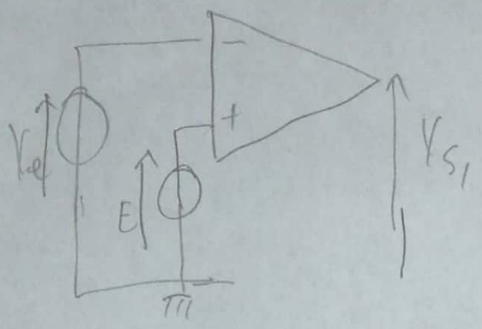
Exo4



2- AOP idéal $CR > 0$

$V^+ \neq V^-$ et $i^+ = i^- = 0$

$V_{s1} = \pm V_{sat}$

$V^+ = E$

$V^- = V_e$

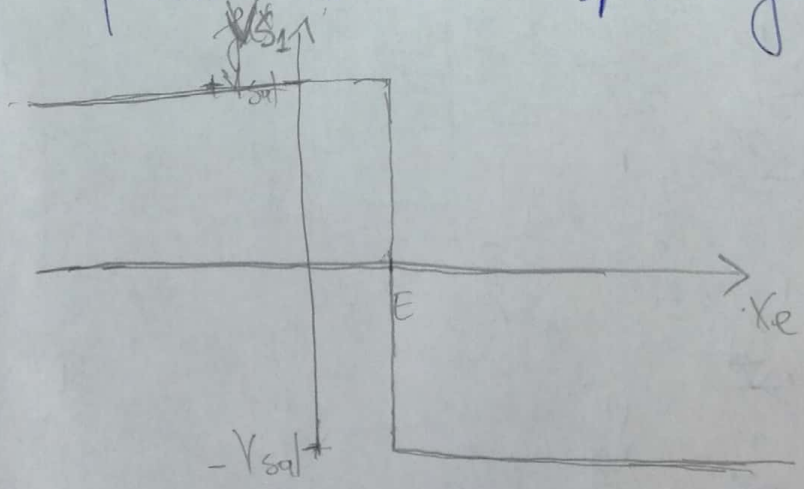
$V^+ - V^- \Rightarrow E - V_e$

$V_{s1} = -V_{sat}$

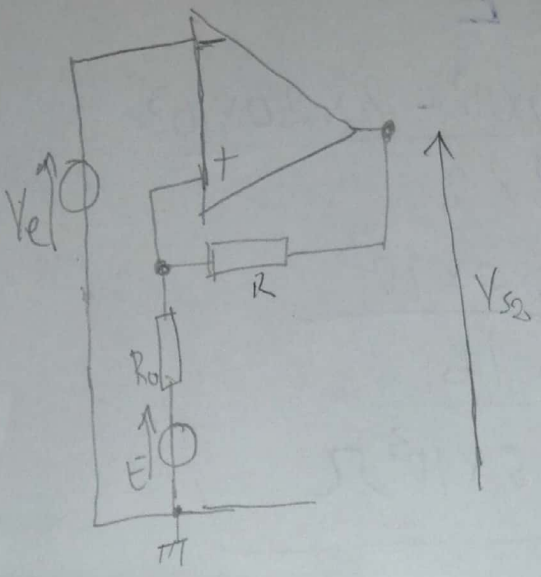
$E - V_e < 0$

$E > 0$

quant $V_e = E$ V_{s1} change de signe



2-



Expression de la tension

$V^- = V_e$

$V^+ = ?$

$i_{Ro} = \frac{E - V^+}{R_o} = \frac{V^+ - V_{s2}}{R}$

$\frac{E}{R_o} - \frac{V^+}{R_o} = \frac{V^+}{R} - \frac{V_{s2}}{R}$

$V^+\left(\frac{1}{R_o} + \frac{1}{R}\right) = \frac{E}{R_o} + \frac{V_{s2}}{R_o}$

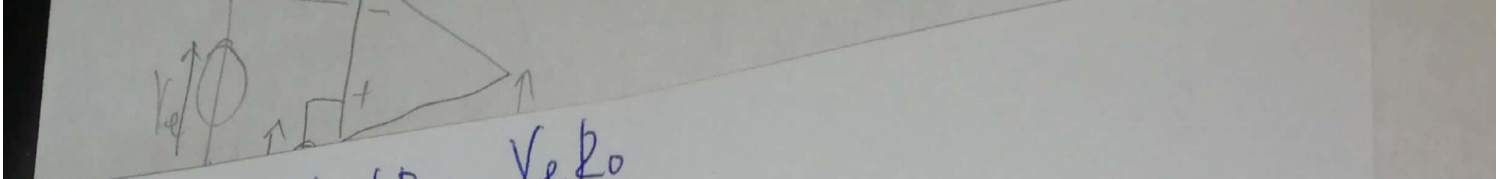
$$\boxed{V^+ = \frac{ER + V_{s2}R_o}{R + R_o}}$$

3 – Calcul de R pour $V_H = 8$

$V^+ - V^- = \frac{ER + V_{s2}R_o}{R + R_o} - V_e$

$V_{s2} = -V_{sat}$

$\frac{ER - V_{sat}R_o}{R + R_o} - V_e = 0$



$$R = \frac{-V_{sat} R_0 - V_e R_0}{V_e E}$$

A.N : $R = \frac{-12 \times 20 \times 10^3 - 2 \times 20 \times 10^3}{-8 \times 2}$

$$R = \frac{-280 \times 10^3}{-16}$$

$$\boxed{R = 17{,}5 \times 10^3 \, \Omega}$$

4) $V_S = +V_{sat}$

$$\frac{ER + V_{sat} R_0}{R + R_0} - V_{BH} = 0$$

$$\boxed{V_{BH} = \frac{ER + V_{sat} R_0}{R + R_0}}$$

A.N : $V_{BH} = \frac{-2 \times 17{,}5 \times 10^3 + 12 \times 20 \times 10^3}{17{,}5 \times 10^3 + 20 \times 10^3}$

$$V_{BH} = \frac{205 \times 10^3}{37{,}5 \times 10^3}$$

$$= 5{,}46$$