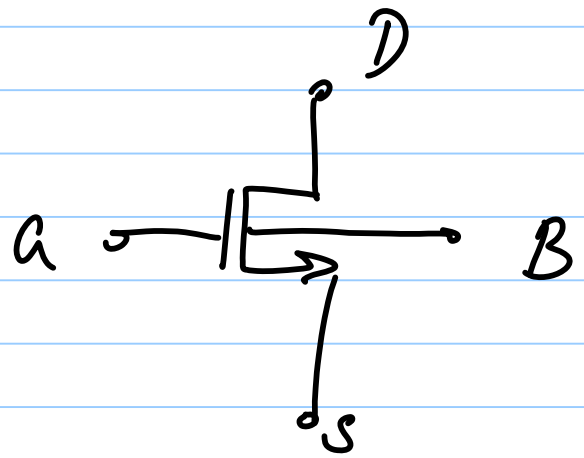
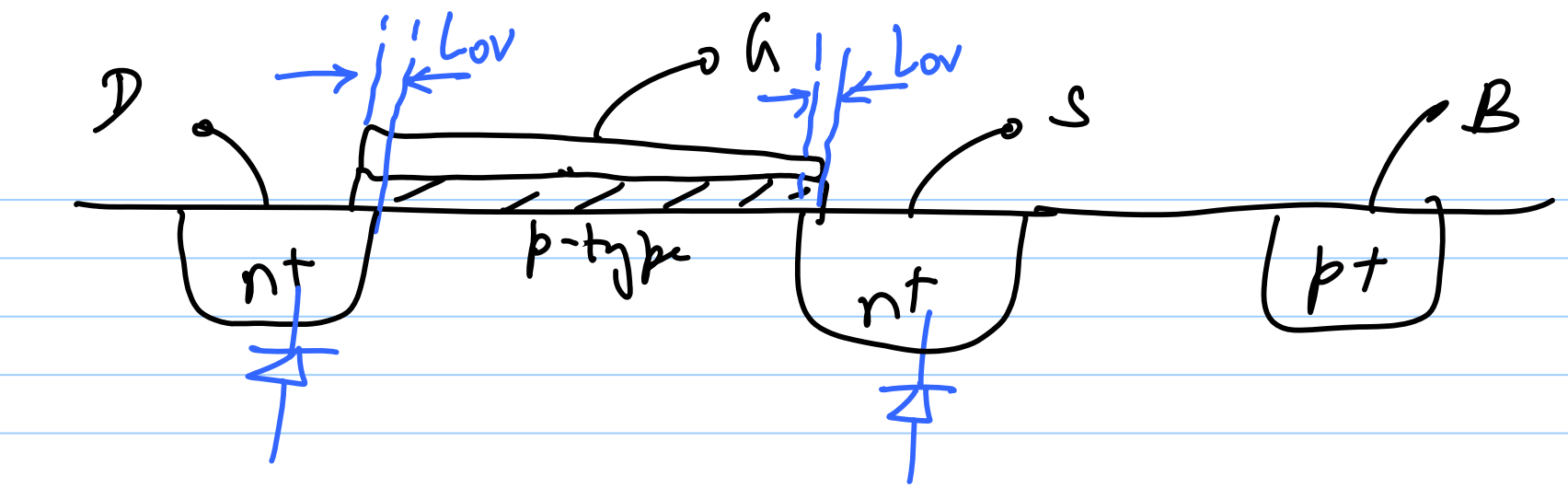
25/9/19

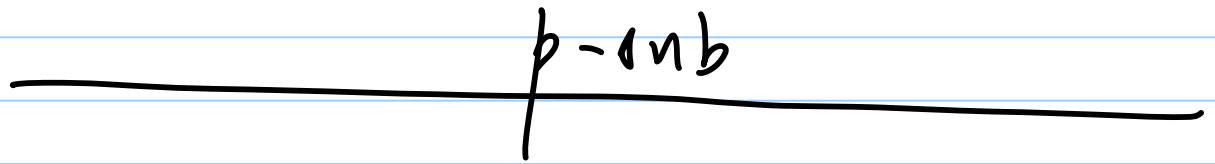
Lec 26

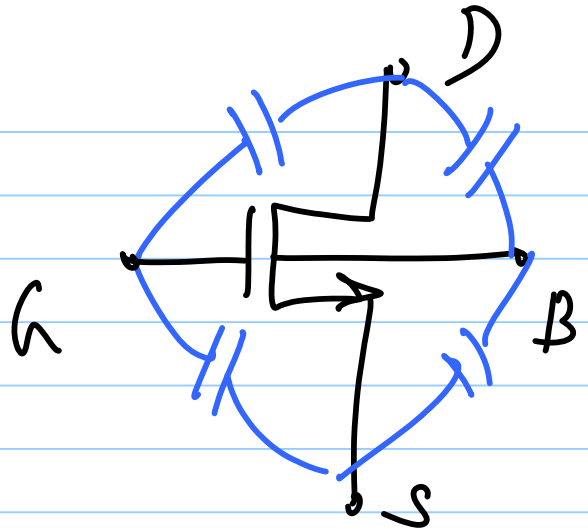


C_{gs}, C_{gd}, C_{gb}

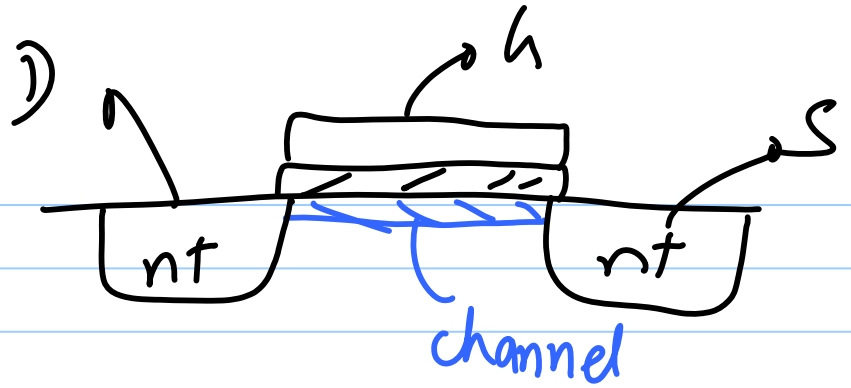
C_{db}, C_{sb}


D
Lov
G
Lov
S
B
n+
p-type
n+
p+


p-sub



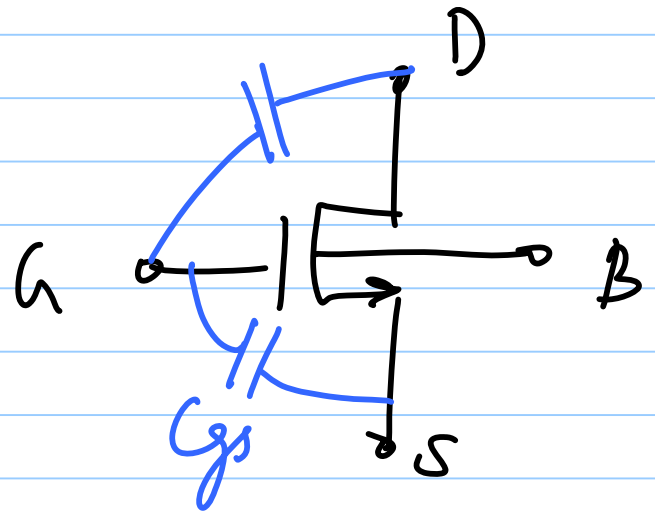
Triode caps

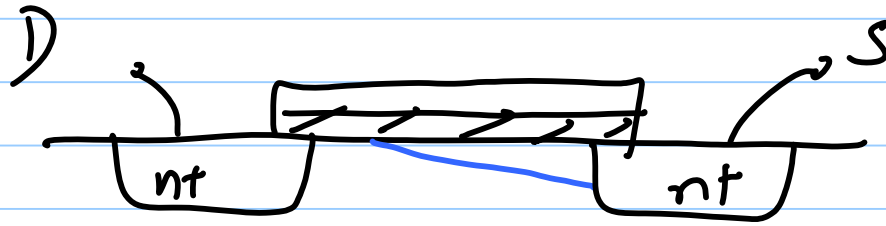


$$C_{gd} = C_{gs} = \frac{1}{2} W \cdot L \cdot C_{ox} = \frac{1}{2} C_{gch}$$

C_{db}, C_{sb}

Saturation regim cap.

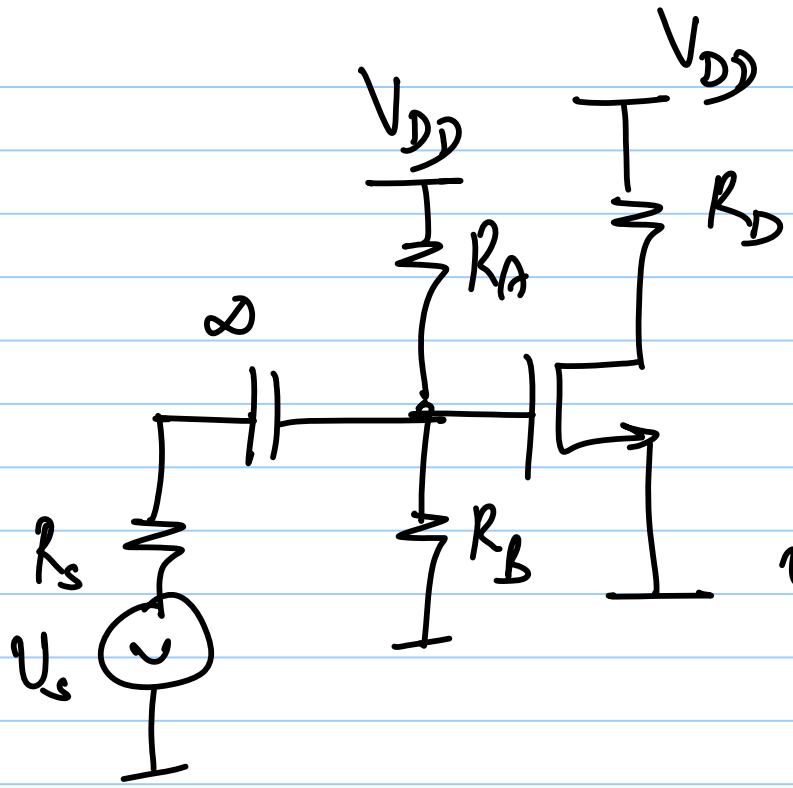


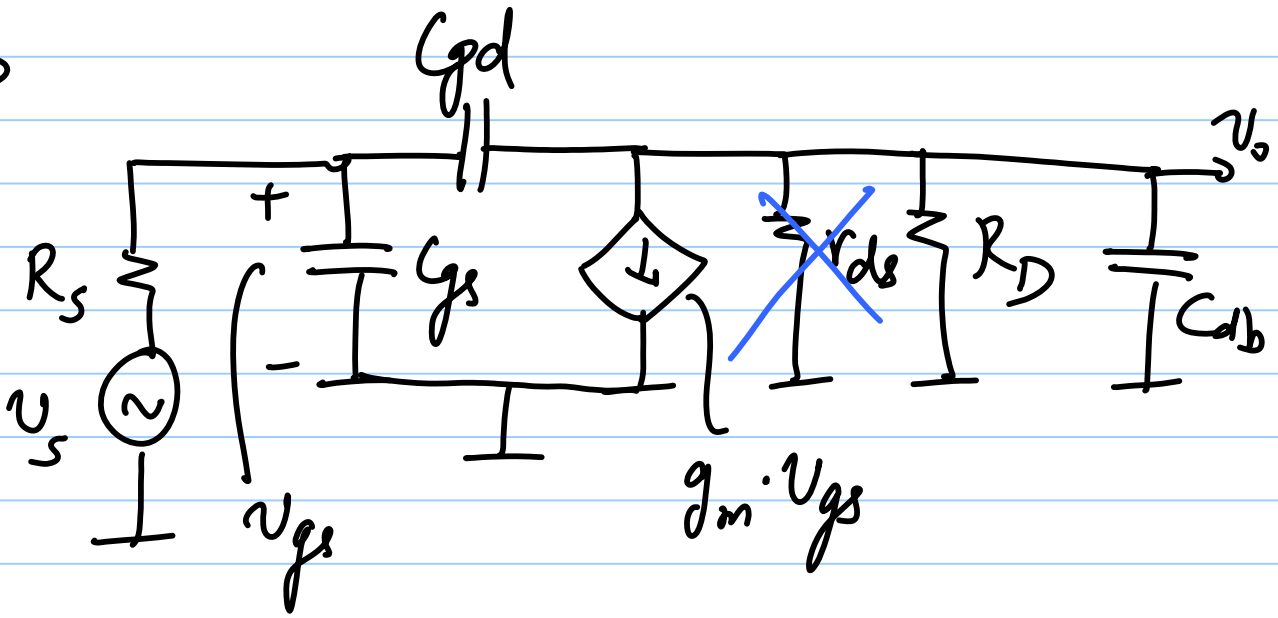


$C_{gs} = \frac{2}{3} WL C_{ox}$; $C_{gd} = WL_{ov} C_{ox}$;

C_{db}, C_{sb}

$R_A \| R_B \gg R_S$


V_{DD}
V_{DD}
R_D
R_A
∞
R_S
R_B
v_s

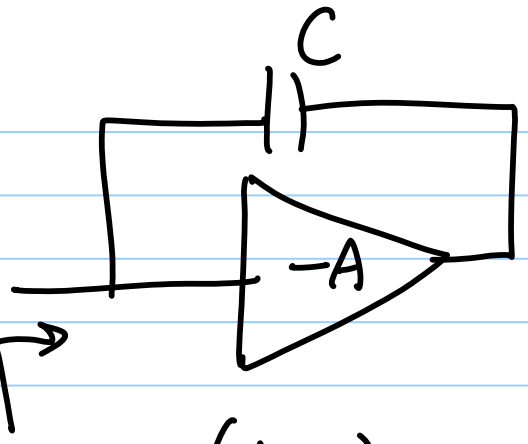

C_{gd}
v_o
R_S
+
C_{gs}
r_{ds}
R_D
C_{db}
v_s
−
v_{gs}
$g_m \cdot v_{gs}$

$$\frac{v_o}{v_s} = \frac{(sC_{gd} - g_m)}{\frac{1}{R_D} + s\left[C_{db} + \frac{R_S}{R_D}(C_{gs} + C_{gd}) + C_{gd} + R_S g_m C_{gd}\right] + s^2\left[(C_{gs} + C_{gd})(C_{db} + C_{gd}) - C_{gd}^2\right] \cdot R_S}$$

Low freq. gain $= -g_m R_D$

$$\frac{v_o}{v_s} = \left(\begin{matrix}\text{DC} \\ \text{gain}\end{matrix}\right) \frac{(1 + s/\omega_z)}{\left(1 + \frac{s}{\omega_{p1}}\right)\left(1 + \frac{s}{\omega_{p2}}\right)}$$

HW



$C_{in} = (A+1)\,C$

here $A = g_m R_D$

$C = C_{gd}$