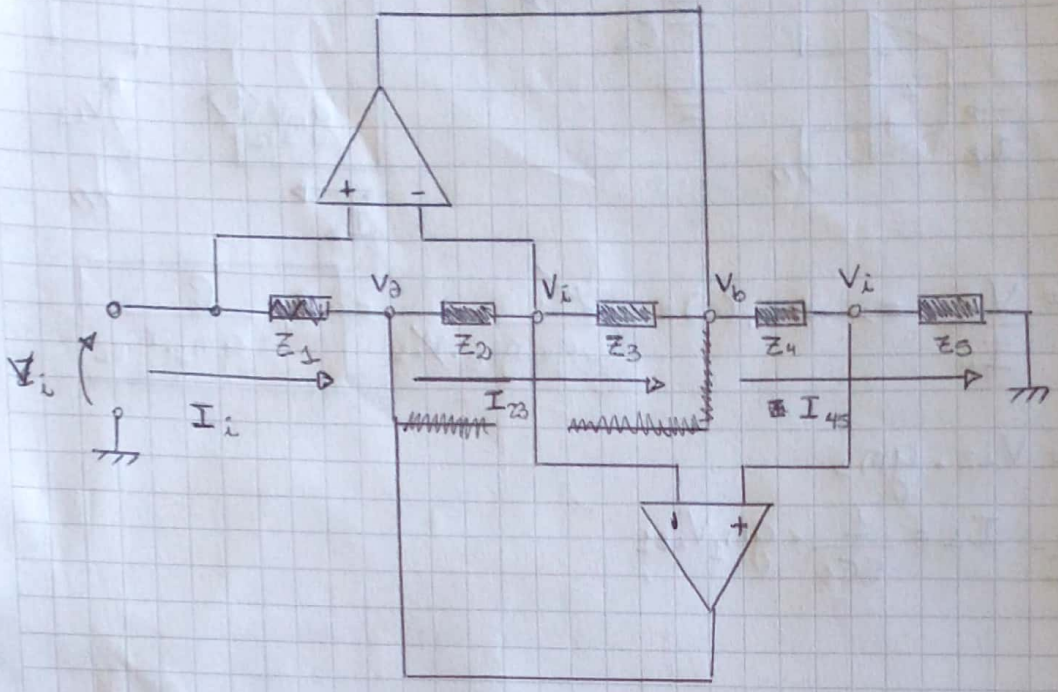
(5) Dato: $R_1 = R_2 = R_3 = R_4 = 1\,K\Omega = R$ $\quad Z_i = \frac{V_i}{I_i}$

$C_1 = C_2 = 1\,\mu F = C$

Para ambas conf. GIC Antoniou:



$$I_i = \frac{V_i - V_a}{Z_1} = (-I_{23})\frac{Z_2}{Z_1} = (-1)\frac{(V_i - V_b)}{Z_3}\cdot\frac{Z_2}{Z_1} = (-1)(-I_{45})\frac{Z_4 Z_2}{Z_3 Z_1} \dots$$

$$I_{23} = \frac{V_a - V_i}{Z_2} = \frac{V_i - V_b}{Z_3} \rightarrow -I_{23} = -\frac{(V_a - V_i)}{Z_2} = \frac{V_i - V_a}{Z_2}$$

$$I_{45} = \frac{V_b - V_i}{Z_4} = \frac{V_i - 0[V]}{Z_5}$$

$$-I_{45} = \frac{-(V_b - V_i)}{Z_4} \Rightarrow -I_{45} = \frac{V_i - V_b}{Z_4}$$

$$\dots = V_i \cdot \frac{1}{Z_5}\cdot\frac{Z_2 Z_4}{Z_1 Z_3} \Rightarrow I_i = V_i \cdot \frac{Z_2 Z_4}{Z_1 Z_3 Z_5} \Rightarrow \boxed{Z_i = \frac{Z_1 Z_3 Z_5}{Z_2 Z_4}}$$

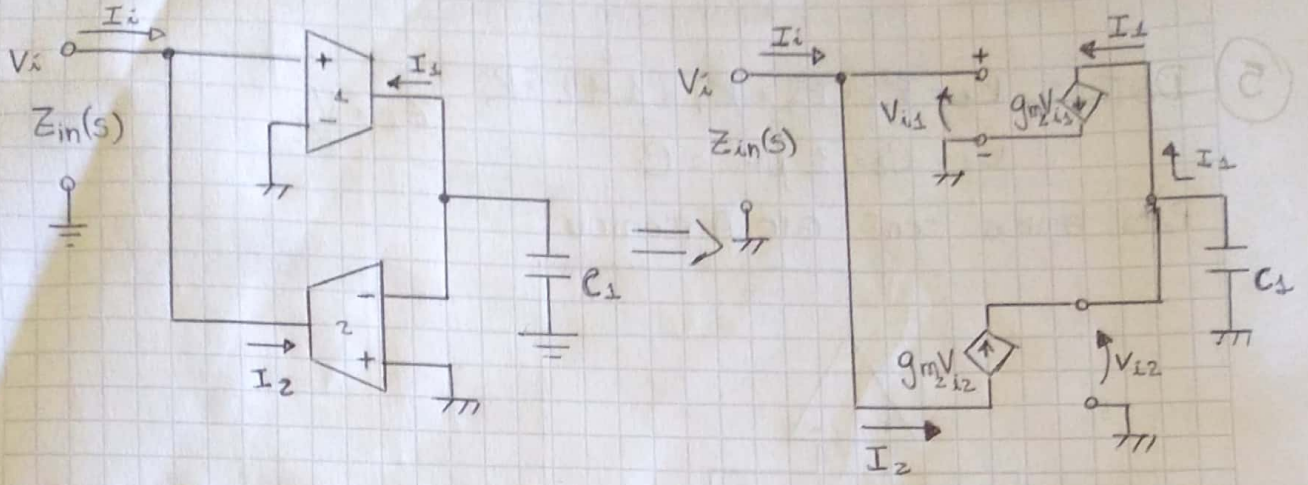
Caso A: $Z_1 = R_1$; $Z_2 = C_1$; $Z_3 = R_2$; $Z_4 = R_3$; $Z_5 = R_4$

$$Z_i = \frac{R_1 \cdot R_2 \cdot R_4}{\frac{1}{sC_1}\cdot R_3} = \frac{R^3}{\frac{1}{sC}\cdot R} = \boxed{R^2 \cdot sC}$$

Caso C: $Z_1 = \frac{1}{sC_1}$; $Z_2 = R_1$, $Z_3 = C_2$; $Z_4 = R_3$; $Z_5 = R_4$

$$Z_i = \frac{\frac{1}{sC_1}\cdot\frac{1}{sC_2}\cdot R_4}{R_1 \cdot R_3} = \frac{\frac{1}{s^2C^2}\cdot R}{R^2} = \boxed{\frac{1}{s^2C^2R}}$$

Caso B:



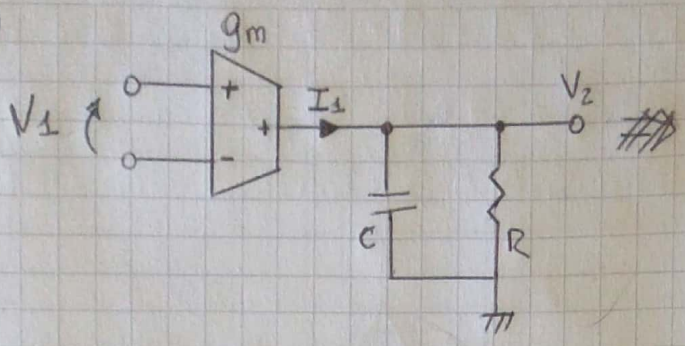
$$Z_{in}(s) = \frac{V_i}{I_i} \Rightarrow Z_{in}(s) = \frac{V_{i1}}{\frac{1}{sC} g_{m1} g_{m2} \cdot V_{i1}} = \boxed{s \cdot \frac{C}{g_{m1} \cdot g_{m2}}}$$

$$I_i = I_2 = V_{i2} \cdot g_{m2}$$

$$V_{i2} = \frac{1}{sC} I_1 = \frac{1}{sC_1} \cdot g_{m1} V_{i1}$$

$$V_{i1} = V_i$$

(10)



$$V_2 = \frac{1}{Y_{//}} \cdot I_1 = \frac{1}{sC + \frac{1}{R}} \cdot g_m \cdot V_1 = \frac{1}{\frac{sCR+1}{R}} \cdot g_m V_1 = \frac{R}{sCR+1} g_m V_1$$

$$\boxed{\frac{V_2}{V_1} = \frac{R}{sCR+1} \cdot g_m}$$