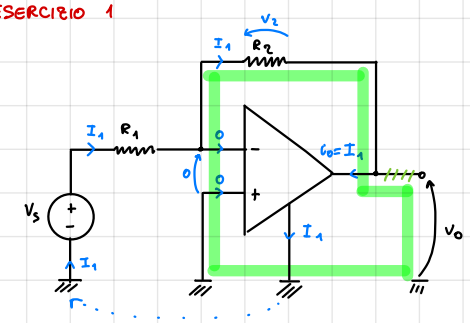
ESERCITAZIONE

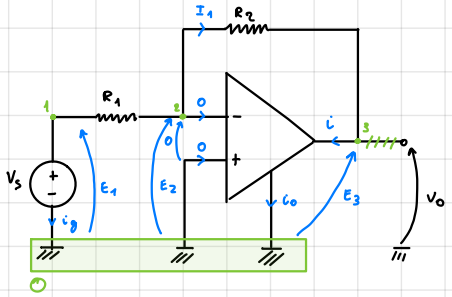
ESERCIZIO 1



$\frac{V_S}{V_o}$? $\quad P_{OPAMP}$?

$V_o = -V_2 = -R_2 I_2 = -R_2 \frac{V_S}{R_1} \quad \Rightarrow \quad \frac{V_S}{V_o} = -\frac{R_2}{R_1}$

$p_{OA} = i_o \cdot v_o = I_1 \cdot V_o = \frac{V_S}{R_1}\left(-\frac{R_2}{R_1} V_S\right) = -\frac{R_2}{R_1^2} V_S^2$



$KCL_1 \quad G_1(E_1 - E_2) + i_g = 0$

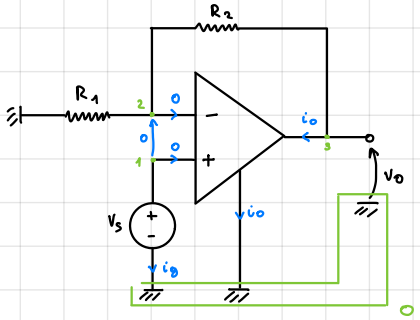
$KCL_2 \quad G_1(E_2 - E_1) + G_2(E_2 - E_3) + 0 = 0$

$KCL_3 \quad G_2(E_3 - E_2) + i_o = 0$

$B.B. \quad E_1 = V_S$

$OP.AMP \quad E_2 = 0$

ESERCIZIO 2



$KCL1 \quad i_g + 0 = 0$

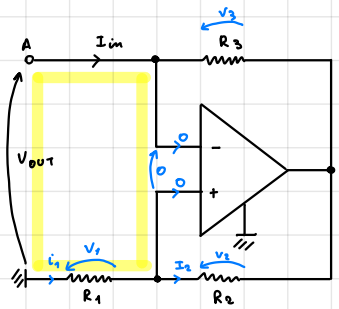
$KCL2 \quad G_1 E_2 + G_2(E_2 - E_3) + 0 = 0$

$KCL3 \quad i_o + G_2(E_3 - E_2) = 0$

$B.B. \quad e_1 = V_3$

$OP\ AMP \quad e_1 = e_2$

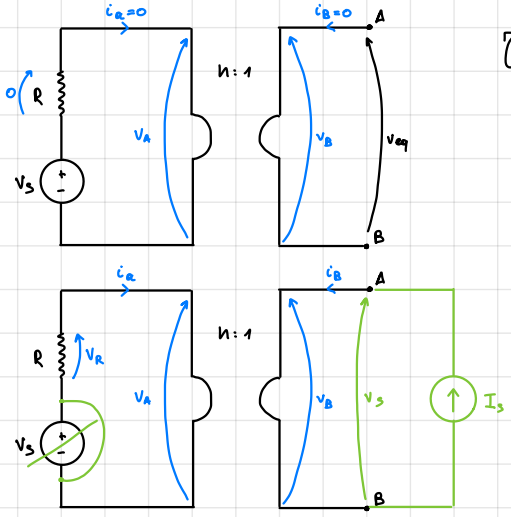
ESERCIZIO 5



R_{in} ?

$V_{OUT} = -V_1 = -R_1 \cdot I_2 = -R_1 \frac{V_3}{R_2} = -R_1 \cdot \frac{R_3}{R_2} \cdot I_{in} \quad \Rightarrow \quad R_{in} = -\frac{R_1 R_3}{R_2}$

ESERCIZIO 13



Thevenin ?

$\begin{cases} V_A = n V_B \\ i_A = -\frac{1}{n} i_B \end{cases} \qquad \begin{cases} V_S = V_A = n V_B = n V_{eq} \\ i_A = 0 \end{cases} \rightarrow \quad V_{eq} = \frac{V_S}{n}$

$\begin{cases} V_S = V_B = \frac{V_R}{n} = -\frac{R i_B}{n} = \frac{R}{n^2} I_S \\ i_B = -\frac{1}{n} I_S \end{cases} \quad \Rightarrow \quad R_{eq} = \frac{V_S}{I_S} = \frac{R}{n^2}$