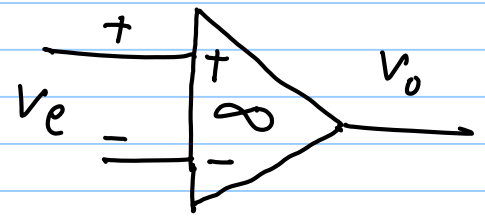
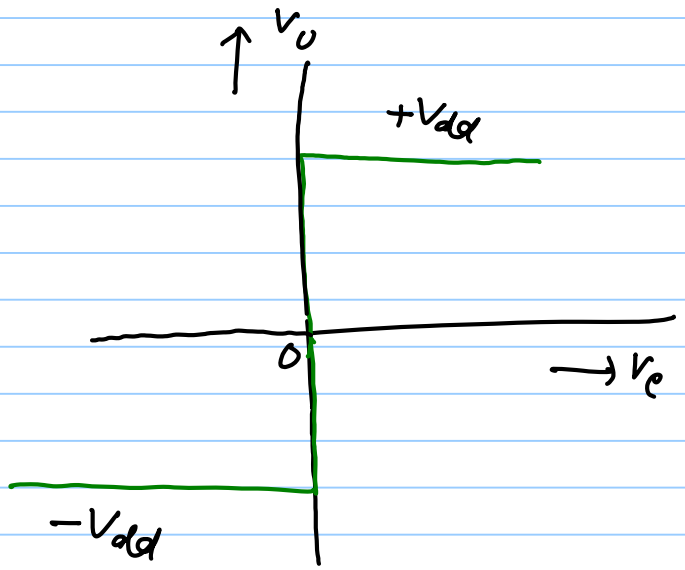
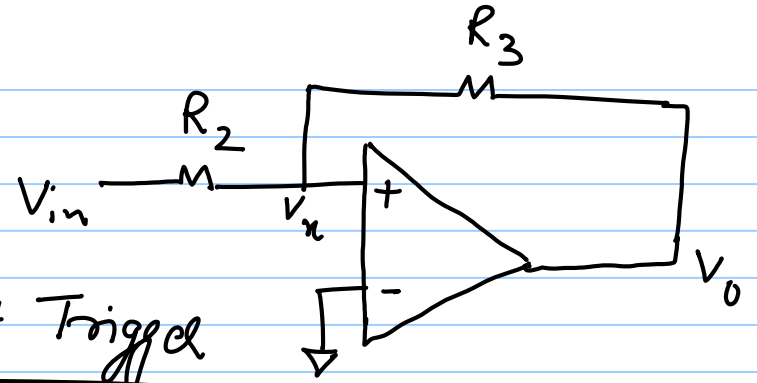
Note Title 1/30/2020

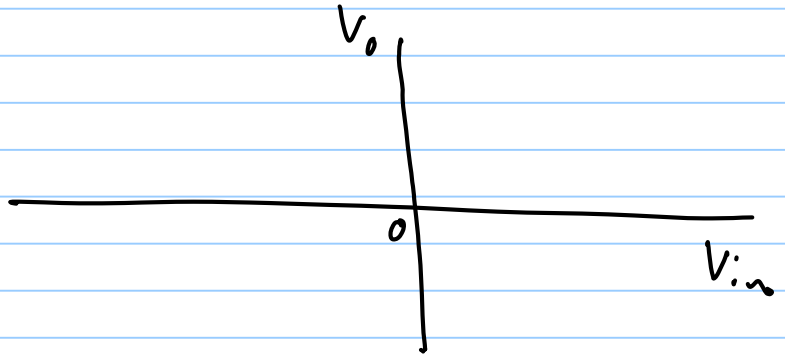






Schmitt Trigger

$$V_0 = -\frac{R_3}{R_2} V_{in} \quad ?$$



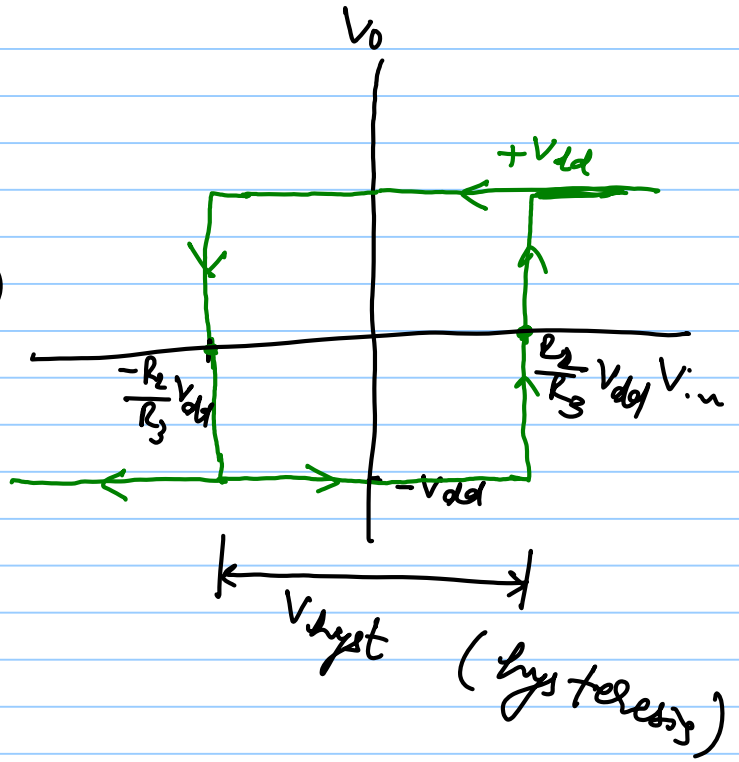
Case - 1 $\quad V_0 = V_{dd}$

$$\frac{V_{in} - V_x}{R_2} = \frac{V_x - V_0}{R_3} \quad \text{— (1)}$$

$V_x = 0, \quad V_0 = V_{dd}$

$V_{in} = V_{trip\_low}$

Substituting in (1)



$$\frac{V_{trip\_low}}{R_2} = -\frac{V_{dd}}{R_3} \Rightarrow V_{trip\_low} = -\frac{R_2}{R_3} V_{dd} \quad \text{— (2)}$$

Case-2 $V_0 = -V_{dd}$

$V_{in} = V_{trip\_high}$, $V_x = 0$

substituting in (1)

$$\frac{V_{trip\_high}}{R_2} = \frac{V_{dd}}{R_3} \Rightarrow V_{trip\_high} = \frac{R_2}{R_3} V_{dd} \quad \text{— (3)}$$

$$V_{hyst} = V_{trip\_high} - V_{trip\_low}$$

$$= 2 \frac{R_2}{R_3} \cdot V_{dd} \quad \text{—— (4)}$$

$R_3 >> R_2$