ELE509E
Current-Mode Analog Circuit Design
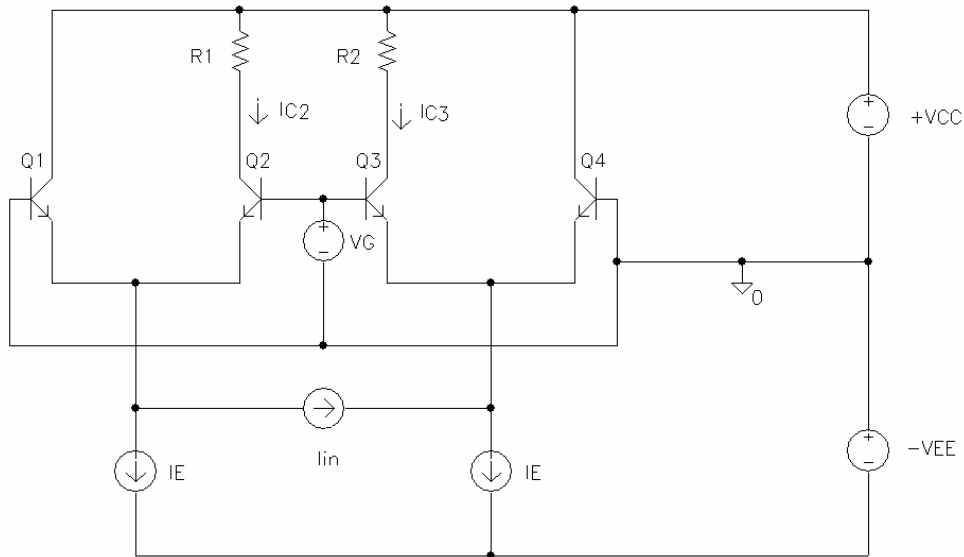## Homework 1 (24.10.2003)

Figure 1

The current gain of the AGC circuit illustrated in Figure 1 is related to the control voltage V_G as

$$\frac{I_{out}}{I_{in}} = \frac{\exp\left(\dfrac{V_G}{V_T}\right)}{\exp\left(\dfrac{V_G}{V_T}\right)+1} \tag{1}$$

Choose appropriate values for the biasing currents I_E, supply voltages $+V_{CC}$, $-V_{EE}$ and load resistors R_1, R_2.
Using SPICE simulation results

a) prove Eqn.1 comparing SPICE simulations with theoretical values calculated from (1).
b) draw the the plots of I_{C2}, I_{C3} against I_{in} taking the control voltage V_G as parameter,
c) specify the limits of the input current I_{in},
d) specify the limits of the control voltage V_G,
e) draw the frequency response of the current gain and determine the bandwidth of the amplifier taking the control voltage V_G as parameter.
f) Give a detailed evaluation of your results.