Homework Assignment No. 5

Due on Monday, September 20, 2004

Problems in ( ) refer to the first edition.

1.) Problem 13.102 (13.91) of the text.

2.) Problem 13. 111 (13.100) of the text. [A_v = -4.60 V/V]

3.) Problem 13.118 (13.108) of the text.

4.) A PMOS common-drain amplifier is shown. Assume the parameters of the transistor are k_F = 0.5mA/V^2, V_{TP} = -1V, and λ = 0. (a.) If I_{SD} = 0.5mA, find the small signal model parameter values for g_m and r_o. (b.) Find an algebraic expression for the small signal input resistance, R_{in}, the output resistance, R_{out}, and the voltage gain, v_{out}/v_{in}. (c.) Numerically evaluate the small signal input resistance, R_{in}, the output resistance, R_{out}, and the voltage gain, v_{out}/v_{in}.
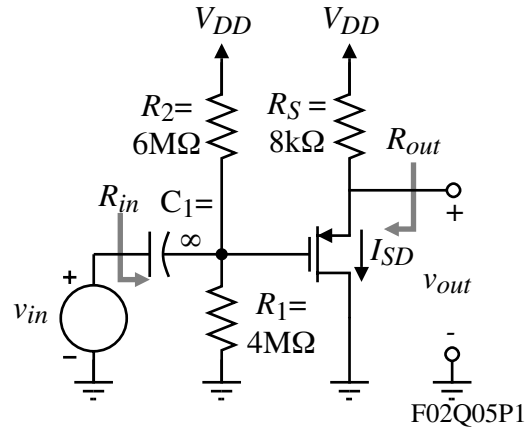
5.) A NMOS common-source inverting amplifier is shown. Assume the parameters of the transistor are K_N = 1mA/V^2, V_{TN}= 1V, and λ = 0. (a.) Find the small signal model parameter values for g_m and r_{ds}. (b.) Find an algebraic expression for the small signal input resistance, R_{in}, the output resistance, R_{out}, and the voltage gain, v_{out}/v_{in}. (c.) Numerically evaluate the small signal input resistance, R_{in}, the output resistance, R_{out}, and the voltage gain, v_{out}/v_{in}.