

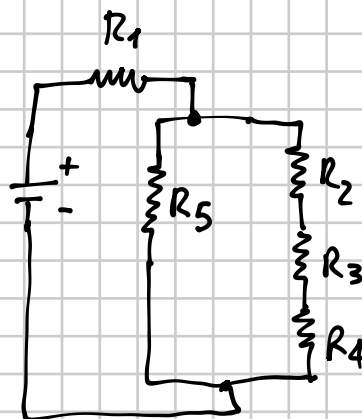
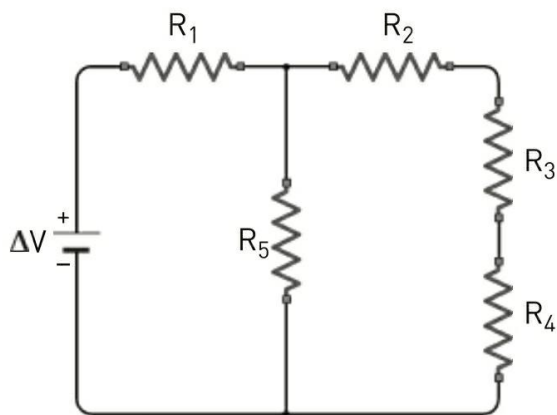
14/1/2020

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★★★

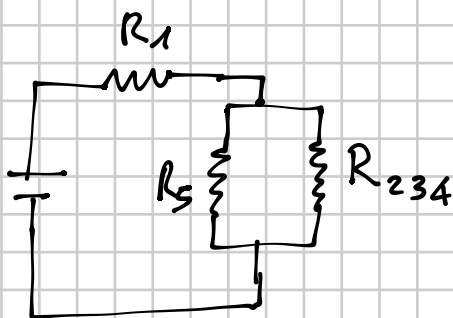
Il circuito in figura contiene un generatore che mantiene una differenza di potenziale di 80 V e cinque resistenze che valgono $R_1 = 80 \Omega$, $R_2 = R_4 = 10 \Omega$, $R_3 = 20 \Omega$, $R_5 = 40 \Omega$.

► Risolvi il circuito.

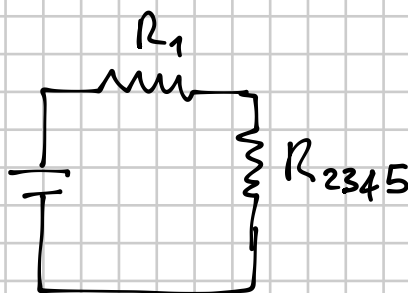


$$[R_{eq} = 100 \Omega, i = i_1 = 0,80 \text{ A}, \Delta V_1 = 64 \text{ V}, \Delta V_5 = 16 \text{ V}, i_5 = i_2 = i_3 = i_4 = 0,40 \text{ A}; \Delta V_2 = \Delta V_4 = 4,0 \text{ V}; \Delta V_3 = 8,0 \text{ V}]$$

Calcoliamo la resistenza equivalente R_{eq} del circuito



$$R_{234} = R_2 + R_3 + R_4 = 40 \Omega$$

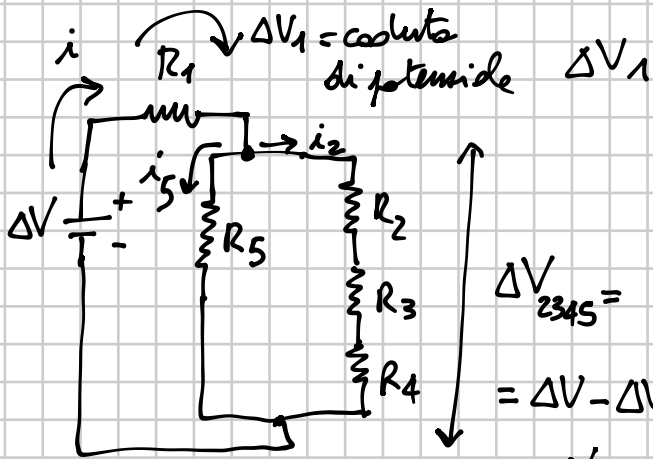


$$R_{2345} = \frac{R_{234} \cdot R_5}{R_{234} + R_5} = \frac{(20 \Omega)(40 \Omega)}{40 \Omega + 20 \Omega} = 20 \Omega$$

$$R_{eq} = R_1 + R_{2345} = 80 \Omega + 20 \Omega = 100 \Omega$$

$$i = \frac{\Delta V}{R_{eq}} = \frac{80 \text{ V}}{100 \Omega} = 0,80 \text{ A}$$

↑
corrente del circuito



$$i_1 = i = 0,80 \text{ A}$$

$$\Delta V_1 = R_1 i_1 = (80 \Omega)(0,80 \text{ A}) = 64 \text{ V}$$

$$\begin{aligned} \Delta V_{2345} &= \\ &= \Delta V - \Delta V_1 = \\ &= 80 \text{ V} - 64 \text{ V} = \\ &= 16 \text{ V} \end{aligned}$$

↑ Si può arrivare allo stesso risultato con

$$\begin{aligned} \Delta V_{2345} &= R_{2345} \cdot i = (20 \Omega)(0,80 \text{ A}) = \\ &= 16 \text{ V} \end{aligned}$$

$$i_5 = \frac{\Delta V_{2345}}{R_5} = \frac{16 \text{ V}}{40 \Omega} = 0,40 \text{ A}$$

$$i_2 = i - i_5 = 0,40 \text{ A}$$

$$i_2 = i_3 = i_4$$

$$\Delta V_2 = R_2 i_2 = (10 \Omega)(0,40 \text{ A}) = 4,0 \text{ V}$$

$$\Delta V_3 = R_3 i_3 = (20 \Omega)(0,40 \text{ A}) = 8,0 \text{ V}$$

$$\Delta V_4 = R_4 i_4 = (10 \Omega)(0,40 \text{ A}) = 4,0 \text{ V}$$

(oppure per differenza)

$$\begin{aligned} \Delta V_4 &= \Delta V_{2345} - \Delta V_2 - \Delta V_3 \\ &= 16 \text{ V} - 4,0 \text{ V} - 8,0 \text{ V} = \\ &= 4,0 \text{ V} \end{aligned}$$