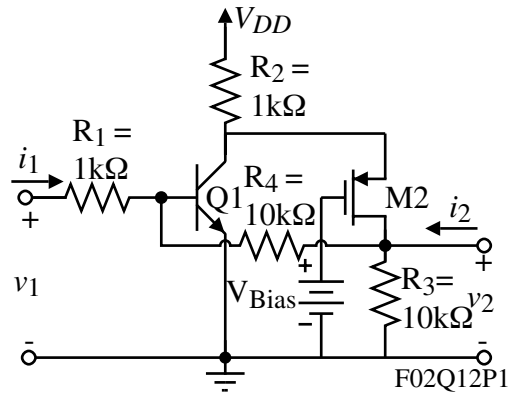


**Homework Assignment No. 12**

Due on Wednesday, April 9, 2003

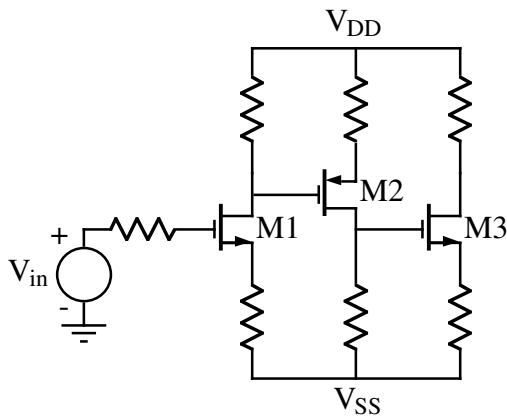
1.) Problem 18.16 of the text.

2.) A shunt-shunt feedback amplifier is shown. Use the methods of feedback analysis to find the numerical values of  $v_2/v_1$ ,  $v_1/i_1$ , and  $v_2/i_2$ . For Q1, assume that  $h_{fe} = 100$ ,  $g_m = 50\text{mS}$  and  $r_o = \infty$ . For M2, assume that  $g_m = 1\text{mS}$  and  $r_{ds} = \infty$ .

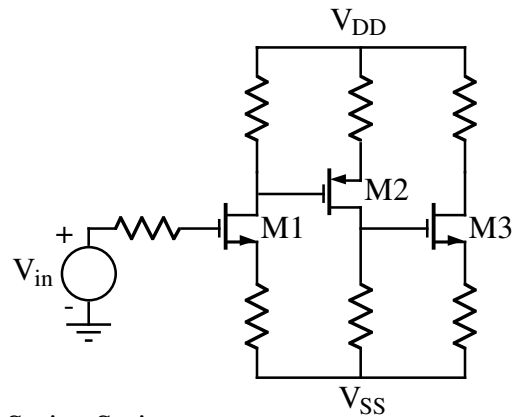


3.) For each of the MOSFET amplifiers shown below, show how to connect a single resistor from the output to the input that achieves a series-shunt, series-series, shunt-shunt and shunt-series negative feedback amplifier. For each of the four configurations, identify on the schematic the correct variables (voltage or current) for  $x_s$ ,  $x_f$ ,  $x_i$ , and  $x_o$ . The outputs should be at the drain or source of M3.

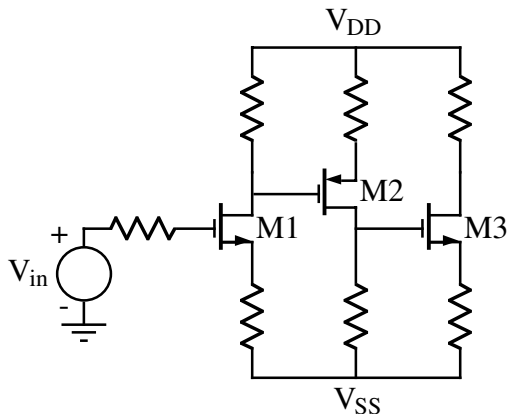
Series-Shunt



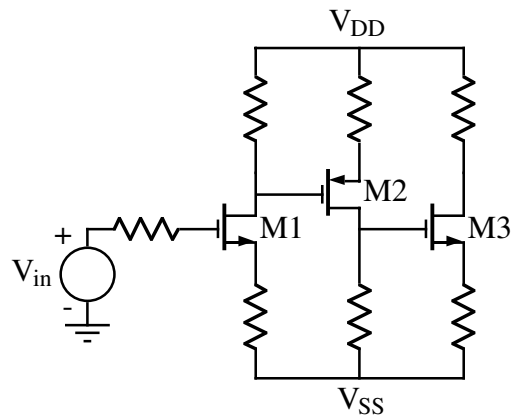
Shunt-Series



Shunt-Shunt

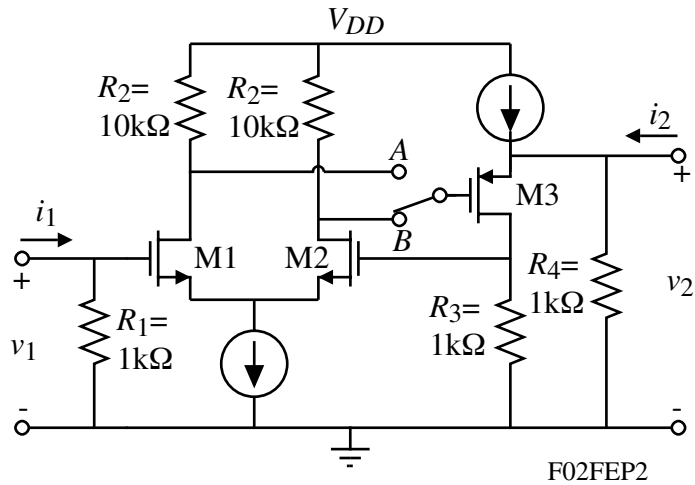


Series-Series



4.) Problem 18.22 of the text.

5.) The simplified schematic of a feedback amplifier is shown. Assume that all transistors are matched and  $g_m = 1\text{mA/V}$  and  $r_{ds} = \infty$ . (a.) Where should the switch be connected for negative feedback? (b.) Use the method of feedback analysis to find  $v_2/v_1$ ,  $R_{in} = v_1/i_1$ , and  $R_{out} = v_2/i_2$ .



**Please note that there are numerous feedback problems you can work (answers only are provided) on the class website.**