Exercises for Tutorial 3: Frequency Response

1) Problem 6.6. in the course book.

2) Problem 6.8(e) in the course book.

3) Problem 6.9(b) in the course book.

4) Problem 6.10(b) in the course book. Assume $r_{03} \gg R_2$.

5) Figure 6 shows an amplifier schematic. For simplicity we can ignore all parasitics of M_1 and M_2 and we assume that the dominant pole occurs at the output node. Also, we assume $g_m \gg 1/r_0$. Find the product $|A_0|\omega_{-3dB}$, where A_0 is the DC gain and ω_{-3dB} is the 3 dB cut-off frequency. Assume $\gamma = 0$.
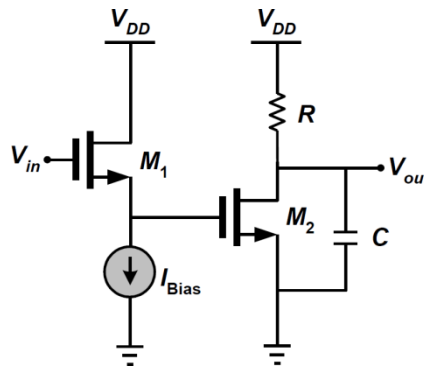

Figure 6 An amplifier schematic.

6) Figure 7 shows an amplifier schematic. For simplicity we can ignore all parasitics of $M_1 - M_4$ and we assume that the dominant pole occurs at the output node. If the input signal has an angular frequency of $\omega_i = 10^9 \ rad/s$, determine the AC gain of the amplifier. Assume $g_{m1} = g_{m3} = 4 \ mA/V$, $g_{m2} = g_{m4} = 1 \ mA/V$, $C = 1 \ pF$, $g_m \gg 1/r_0$ and $\gamma = 0$.
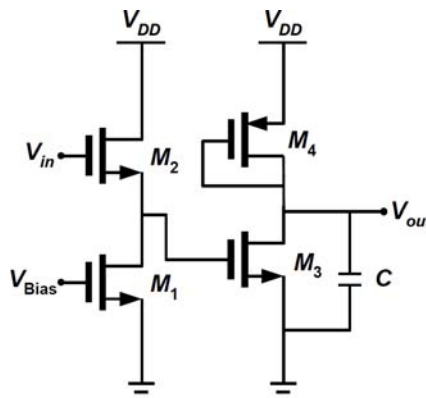

Figure 7 An amplifier schematic.