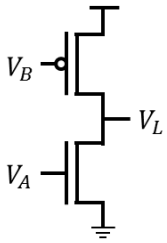
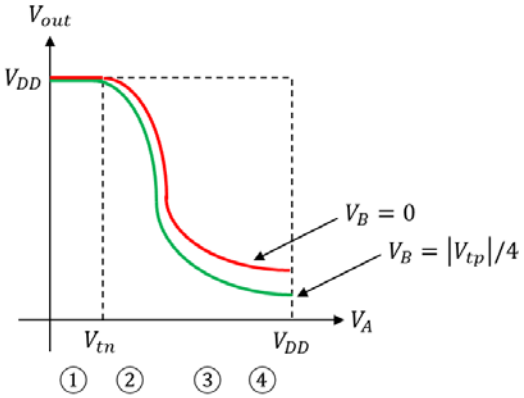
Homework Assignment 6
(Due 4:10pm, Mar. 8)

(1) [DC Analysis, 40 points] Draw two DC curves (V_A vs. V_L) for the following circuit for $V_B = 0\ (V)$ and $V_B = \frac{|V_{tp}|}{4}\ (V)$.





① NFET: $V_{GS,n} = V_A < V_{tn}$: OFF
PFET: $V_{SG,p} = V_{DD} - V_B > |V_{tp}|$: ON
$V_L = V_{DD}$
$V_{SD,p} = V_{DD} - V_{DD} \approx 0 < V_{SG,p} - |V_{tp}|$: Linear

② NFET: $V_{GS,n} = V_A > V_{tn}$: ON
$V_{DS,n} \approx V_{DD} - 0 > V_{GS,n} - V_{tn}$: Saturation
PFET: $V_{SG,p} = V_{DD} - V_B > |V_{tp}|$: ON
$V_L \approx V_{DD}$
$V_{SD,p} = V_{DD} - V_{DD} \approx 0 < V_{SG,p} - |V_{tp}|$: Linear

③ NFET: $V_{GS,n} = V_A > V_{tn}$: ON, Saturation
PFET: $V_{SG,p} = V_{DD} - V_B > |V_{tp}|$: ON
$V_L \approx V_{DD}/2$
$V_{SD,p} = V_{DD} - \frac{V_{DD}}{2} > V_{SG,p} - |V_{tp}|$: Saturation

④ NFET: $V_{GS,n} = V_A > V_{tn}$: ON, Linear
PFET: $V_{SG,p} = V_{DD} - V_B > |V_{tp}|$: ON
$V_L \approx 0$
$V_{SD,p} = V_{DD} - \frac{V_{DD}}{2} > V_{SG,p} - |V_{tp}|$: Saturation