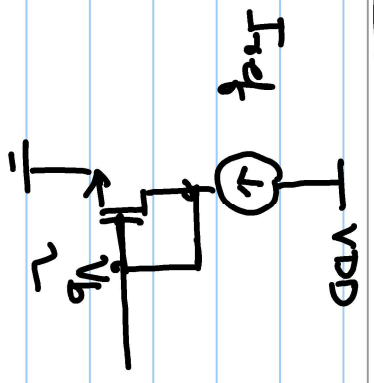


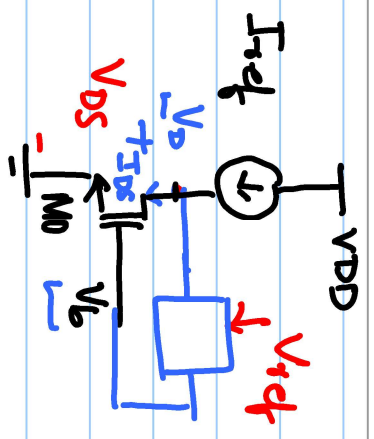
Lecture # 17.

Note Title

14-09-2021



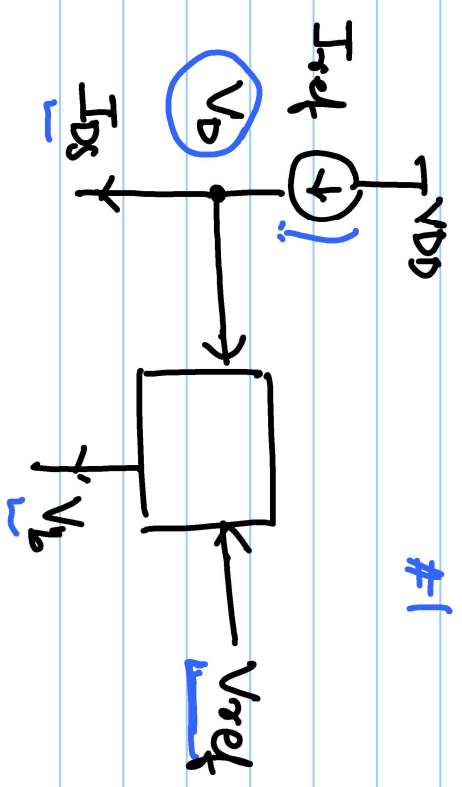
$$V_{as} = V_{DS} = V_b$$



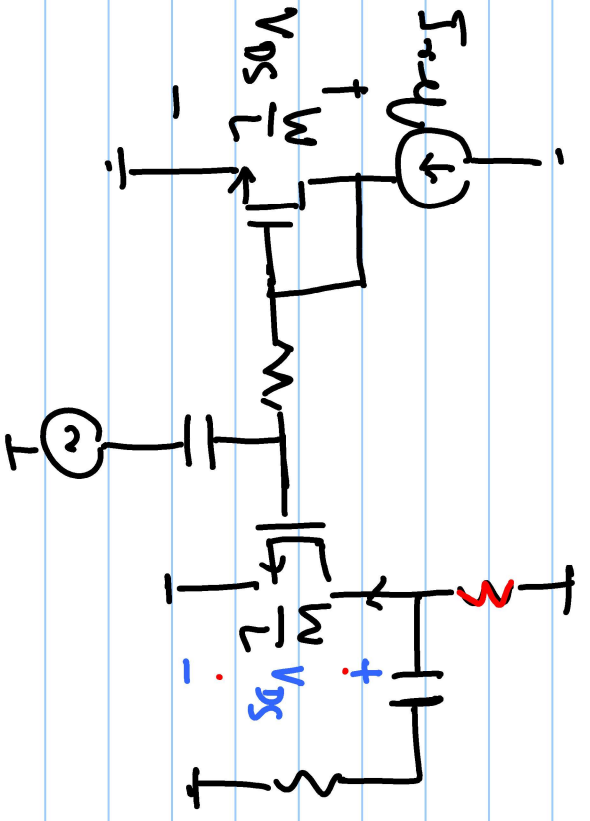
if $I_{req} > I_{DS} \Rightarrow V_b \uparrow$
 $I_{req} < I_{DS} \Rightarrow V_b \downarrow$

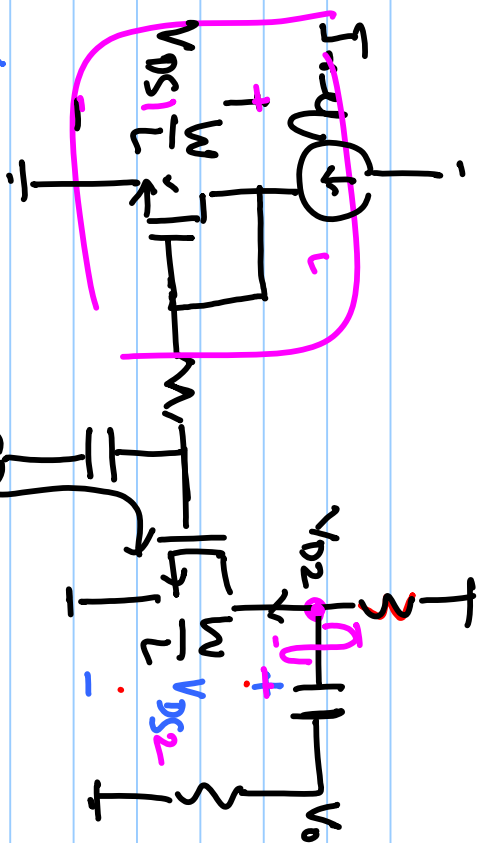
$$V_{DS, min} = V_{as} - V_{th}$$

#1



- for current mirror, to have same current we should have same V_{gs} .

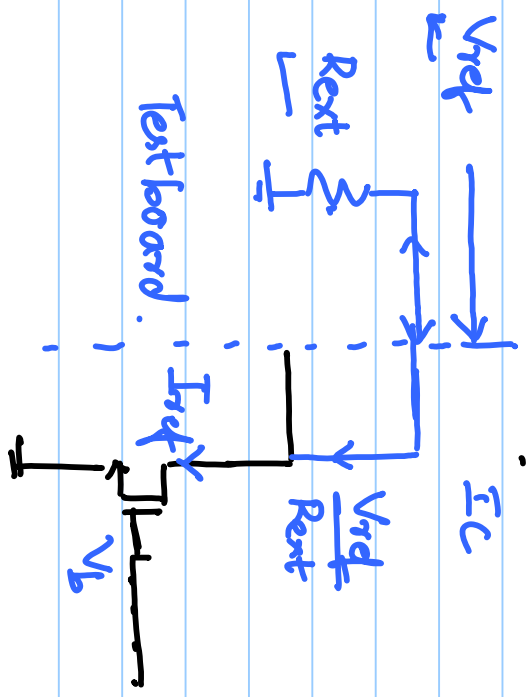
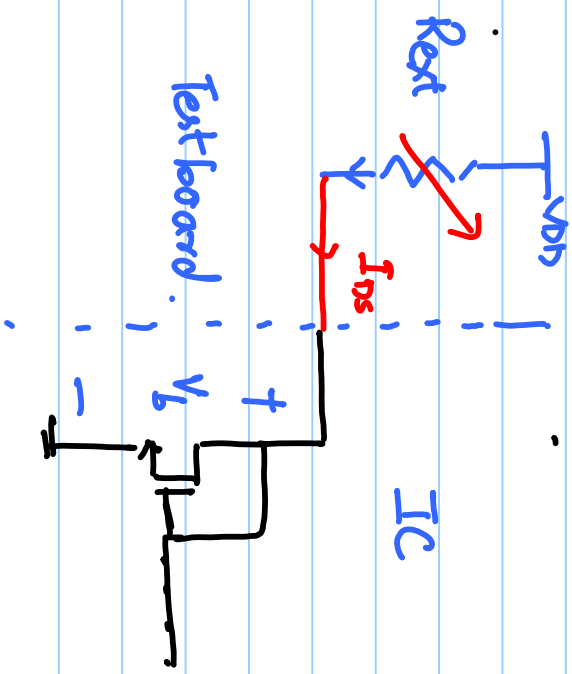
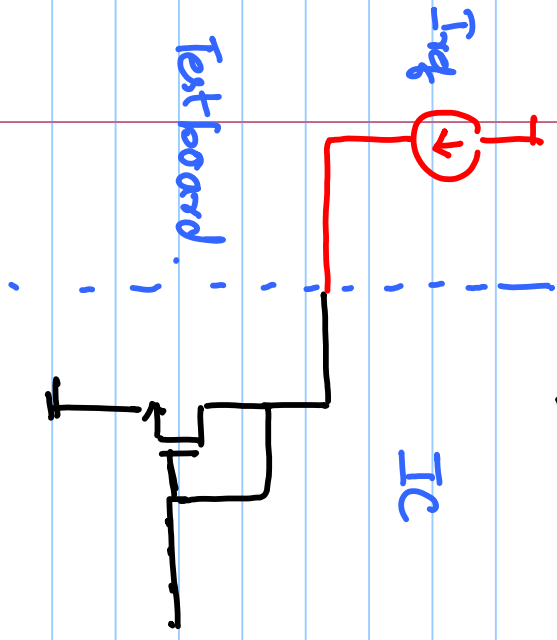




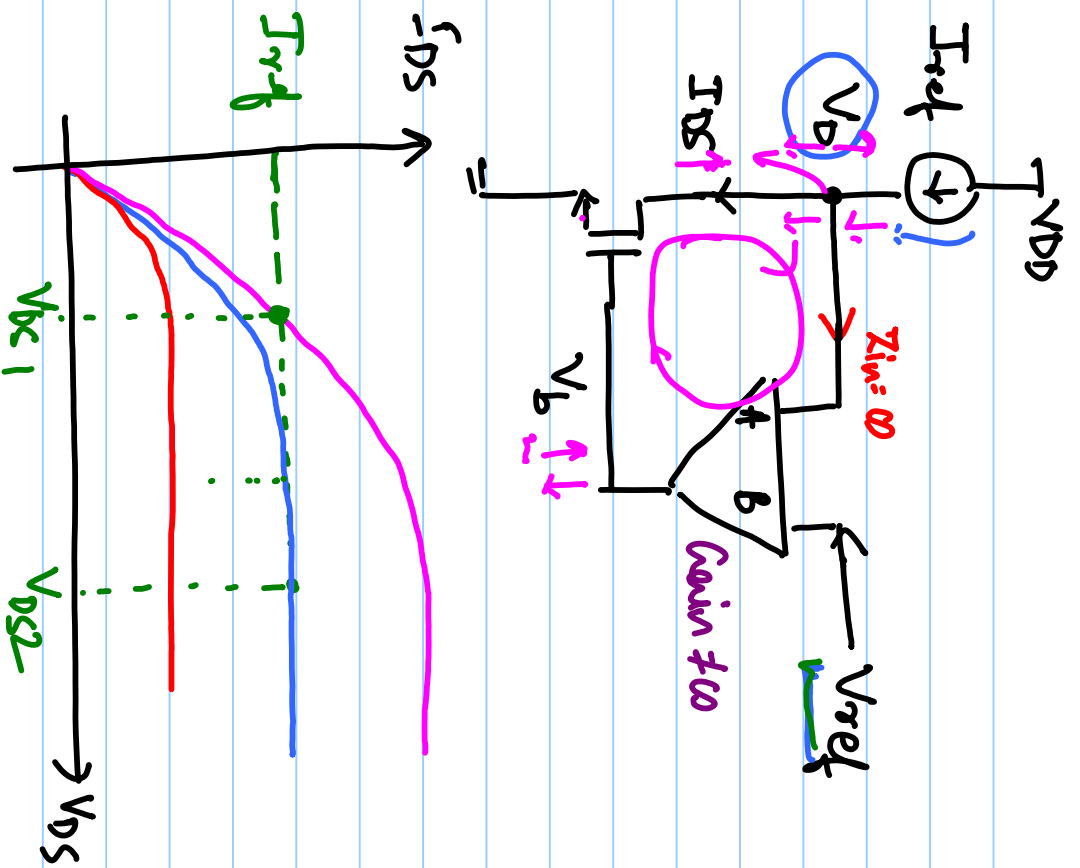
- $V_{DS1} = V_{DS}$

- $V_{DS1} = V_{DS2}$

- V_{DS2} is decided by swing limits.



#2



- if opamp gain is infinite

$V_D = V_{ref}$, V_b is generated accordingly.

- $I_{DS} = I_{ref}$

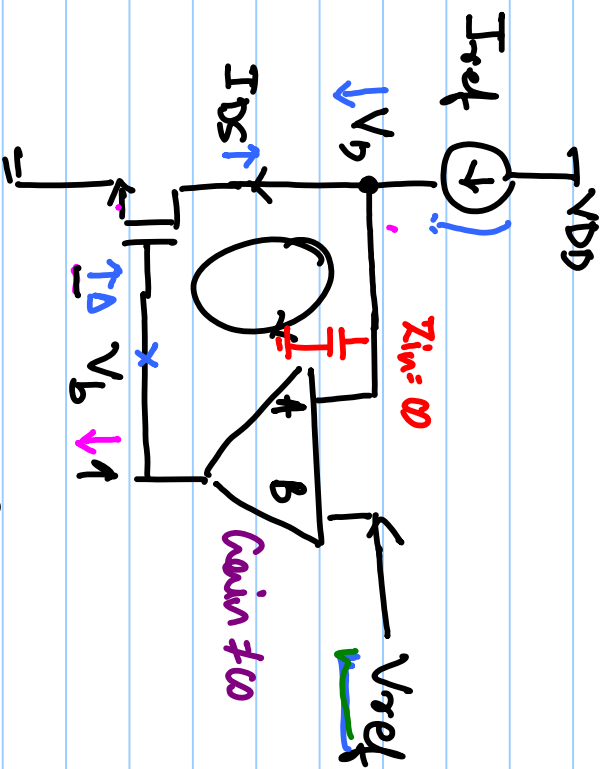
- $A : +ve$ | $A -ve$

$B : -ve$ | $B +ve$

if V_D increases $\Rightarrow V_D - V_{ref} \uparrow$

$-ve$ feed. $V_D \downarrow \leftarrow I_{DS} \uparrow \leftarrow V_b \uparrow$

$+ve$ feed. $V_b \uparrow$



- $V_D = V_{ref}$ if $-ve$ feedback, $gain = \infty$.

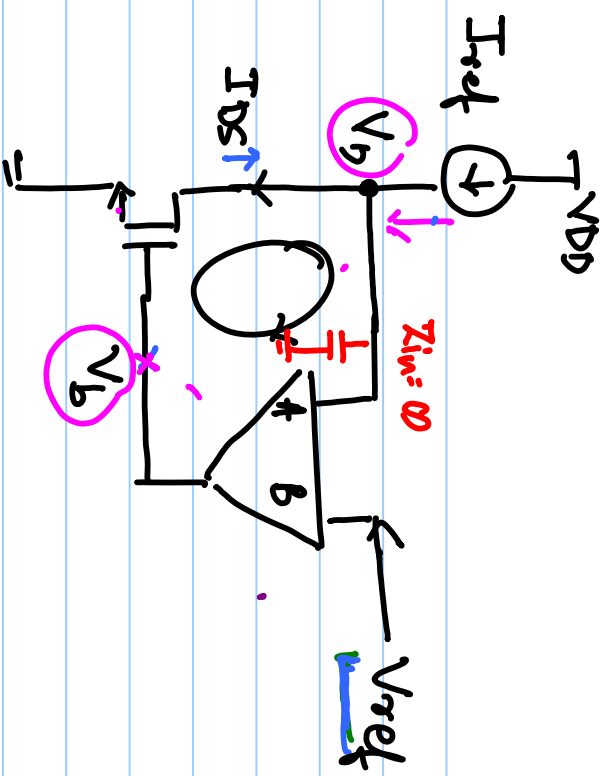
- To check whether loop is stable or not.

$$\begin{cases} A: +ve \\ B: -ve \end{cases}$$

$$V_e = (V_D - V_{ref}) \downarrow \implies V_B \downarrow$$

$$\begin{cases} A: -ve \\ B: +ve \end{cases}$$

$$V_e = V_{ref} - V_D \uparrow \implies V_B \uparrow$$



at $t=0$, $I_{DS}=0$, $V_D=0$, $V_G=0$

- A: -ve, B: +ve +ve feedback in ckt.

- Circuit should be in -ve feedback to have a valid operating point.

- Ckt. should be in -ve feedback to keep it stable under regular operation.

