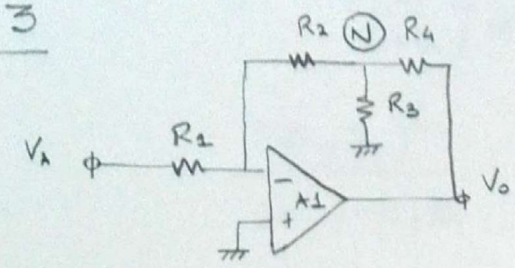
Primer Parcial 2016

Ej. 3

a)

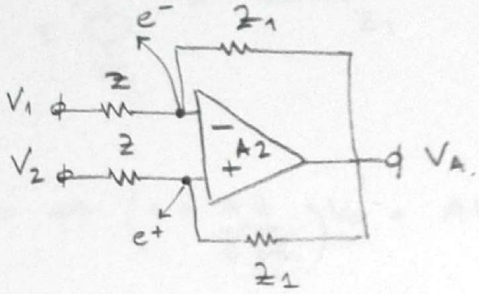


$G = \frac{V_o}{V_A}$; A1 ideal

(N):

$$\left.\begin{aligned} \frac{V_A}{R_1} &= \frac{V_N}{R_3} + \frac{(V_N - V_o)}{R_4} \\ V_N &= -\frac{R_2}{R_1} V_A \end{aligned}\right\} \Rightarrow \frac{V_o}{V_A} = -\frac{R_2}{R_1}\left(1 + \frac{R_4}{R_2} + \frac{R_4}{R_3}\right) = G$$

b) A2 $\begin{cases} R_i = \infty \\ r_o = 0 \\ A \text{ finita} \end{cases}$



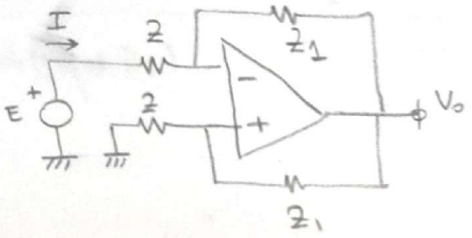
bi)

$V_o = A(e^+ - e^-)$

$$\left.\begin{aligned} e^+ &= V_o + \frac{Z_1(V_2 - V_o)}{Z + Z_1} = \frac{Z}{Z_1 + Z_2} V_o + \frac{Z_1}{Z + Z_1} V_2 \\ e^- &= \frac{Z}{Z + Z_1} V_o + \frac{Z_1}{Z + Z_1} V_1 \end{aligned}\right\} \Rightarrow V_o = \frac{A Z_1}{Z + Z_1}(V_2 - V_1)$$

bii)

$$Z_{Th_1} = \frac{E}{I}$$



$$\left.\begin{aligned} e^+ &= \frac{Z}{Z + Z_1} V_o \\ e^- &= E - Z I \end{aligned}\right\} \Rightarrow \uparrow V_o = A(e^+ - e^-)$$

$$V_o = \frac{A Z}{Z + Z_1} V_o - A E + A Z I$$

$$V_o = E - (Z + Z_1) I \Rightarrow$$

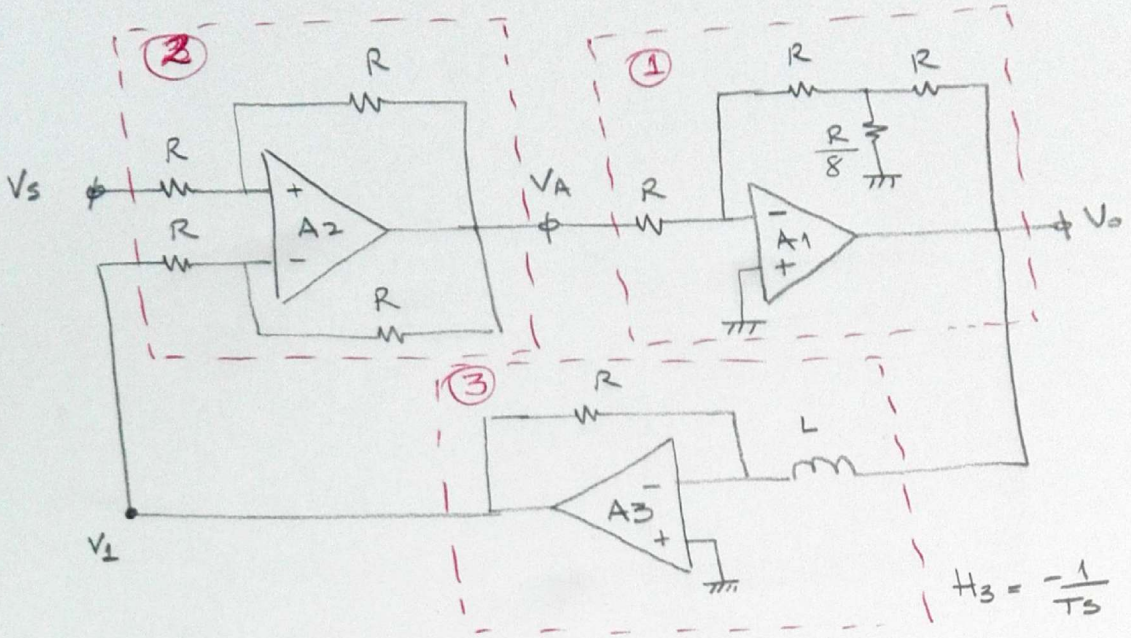
$$\Rightarrow Z_{Th_1} = \frac{E}{I} = \frac{(Z + Z_1)^2}{Z + (1 + A) Z_1}$$

Analogamente,

$$Z_{Th_2} = \frac{(Z + Z_1)^2}{Z + Z_1(1 - A)}$$

Ej 3 (P1 2016)

c)



$H_3 = -\frac{1}{Ts}$

$\left(T = \frac{L}{R}\right)$

③: $V_1 = -\frac{V_o}{Ts}$

②: $V_A = \frac{A}{2}(V_s - V_1)$

①: $G = -\frac{R}{R}\left(1 + \frac{R}{R} + \frac{8R}{R}\right) = -10$

$V_o = G V_A$

$\Rightarrow V_o = G\frac{A}{2}V_s + G\frac{A}{2}\frac{V_o}{Ts} \Rightarrow$

$$\boxed{\frac{V_o}{V_s} = \frac{\frac{GA}{2}\cdot s}{s - \frac{GA}{2T}}}$$