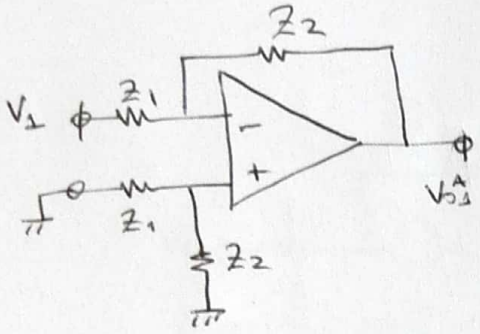
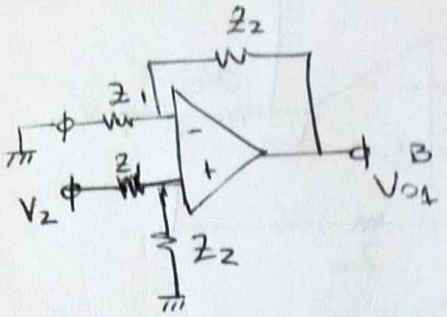
S22 - 1er Parcial 2017

a)





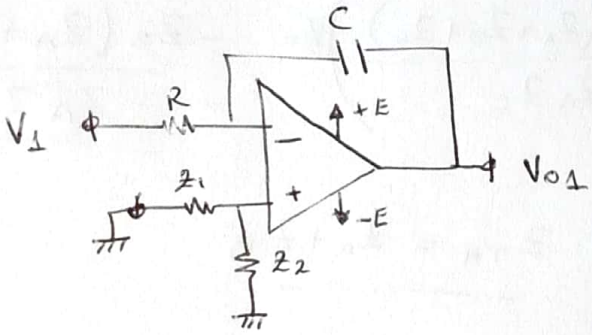
$$V_{o1}^A = -\frac{Z_2}{Z_1} V_1$$

$$V_{o1}^B = \left(1 + \frac{Z_2}{Z_1}\right)\left(\frac{Z_2}{Z_1 + Z_2} \cdot V_2\right) = \frac{Z_2}{Z_1} V_2$$

Superp.:

i) $$V_{o1} = V_{o1}^A + V_{o1}^B = \frac{Z_2}{Z_1}(V_2 - V_1)$$

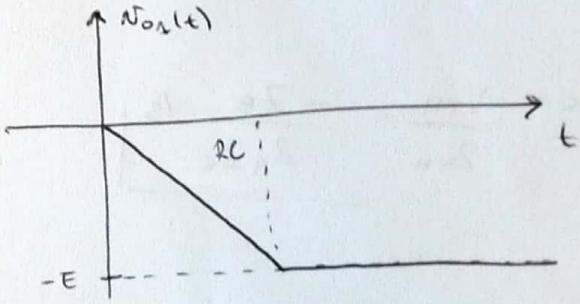
ii)



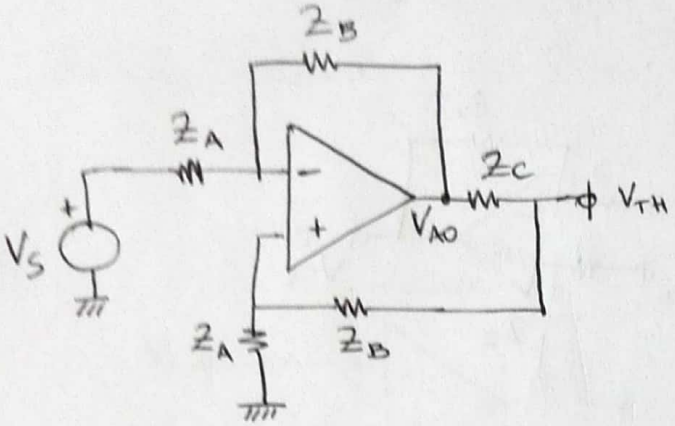
$$V_{o1}(s) = \frac{-1}{RCs} V_1(s) = -E \cdot \frac{t}{RC}$$

Mientras A.O en Zona Lineal.

$$V_{o1}(t) = \begin{cases} -\frac{E}{RC} \cdot t, & 0 < t < RC \\ -E, & t > RC \end{cases}$$



b)



$$e^+ - e^- \Rightarrow \frac{Z_A}{Z_A+Z_B+Z_C} V_{AO} = \frac{Z_A}{Z_A+Z_B} V_{AO} + \frac{Z_B}{Z_A+Z_B} V_S$$

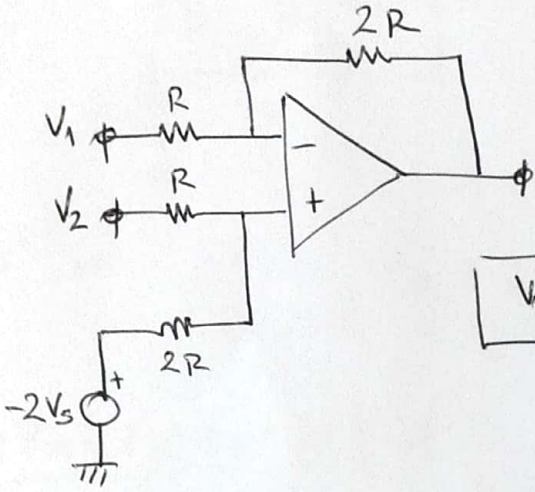
$$V_{AO} = \frac{-Z_B(Z_A+Z_B+Z_C)}{Z_A Z_C} \cdot V_S$$

$$\Rightarrow V_{TH} = \frac{(Z_A+Z_B)}{Z_A+Z_B+Z_C}\left(-\frac{Z_B(Z_A+Z_B+Z_C)}{Z_A Z_C}\right)V_S = -\frac{Z_B(Z_A+Z_B)}{Z_A Z_C} \cdot V_S$$

Z_{TH}) $(V_S = 0)$ $\quad V_{AO} = E \Rightarrow Z_{TH} = Z_A + Z_B$

$$I_{cc} = \frac{V_{TH}}{Z_{TH}} = \frac{-Z_B}{Z_A Z_C} V_S$$

c) $Z_A = Z_B = Z_C = R \Rightarrow \begin{cases} V_{TH} = -2V_S \\ Z_{TH} = 2R \end{cases}$



$$V_{out}(s) = 2\left(V_2(s) - V_1(s)\right) - 2V_S\left(1+2\right)\cdot\frac{1}{3}$$

$$\boxed{V_{out}(s) = 2\left(V_2(s) - V_1(s) - V_S(s)\right)}$$