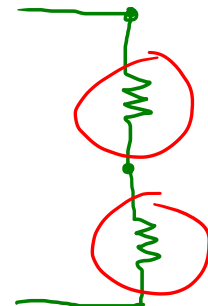
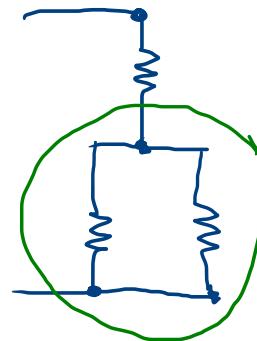
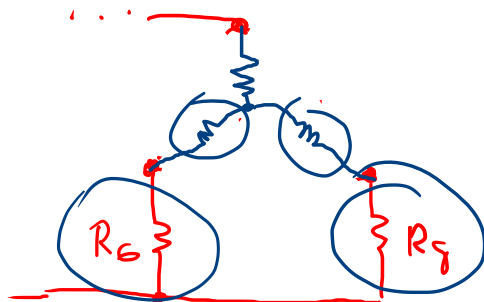
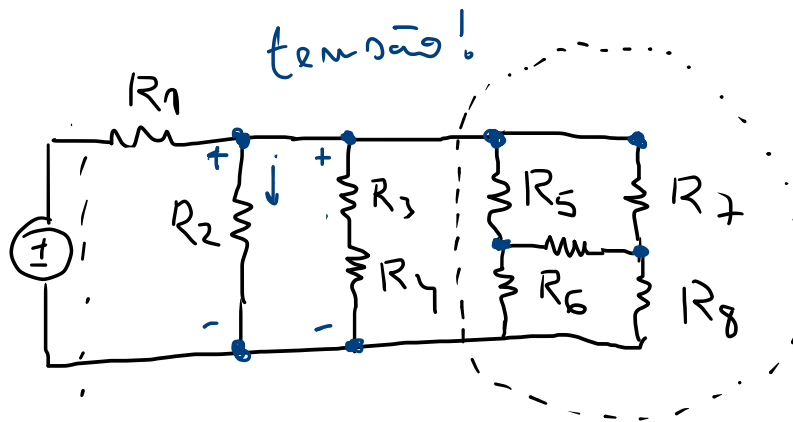
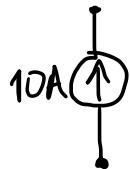
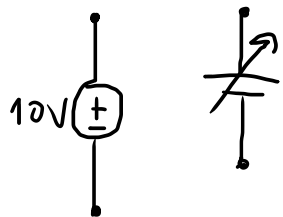
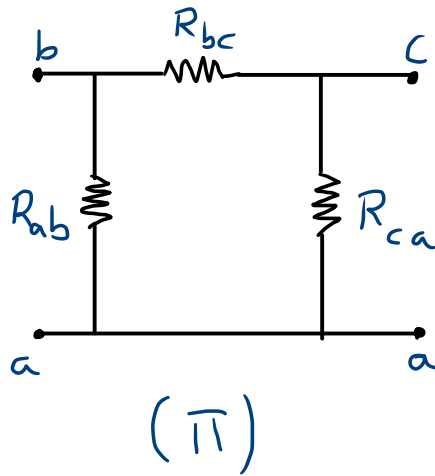
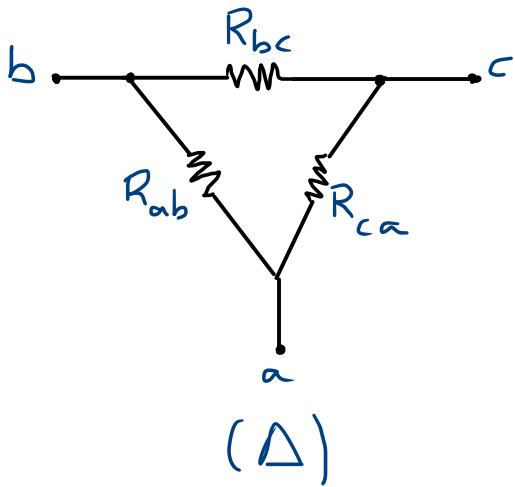
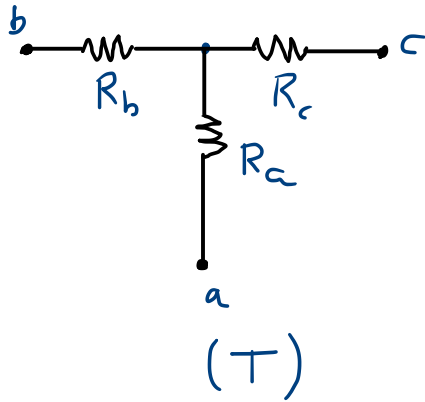
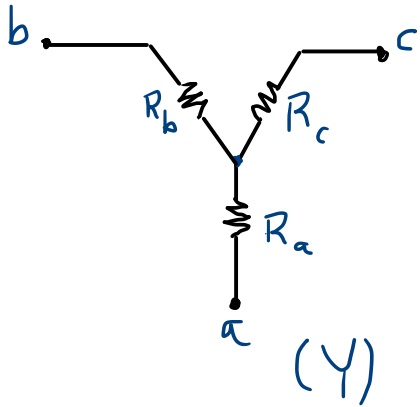


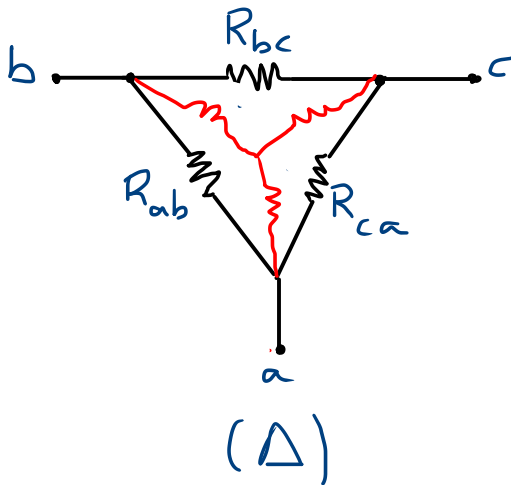
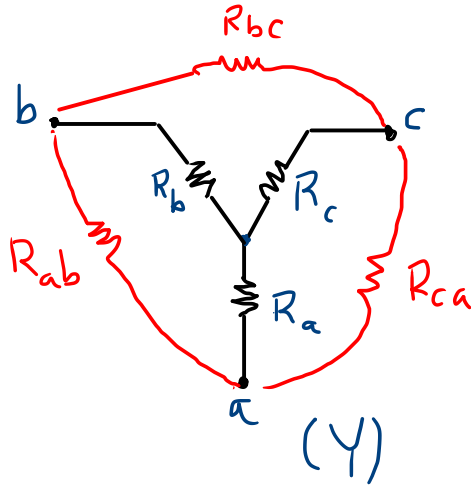
# Circuitos cc (Parâmetros resistivos)



Transformações Y- $\Delta$  e  $\Delta$ -Y:



Transformações Y-Δ e Δ-Y:



a-b

$$R_a + R_b = \frac{R_{ab}(R_{bc} + R_{ca})}{R_{ab} + R_{bc} + R_{ca}} \quad (\text{I})$$

b-c

$$R_b + R_c = \frac{R_{bc}(R_{ab} + R_{ca})}{R_{ab} + R_{bc} + R_{ca}} \quad (\text{II})$$

c-a

$$R_a + R_c = \frac{R_{ca}(R_{ab} + R_{bc})}{R_{ab} + R_{bc} + R_{ca}} \quad (\text{III})$$

Transformações Y-Δ e Δ-Y:

a-b

$$R_a + R_b = \frac{R_{ab}(R_{bc} + R_{ca})}{R_{ab} + R_{bc} + R_{ca}} \quad (\text{I})$$

b-c

$$R_b + R_c = \frac{R_{bc}(R_{ab} + R_{ca})}{R_{ab} + R_{bc} + R_{ca}} \quad (\text{II})$$

c-a

$$R_a + R_c = \frac{R_{ca}(R_{ab} + R_{bc})}{R_{ab} + R_{bc} + R_{ca}} \quad (\text{III})$$

$(\text{I}) + (\text{III}) - (\text{II})$ :

$$R_a = \frac{R_{ab} R_{ca}}{R_{ab} + R_{bc} + R_{ca}} \quad (\text{IV})$$

$$R_b = \frac{R_{ab} R_{bc}}{R_{ab} + R_{bc} + R_{ca}} \quad (\text{V})$$

$$R_c = \frac{R_{bc} R_{ca}}{R_{ab} + R_{bc} + R_{ca}} \quad (\text{VI})$$

## Transformações Y-Δ e Δ-Y:

(I) + (III) - (II):

$$R_a = \frac{R_{ab} R_{ca}}{R_{ab} + R_{bc} + R_{ca}}$$

(IV)

$$R_b = \frac{R_{ab} R_{bc}}{R_{ab} + R_{bc} + R_{ca}}$$

(V)

$$R_c = \frac{R_{bc} R_{ca}}{R_{ab} + R_{bc} + R_{ca}}$$

(VI)

Relacionando as eq. (I) e (V):

$$\frac{R_a}{R_b} = \frac{R_{ca}}{R_{bc}} \quad (\text{VII})$$

Relac. as eq. (II) e (V):

$$\frac{R_c}{R_b} = \frac{R_{ca}}{R_{ab}} \quad (\text{VIII})$$

Comb. as eq. (VII) e (VIII):

$$\frac{R_a}{R_c} = \frac{R_{ab}}{R_{bc}} \quad (\text{IX})$$

Transformações Y-Δ e Δ-Y:

Relacionando as eq. (I) e (V):

$$\frac{R_a}{R_b} = \frac{R_{ca}}{R_{bc}} \quad (\text{VI})$$

Relac. as eq. (II) e (V):

$$\frac{R_c}{R_b} = \frac{R_{ca}}{R_{ab}} \quad (\text{VII})$$

Comb. as eq. (VI) e (VII):

$$\frac{R_a}{R_c} = \frac{R_{ab}}{R_{bc}} \quad (\text{IX})$$

Subst. as eq. (VI) e (IX) em (II):

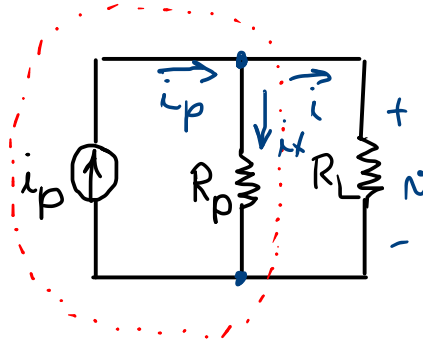
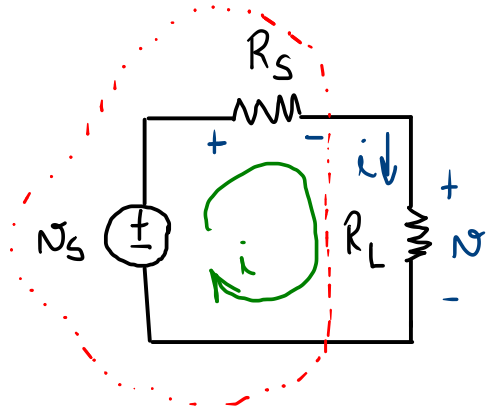
$$R_b + R_c = \frac{R_{bc}^2 \left( \frac{R_a}{R_c} + \frac{R_a}{R_b} \right)}{R_{bc} \left( \frac{R_a}{R_c} + 1 + \frac{R_a}{R_b} \right)}$$

$$R_{bc} = \frac{R_a R_b + R_b R_c + R_a R_c}{R_a}$$

$$R_{ab} = \frac{R_a R_b + R_b R_c + R_a R_c}{R_c}$$

$$R_{ca} = \frac{R_a R_b + R_b R_c + R_a R_c}{R_b}$$

→ Conversão de modelos de fontes:



$$V_S - R_S \cdot i - V = 0$$

$$V_S = R_S \cdot i + V$$

$$i = \frac{V_S}{R_S} - \frac{V}{R_S}$$

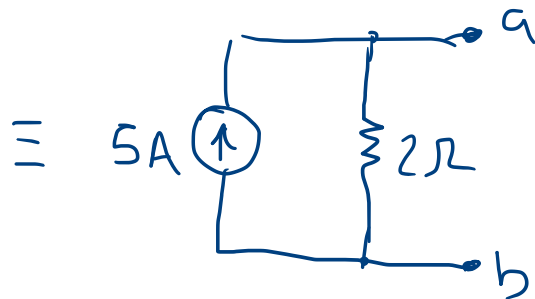
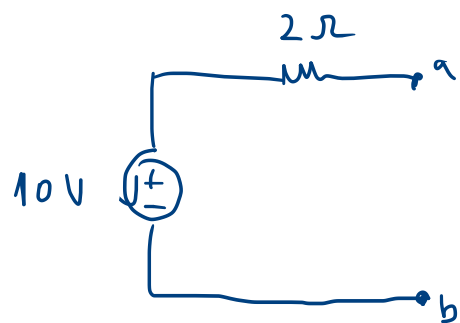
$$i_p = i_x + i$$

$$i = i_p - i_x$$

$$i = i_p - \frac{V}{R_p}$$

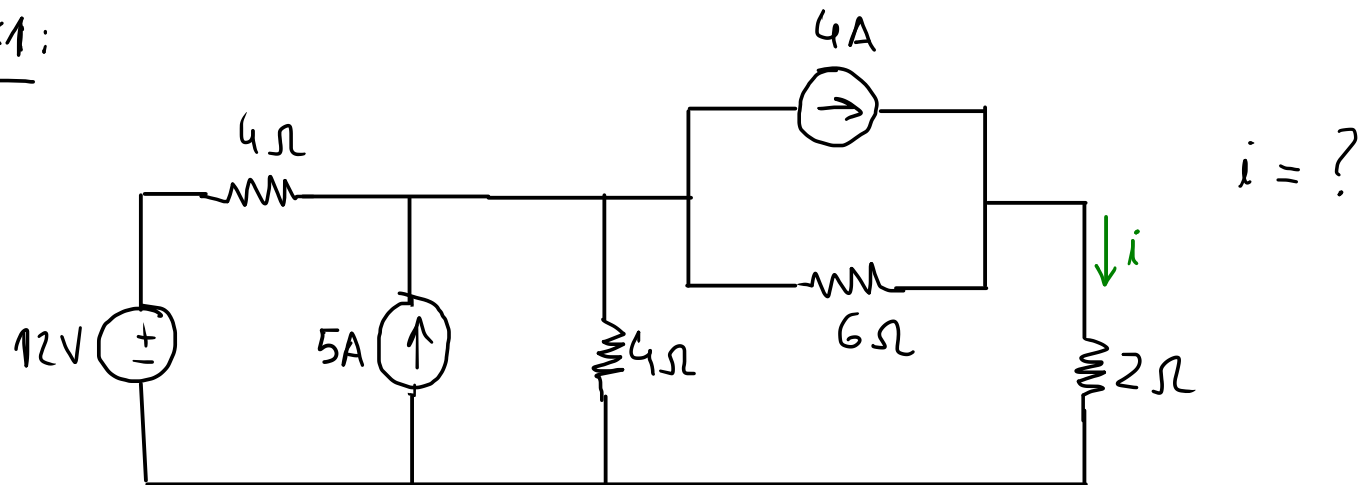
$$i_p = \frac{V_S}{R_S}$$

$$R_S = R_p$$

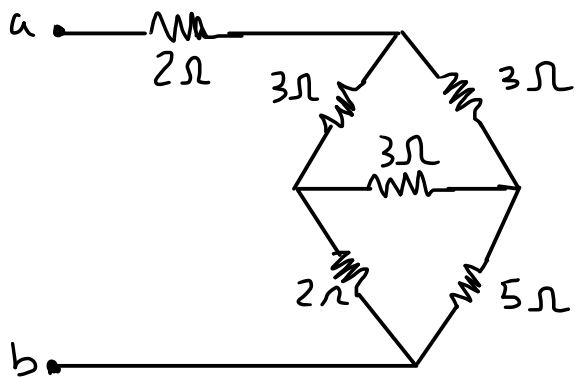




EX1:



EX2:  $R_{ab} = ?$



EX3:

