain of $A_m = i_{e2}/v_i = 3.23m\Omega$ if the open loop gain were infinite, viz $(1/b = 3.23m\Omega)$. Use dc power supplies of $\pm 15\ V$. The $\beta$ of both transistors is $\infty$ and $V_{BE} = 0.65\ V$ for the NPN transistor $Q_1$ and $V_{EB} = 0.65\ V$ for the PNP transistor $Q_2$. The input impedance seen by the function generator is to be $150\ \Omega$ and the dc voltage $V_{E1} = -5\ V$, $R_4 = 10\ k\Omega$, $R_5 = 1.3\ k\Omega$, $R_6 = 1.2\ k\Omega$, $R_7 = 3\ k\Omega$, $R_8 = 3\ k\Omega$, $R_L = 15\ k\Omega$, $C_1 = 10\ \mu F$, $C_2 = 20\ \mu F$, and $C_3 = 100\ \mu F$. Compute the resistors $R_1$, $R_2$, and $R_3$ to satisfy the design specifications. Assume that $R_g$ is zero. Verify the design with a SPICE simulation to determine the DC operating point, an AC analysis (outputs $i_{e2}$ and $v_o$), and the clipping behavior. Repeat the AC analysis for $A_m$ when a $100\ \mu F$ is placed from the emitter of $Q_2$ to ground.