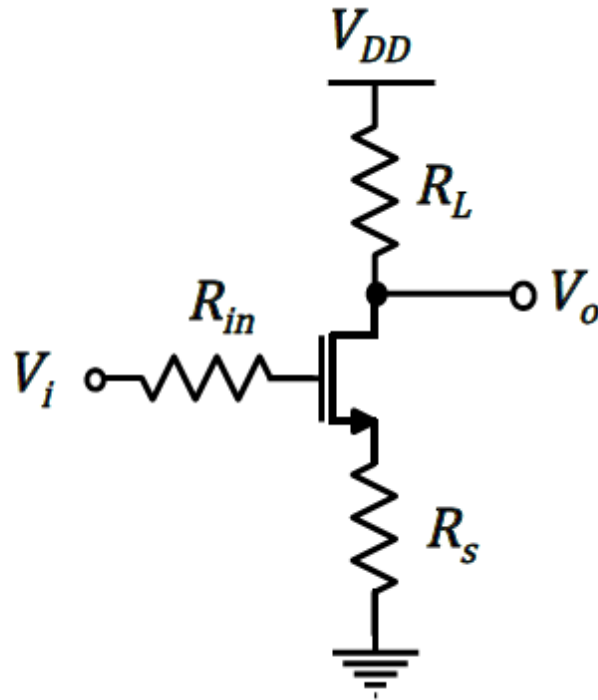


ASSIGNMENT #3

All simulations need to be done in ELDO

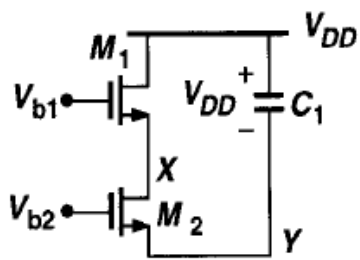
Submission Date # 8/09/2017

Q.1

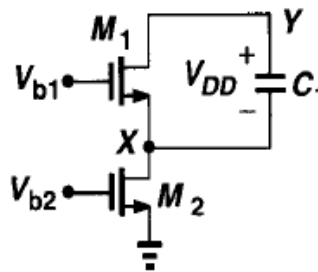


- Derive the expression for mid-band gain V_o/V_i ?
- Given $R_{in} = 100\text{K}\Omega$, $g_m = 4\text{mA/V}$, $R_L = 5\text{K}\Omega$, calculate the low frequency gain A , 3- dB frequency ω_H , and gain- bandwidth product $GBW = |A\omega_H|$ for $R_s = 0$, 100 , 250 Ω , respectively.
- Simulate in ELDO using 130nm PTM file and compare the results.

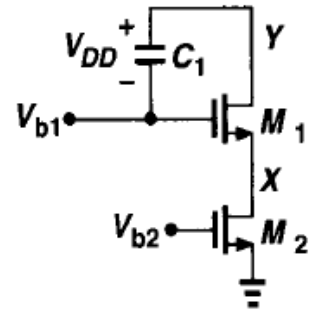
Q.2 For the given circuit plot V_X and V_Y , Considering initial voltage across $C_1 = V_{DD} = 2V$ using 130nm PTA file.



(a)



(b)



(c)

Q.3 Design a common source amplifier :

a.) Giving a gain of appx. 4, using 130 PTM file , you can choose any design for this implementation along with the value of resistances and capacitances as needed.

b.) Vary the value of R_D and R_S and show its effect on the V_{OUT} (min. 3 variations) .

Q.4 For the transistor in the amplifier , $V_{tp} = -0.8V$.The small signal source V_{sig} is a small sinusoidal signal with no DC component. (simulate in ELDO)

a.) Neglecting the channel length modulation , design the value of V_{bias} such that the output swing is maximum.

b.) How large the V_{swing} peak-to-peak value while M_1 and M_2 stay in saturation?

