Homework Assignment No. 11

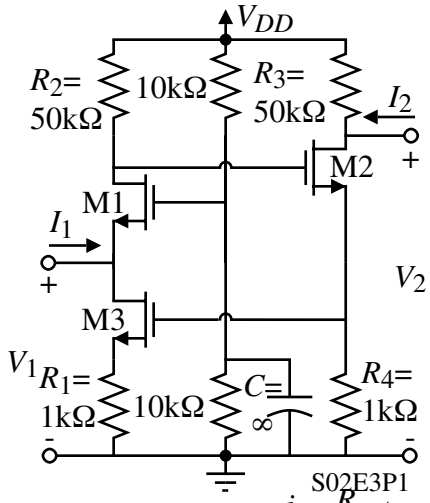
Due Monday, March 29, 2004 in class

Problem 1 - (10 points)

Problem 8.26 of GHLM

Problem 2 - (10 points)

The simplified schematic of a feedback amplifier is shown. Use the method of feedback analysis to find V_2/V_1, $R_{in} = V_1/I_1$, and $R_{out} = V_2/I_2$. Assume that all transistors are matched and that g_m = 1mA/V and $r_{ds} = \infty$.



Problem 3 – (10 points)

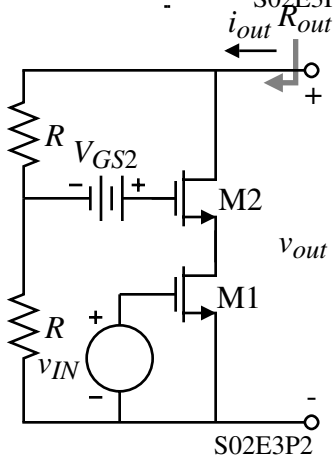
Problem 8.30 of GHLM

Problem 4 - (10 points)

Use the Blackman's formula (see below) to calculate the small-signal output resistance of the stacked MOSFET configuration having identical drain-source drops for both transistors. Express your answer in terms of all the pertinent small-signal parameters and then simplify your answer if $g_m > g_{ds} > (1/R)$. Assume the MOSFETs are identical.

$$R_{out} = R_{out}\,(g_m=0)\left[\frac{1 + RR(\text{output port shorted})}{1 + RR(\text{output port open})}\right]$$

(You may use small-signal analysis if you wish but this circuit seems to be one of the rare cases where feedback analysis is more efficient.)



Problem 5 – (10 points)

Problem 7.1-10 of Allen and Holberg, 2nd edition.