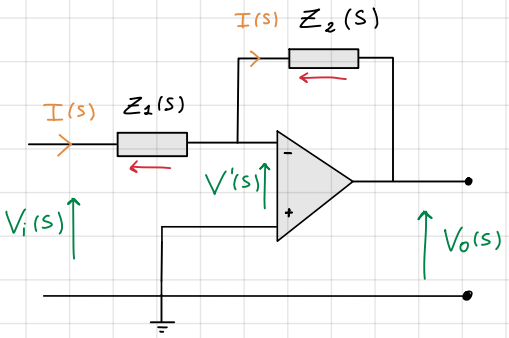
# METODO DELLE IMPEDENZE




$$I_1(s) = \frac{V_1(s)}{Z_1(s)} \quad , \quad I_2 = \frac{V_2(s)}{Z_2(s)}$$

ma $V_1(s) = V_i(s) - V'(s)$ , $V_2(s) = V'(s) - V_o(s)$

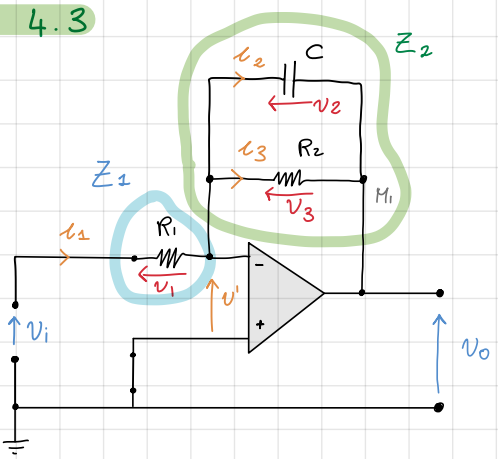
$\Rightarrow$ Siccome $i_1 = i_2$ $\rightarrow$ $\frac{V_i(s) - V'(s)}{Z_1(s)} = \frac{V'(s) - V_o(s)}{Z_2(s)}$ ma $V'(s) = 0$

$\rightarrow$ $\frac{V_i(s)}{Z_1(s)} = -\frac{V_o(s)}{Z_2(s)}$ $\Rightarrow$ $\boxed{\frac{V_o(s)}{V_i(s)} = -\frac{Z_2(s)}{Z_1(s)}}$

Siccome $G(s) = \frac{V_o(s)}{V_i(s)}$

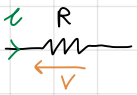
allora $G(s) = -\frac{Z_2(s)}{Z_1(s)}$

## ES 4.3

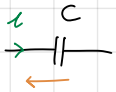



SICCOME

$$Z(s) = \frac{V(s)}{I(s)}$$




$\rightarrow$ $Z(s) = \frac{V}{I} = \frac{R \cdot I}{I} \Rightarrow \boxed{Z_R(s) = R}$

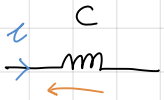



$Z(t) = \frac{v}{i} = \frac{v}{C\dot{v}} \rightleftharpoons Z(s) = \frac{V(s)}{Cs\,V(s)}$

$\rightarrow$ $\boxed{Z_C(s) = \frac{1}{Cs}}$

$\Rightarrow$ $Z_{2C} = Z_R // Z_C = \frac{Z_R \cdot Z_C}{Z_R + Z_C}$

$= \frac{R \cdot \frac{1}{Cs}}{R + \frac{1}{Cs}} = \frac{\frac{R}{Cs}}{\frac{RCs + 1}{Cs}} = \frac{R_2}{R_2Cs + 1}$ ($Z_2$)




$\boxed{Z_C(s) = \frac{1}{Ls}}$

$Z_1$: $Z_R = R_1$

$\Rightarrow$ $\frac{V_o(s)}{V_i(s)} = -\frac{Z_2(s)}{Z_1(s)} = \frac{\frac{R_2}{R_2Cs + 1}}{R_1} = \frac{R_2}{R_1} \cdot \frac{1}{R_2Cs + 1}$ ($G(s)$)