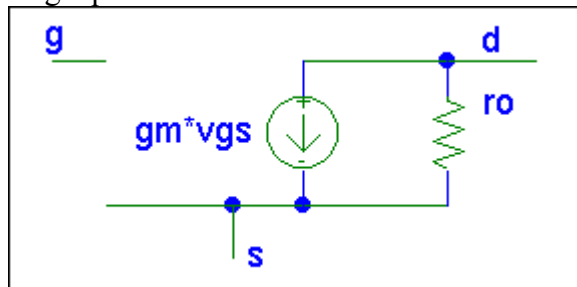


1. [50 points] (small signal mos equivalent)

For the mnmosis transistor with $W=2L=20\mu$ plot in PSpice the curves of i_D versus v_{DS} with v_{GS} as a parameter.

a) From those curves graphically determine the values for g_m and r_o for the following equivalent circuit when the transistor is biased at $V_{GS}=3V=V_{DS}$.



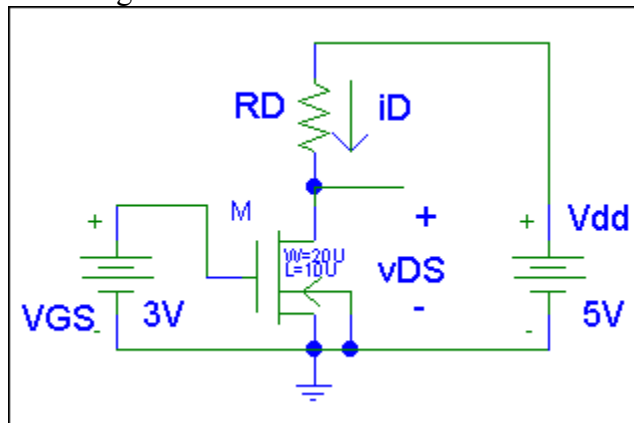
b) Using the equations of the book, see page 255, calculate g_m and r_o and compare with those found in part a).

c) repeat parts a) and b) for $V_{GS}=4V=V_{DS}$.

2. [50 points] (load line on NMOS curves)

Use the transistor of problem 1 above and apply a drain bias battery, V_{DD} , of voltage 5V and a gate DC supply to set the Q point.

a) Determine the value of a resistor R_D to give the Q point of part a) of problem 1 for the following circuit.



b) Simultaneously show the load line of part a) on the transistor curves and designate on them the Q point.