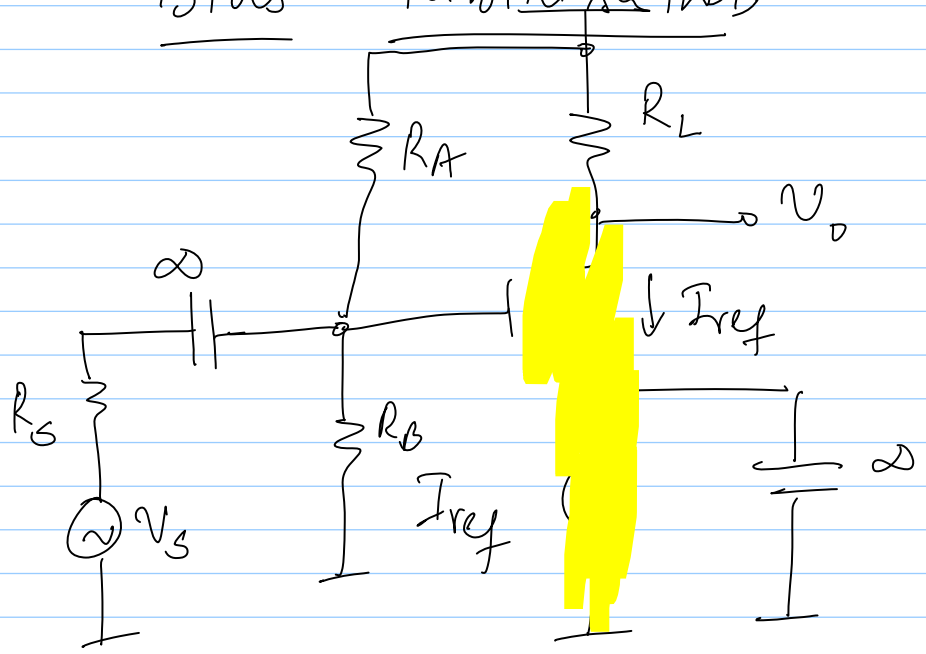
6-9-12

Lec 18

Bias Stabilization



$R_A \| R_B \rightarrow R_o$

Swing limits

Cutoff

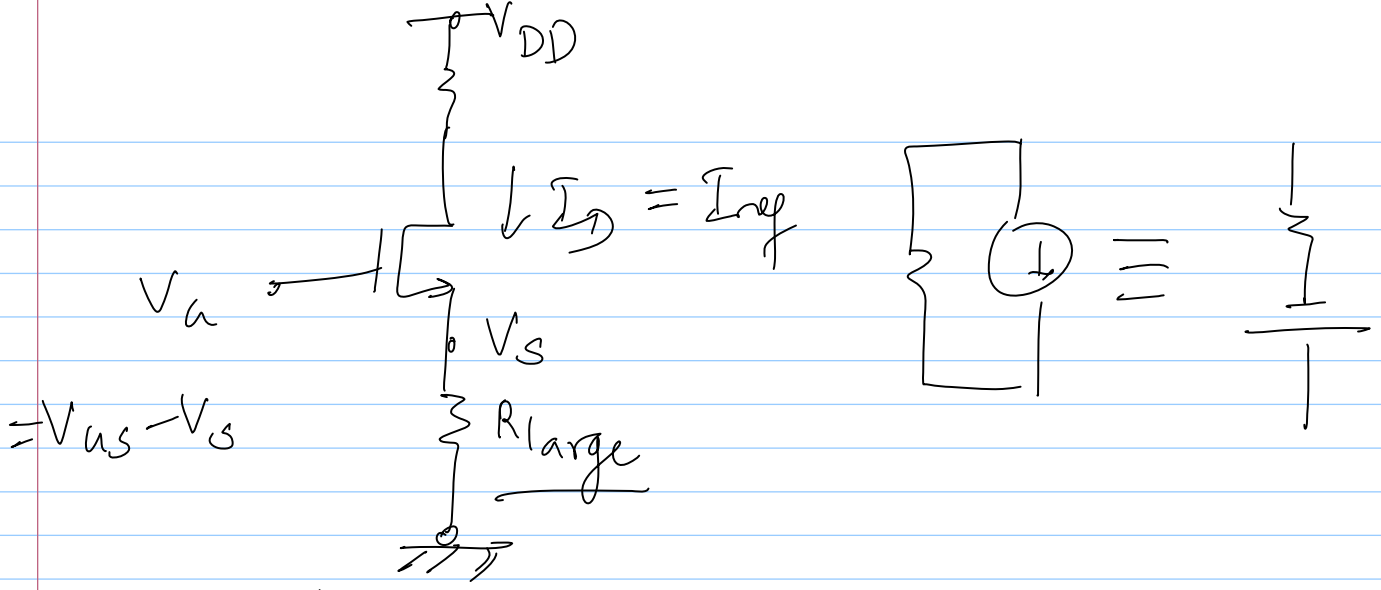
$$I_{ref} + g_m V_A \sin \omega t = 0$$

$$\Rightarrow \boxed{|V_A| = \frac{I_{ref}}{g_m}}$$

Triode

$$V_D = V_G - V_T$$

$$= \frac{V_{DD} \cdot R_B}{R_A + R_B} + V_A \sin \omega t - V_T$$



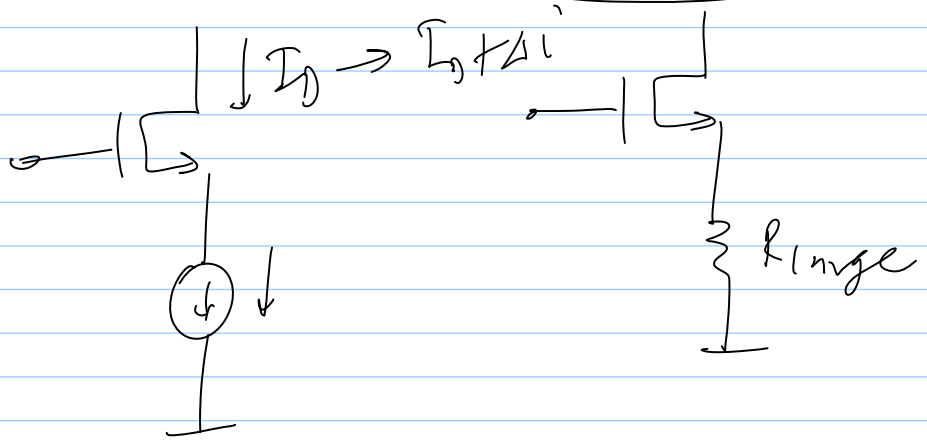
$$V_S = I_{ref} \cdot R_{large}$$

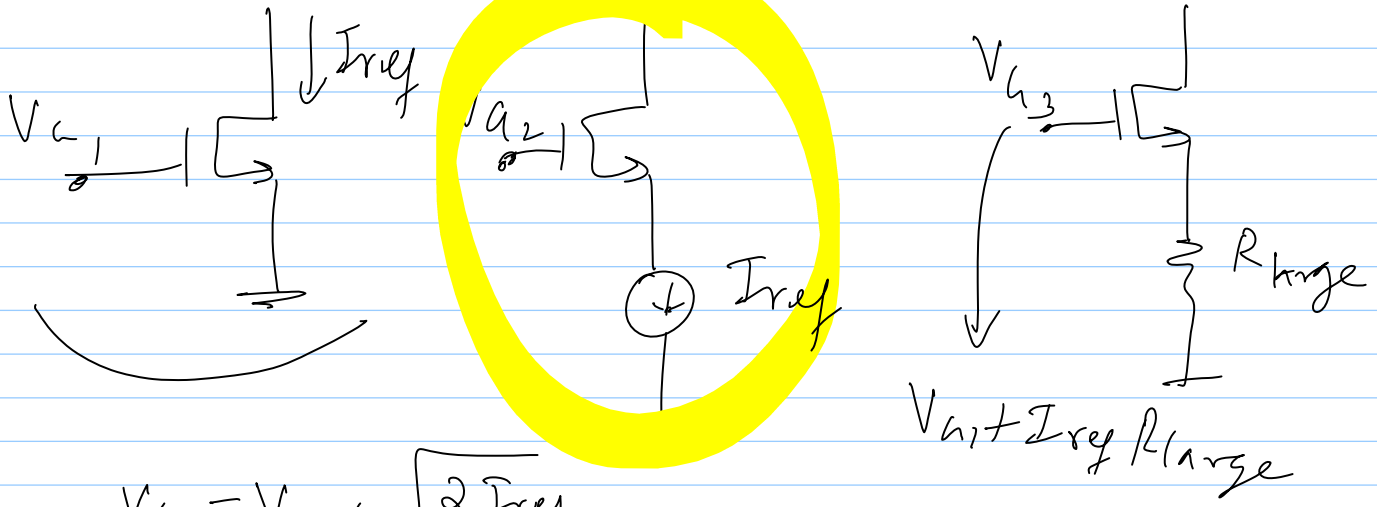
$$I_{ref} = \frac{1}{2} \mu_n C_{ox} \left(\frac{W}{L}\right) (V_{GS} - V_T)^2$$

$V_{GS} = V_G - V_S$

$$V_G = V_{GS} + V_S$$

$$= V_T + \sqrt{\frac{2 I_{ref}}{\mu_n C_{ox} \left(\frac{W}{L}\right)}} + I_{ref} R_{large}$$





$$V_{GS1} = V_T + \sqrt{\frac{2 I_{ref}}{\mu_n C_{ox} \left(\frac{W}{L}\right)}}$$

1) $V_{G2} = V_{G1}$

2) $= V_{G1} + V_{S2}$

can be anything