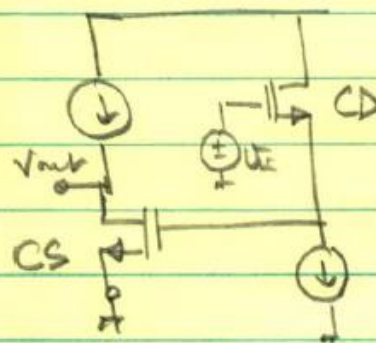
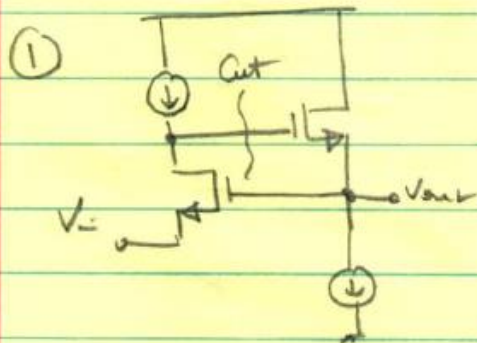


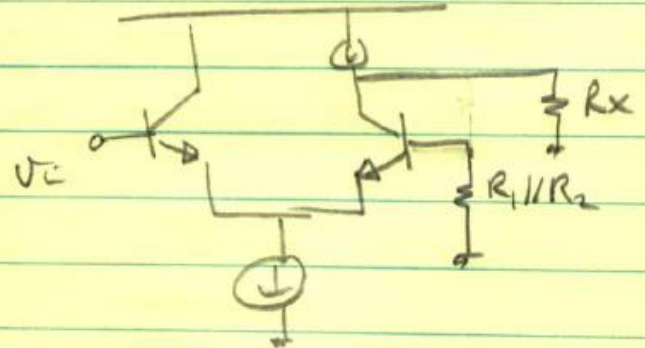
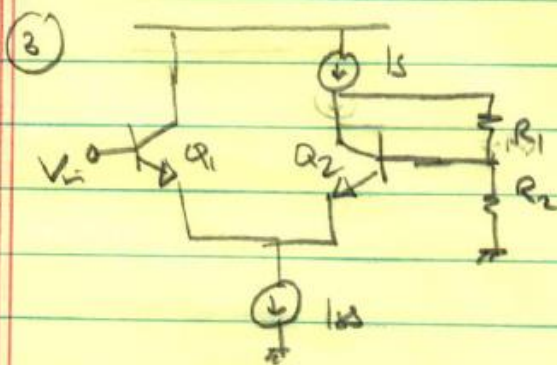
EH333SE HW#4 Solutions



CD gain +ve
CS gain -ve

x total gain -ve
thus negative feedback

② Single pole amplifier, phase margin is 90°.



$$R_x = R_1 + R_2$$

voltage-voltage feedback

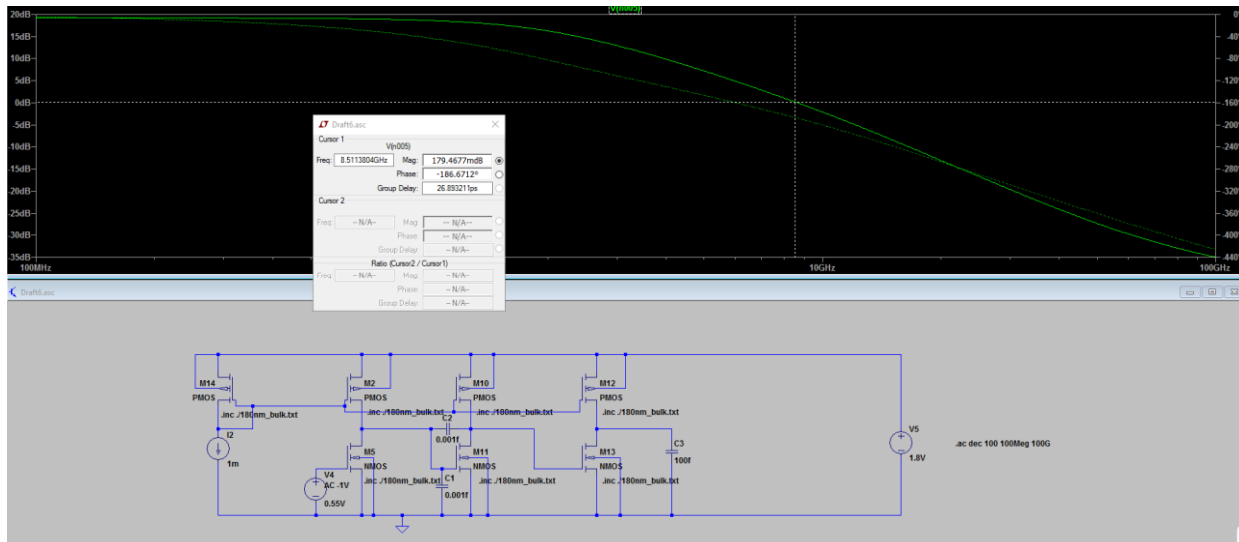
series-shunt feedback $A_o = \frac{r_{m2}}{r_{m1} + r_{m2} + R_1 // R_2} \cdot g_{m2} \cdot R_x$

$$R_{in} = r_{m1} + r_{m2} + R_1 // R_2 \quad R_{out} = R_x \quad K = \frac{R_2}{R_1 + R_2}$$

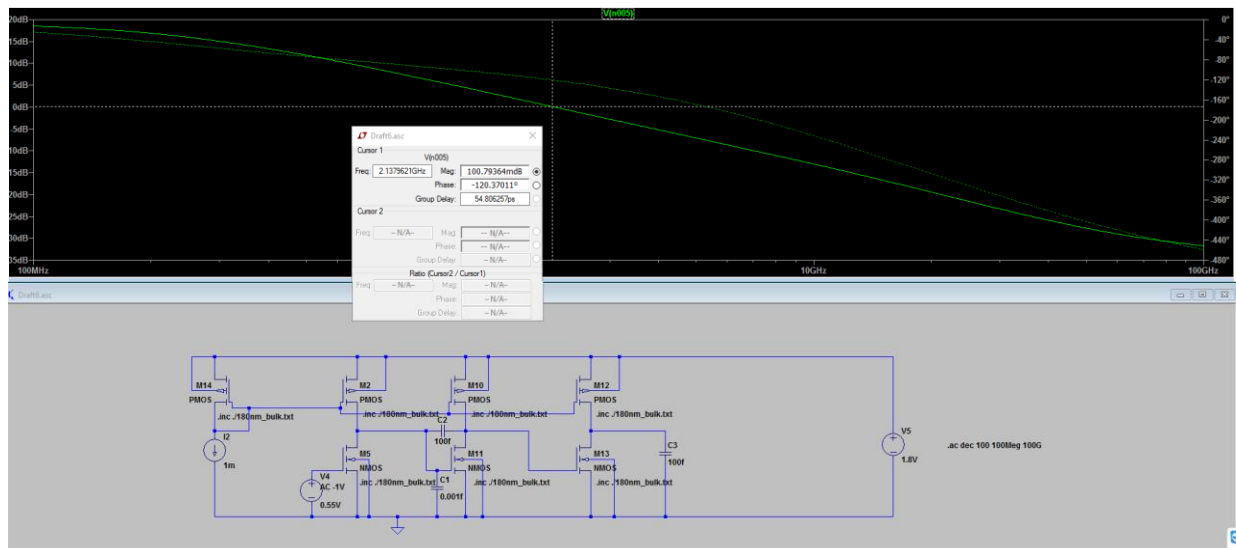
$$CL A_o = \frac{A_o}{1 + K A_o} \quad CL R_{in} = R_{in} (1 + K A_o)$$

$$CL R_{out} = \frac{R_{out}}{1 + K A_o}$$

4) With no compensation, the phase margin is about -7 degrees.



If a capacitance of 100 fF is applied between X and Y, phase margin reaches 60 degrees. Under this condition, unity-gain bandwidth is 2.14 GHz.



If a capacitance of 1pF is applied between X and the ground, phase margin reaches again 60 degrees. Under this condition, unity-gain bandwidth is 1.78 GHz.

