Homework Assignment No. 5

Due on Wednesday, February 12, 2003

1.) Find the dc operating point, the small signal voltage gain, $v_{out}/v_{in}$, the small signal input resistance, $R_{in}$, and the small signal output resistance, $R_{out}$, if $K_n = 0.1\text{mA/V}^2$, $V_{TP} = -1\text{V}$, and $\lambda = 0.01\text{V}^{-1}$.

2.) Problem 13.91 of the text.

3.) Problem 13.100 of the text. $[A_v = -4.60 \text{ V/V}]$

4.) Problem 13.108 of the text.

5.) A PMOS common-drain amplifier is shown. Assume the parameters of the transistor are $k_F = 0.5\text{mA/V}^2$, $V_{TP} = -1\text{V}$, and $\lambda = 0$. (a.) If $I_{SD} = 0.5\text{mA}$, 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, $v_{out}/v_{in}$.