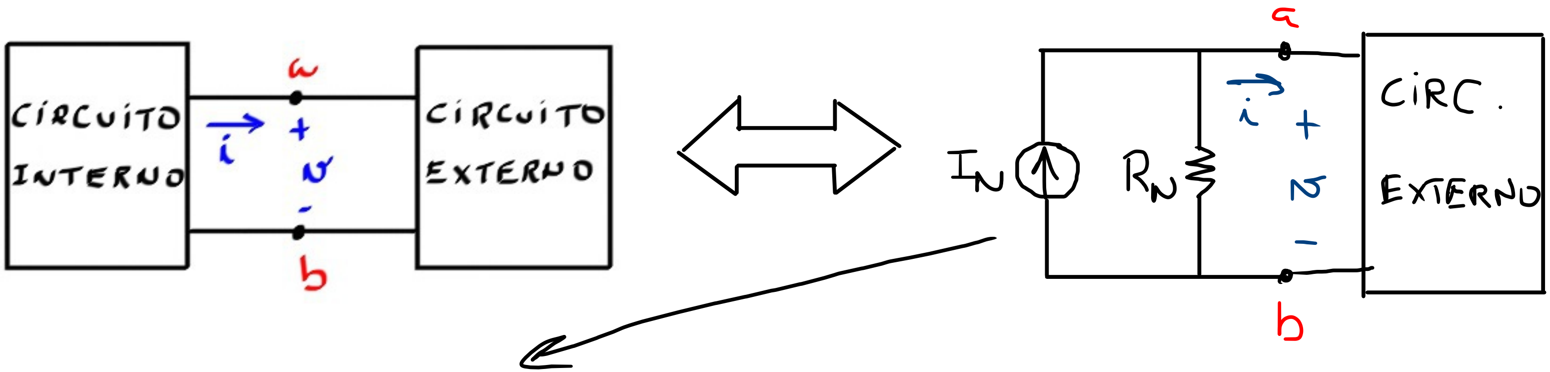
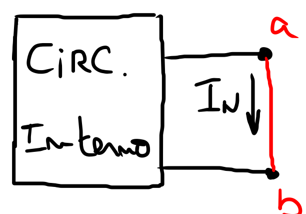
Teorema de Norton



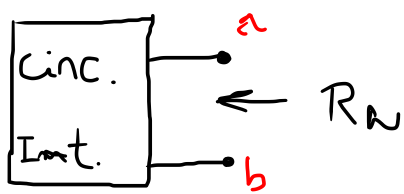
$$I_N = i + \frac{v}{R_N}$$

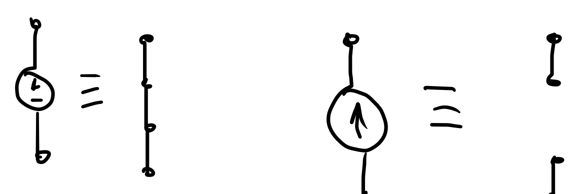
→ P/ $v = 0$: $i = I_N$



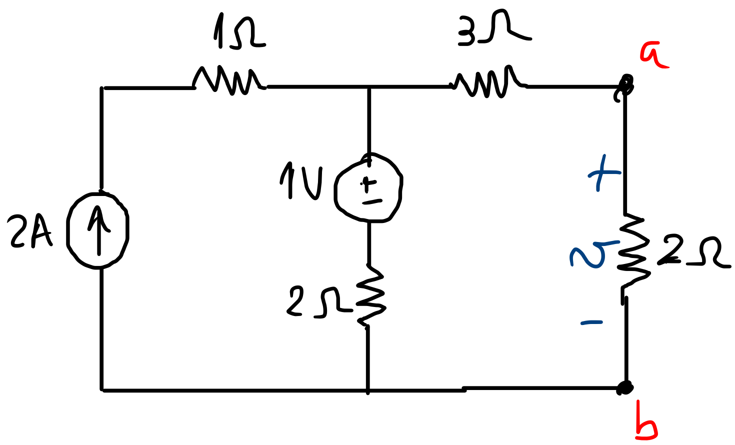
corrente de curto-circuito na configuração original.

→ R_N :



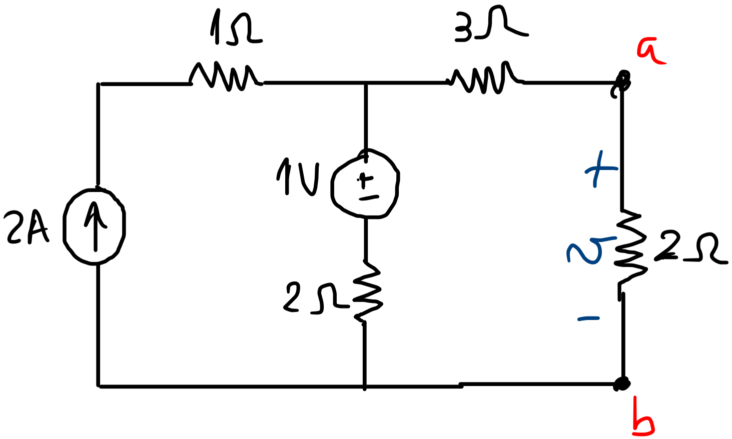


Ex: Teorema de Norton

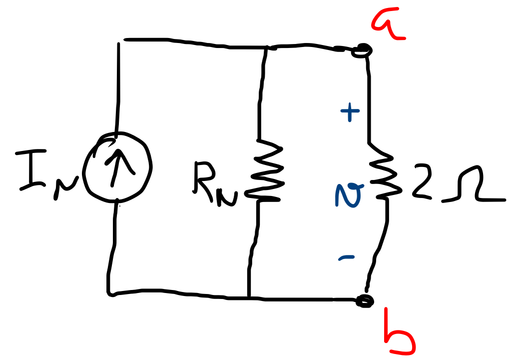


Ex: Teorema de Norton

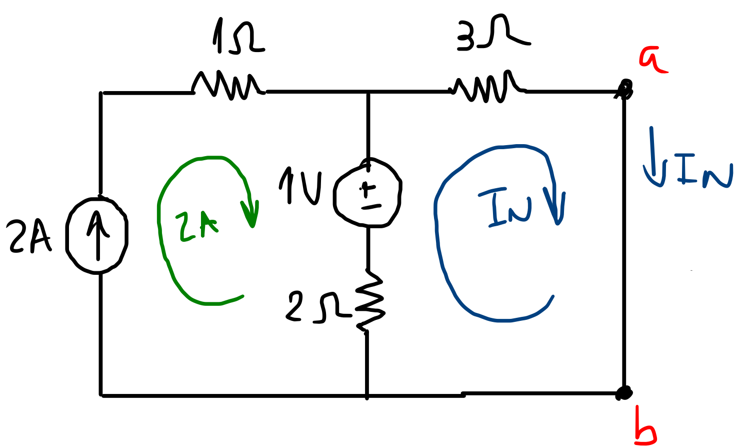
$v = ?$



$\Rightarrow$



→ Cálculo de I_N:

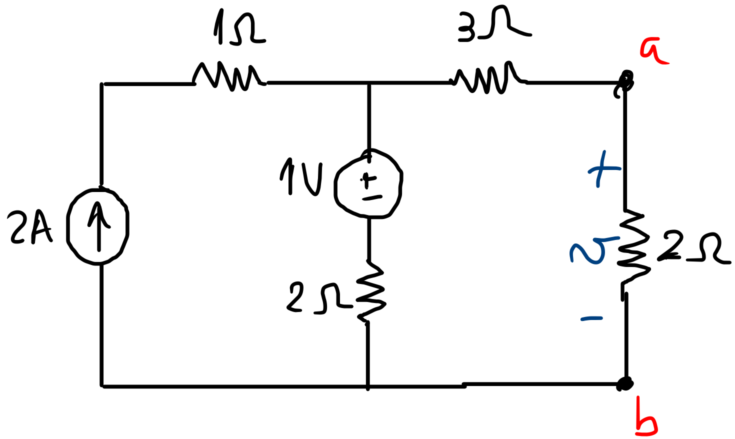


$$3 \cdot I_N + 2(I_N - 2) = 1$$

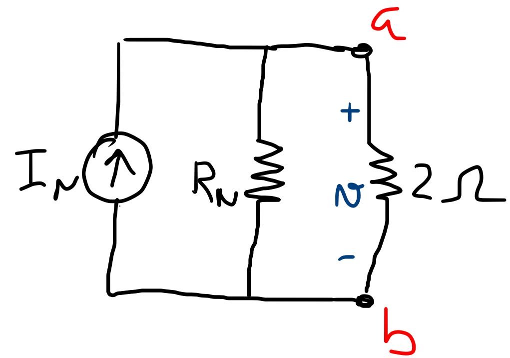
$$\boxed{I_N = 1\,A}$$

Ex: Teorema de Norton

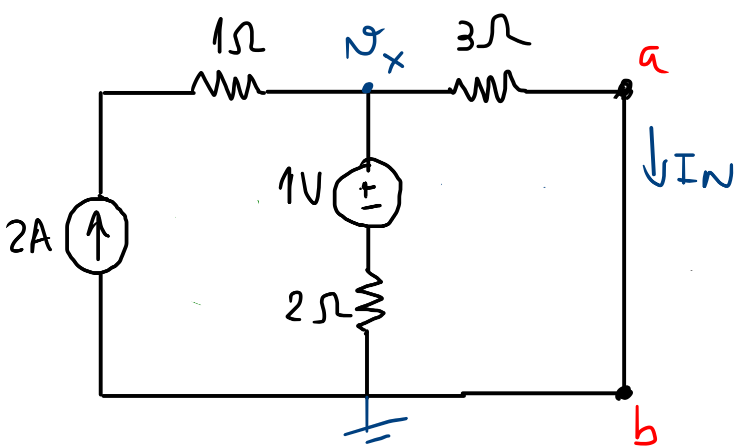
$v = ?$



$\Rightarrow$



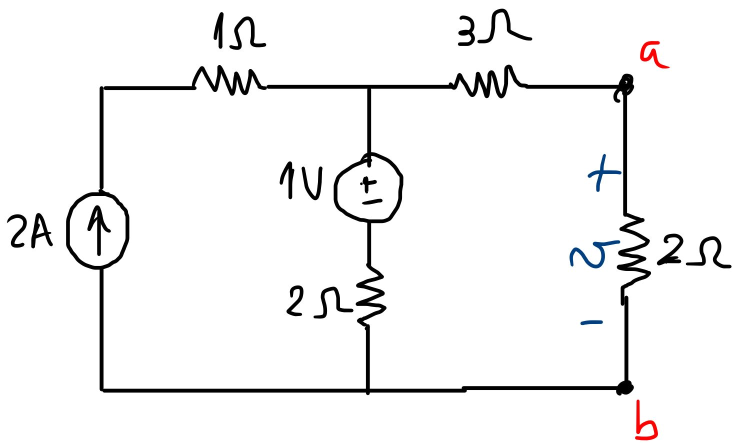
→ Cálculo de I_N:



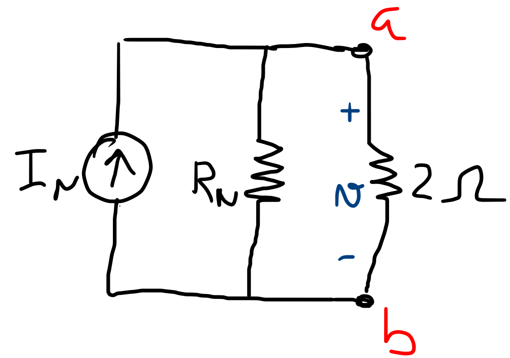
$$\frac{v_x - 1}{2} + \frac{v_x}{3} = 2$$

Ex: Teorema de Norton

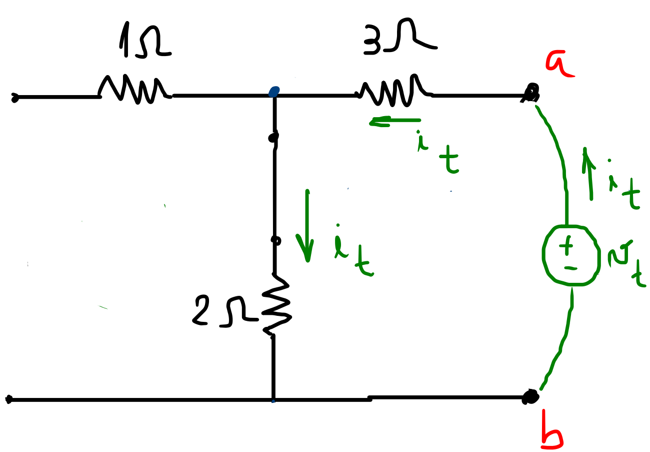
$v = ?$



$\Rightarrow$



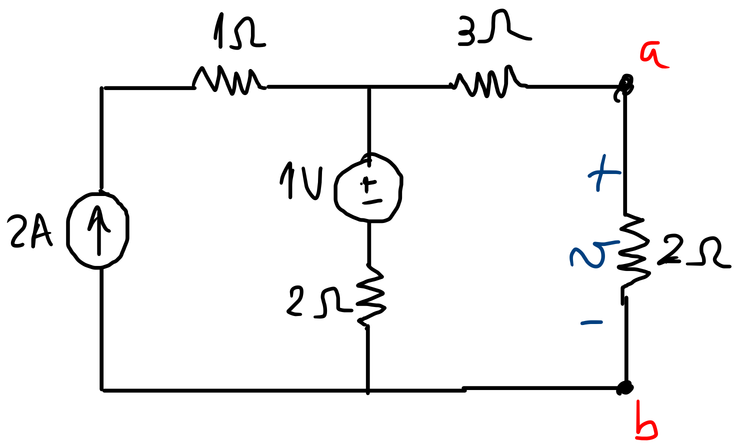
→ Cálculo de R_N:



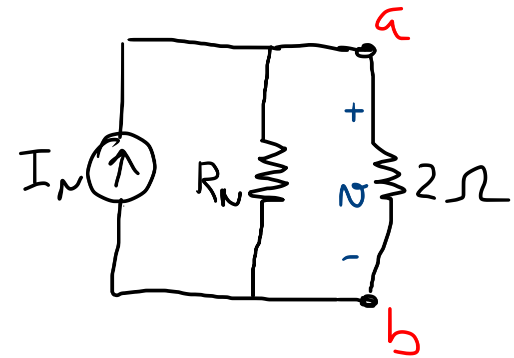
$$\boxed{R_N = 3 + 2 = 5\,\Omega}$$

Ex: Teorema de Norton

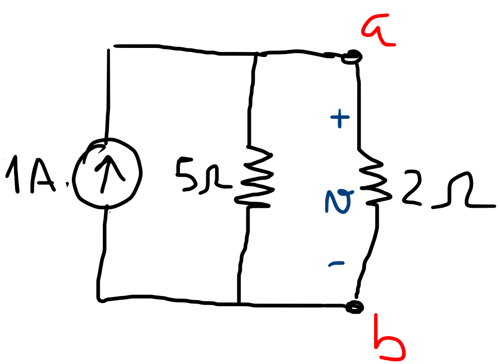
$v = ?$



$\Rightarrow$

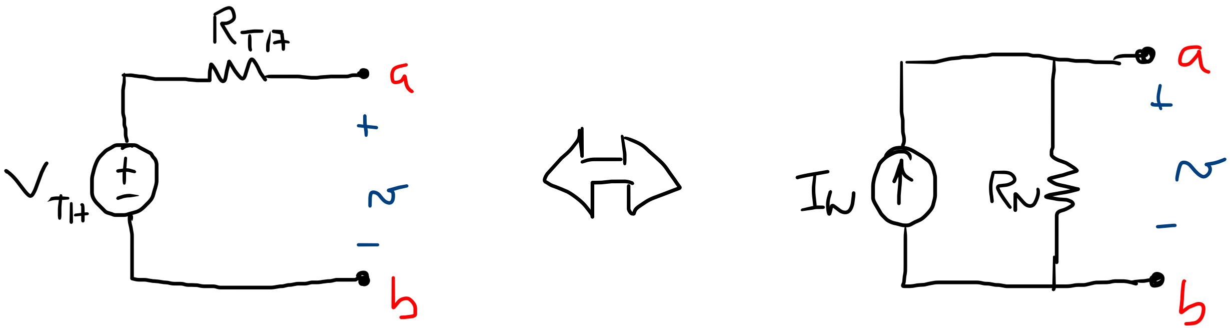


Circuito equivalente de NORTON:



$$v = (2 \,\|\, 5) \cdot \underbrace{I_N}_{1A} \;\therefore\; \frac{10}{7}\,V$$

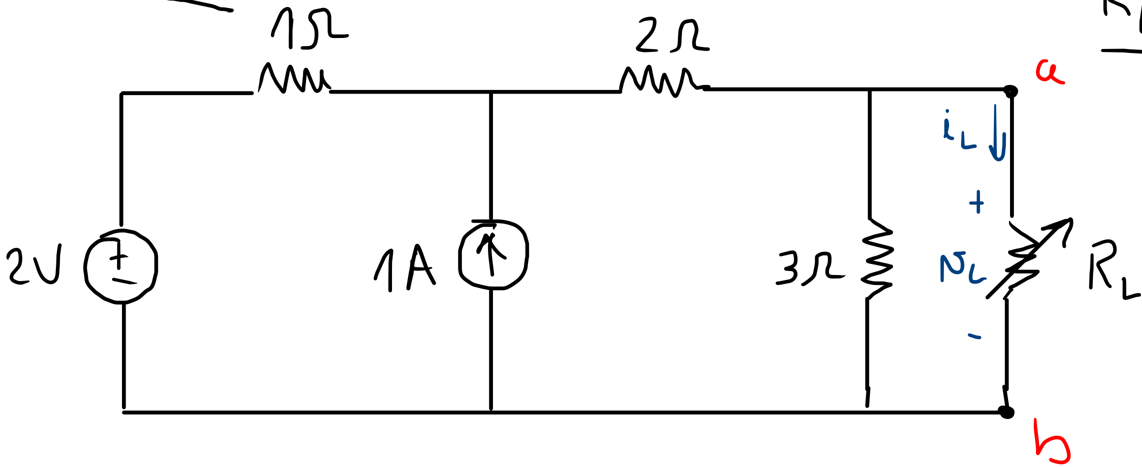
→ Relação entre os modelos de Thevenin e Norton



$$\boxed{I_N = \frac{V_{TH}}{R_{TH}}} \quad ; \quad \boxed{R_{TH} = R_N}$$

$$\boxed{R_{TH} = \frac{V_{TH}}{I_N}}$$

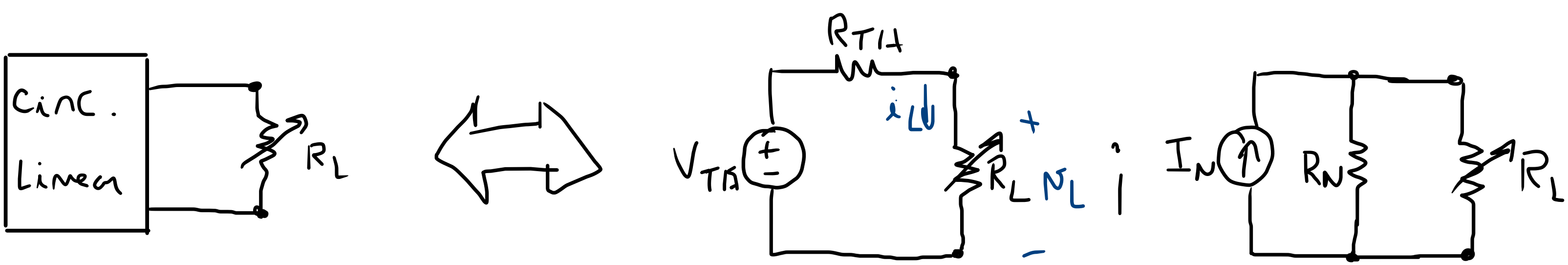
Exercício



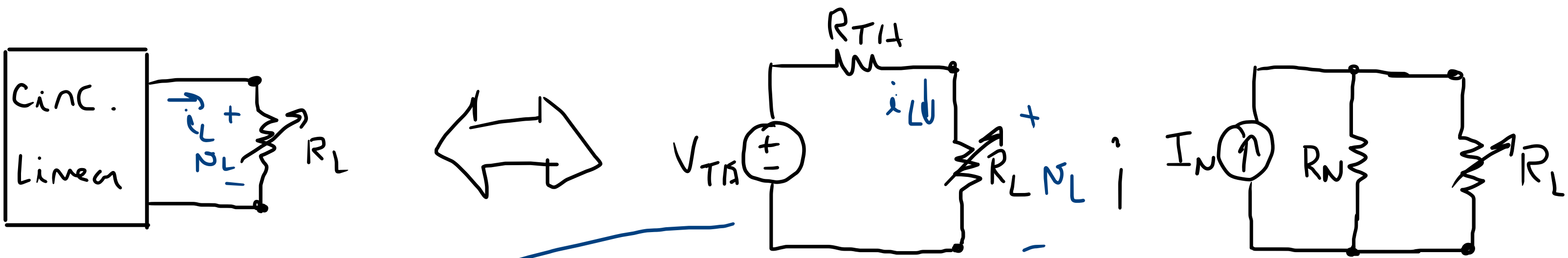
$R_L = ?$

↳ P_L MÁXIMA

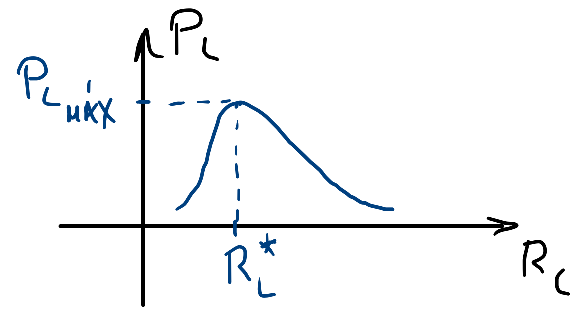
* Teorema da máxima transferência de potência



* Teorema da máxima transferência de potência



$$P_L = R_L \cdot i_L^2 = R_L \cdot \frac{V_{TH}^2}{(R_{TH}+R_L)^2}$$



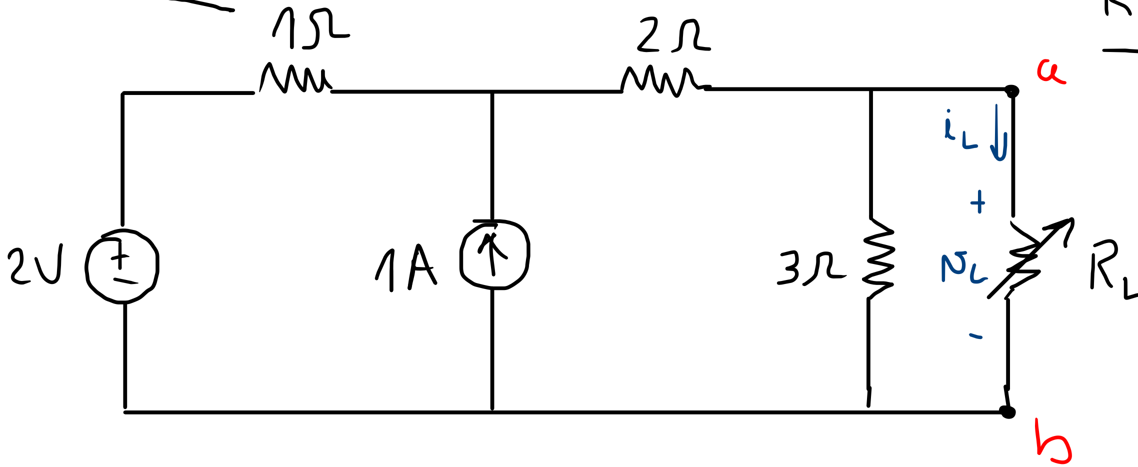
→ Fazendo $\frac{dP_L}{dR_L} = 0 \Rightarrow V_{TH}^2 (R_{TH} + R_L^*)^2 - 2R_L V_{TH}^2 (R_{TH} + R_L^*) = 0$

$$\boxed{R_L^* = R_{TH}} \quad \text{ou} \quad \boxed{R_L^* = R_N}$$

$$\boxed{P_{L_{máx}} = \frac{V_{TH}^2}{4R_{TH}}}$$

Voltando!

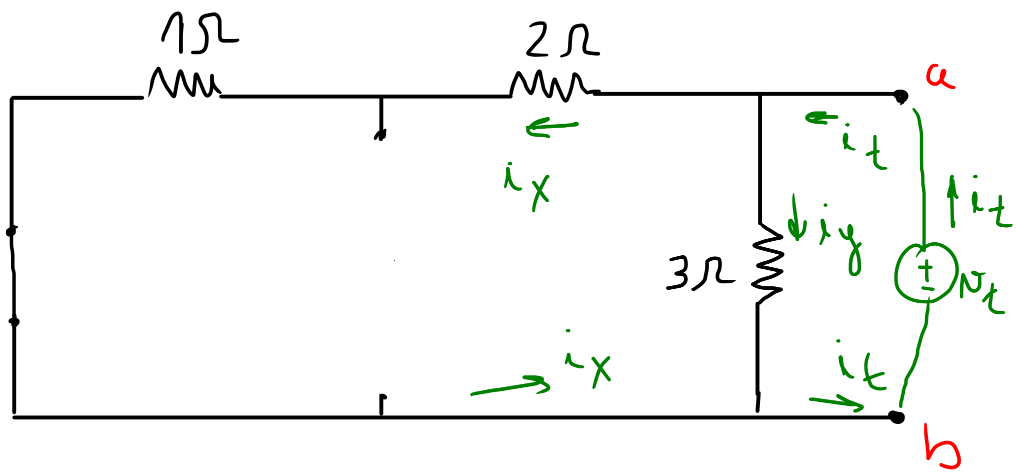
Exercício



$R_L = ?$

↳ P_L MÁXIMA

Cálculo de $R_L = R_{TH}$:



$R_L = R_{TH} = (1+2)||3$

$$\boxed{R_{TH} = \frac{3}{2}\Omega}$$