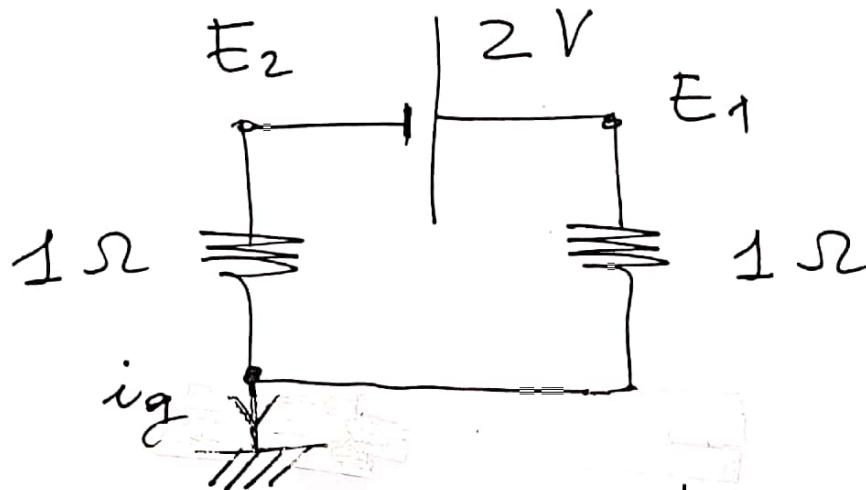
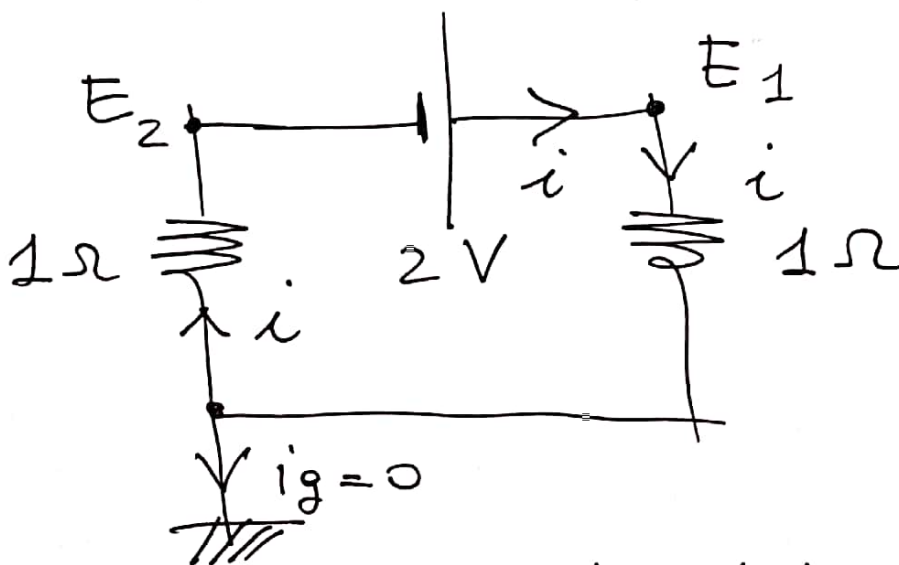


Esercizio



? determinare il potenziale dei nodi E_1 e E_2 rispetto a T_{avg} .

Soluzione. Essendoci un solo collegamento a T_{avg} si ha $i_g = 0$



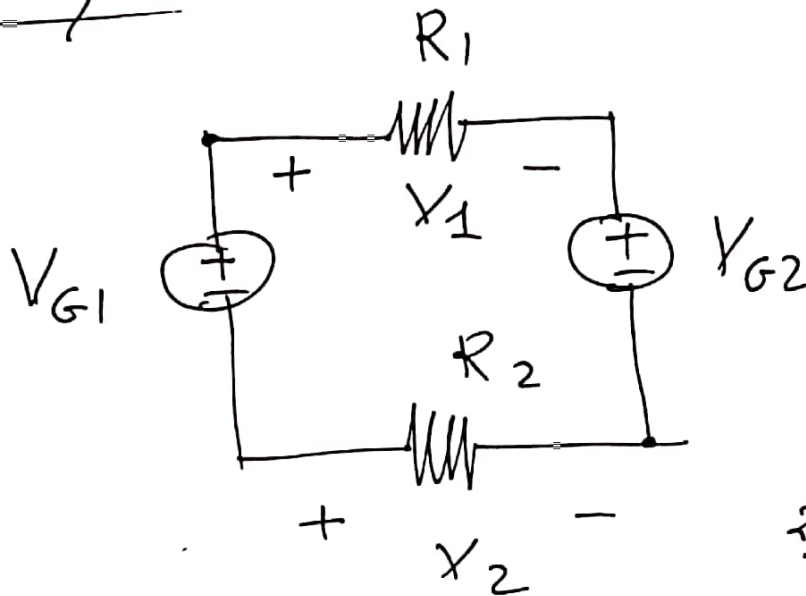
$$\text{KV: } -2 + 1 \cdot i + 1 \cdot i = 0 \Rightarrow$$

$$i = 1 \text{ A} \Rightarrow$$

$$E_1 = 1 \cdot i = 1 \text{ V},$$

$$E_2 = -1 \cdot i = -1 \text{ V}.$$

Esercizio



$$R_1 = 2 \Omega \quad (1)$$

$$R_2 = 3 \Omega$$

$$V_{G1} = 15 \text{ V}$$

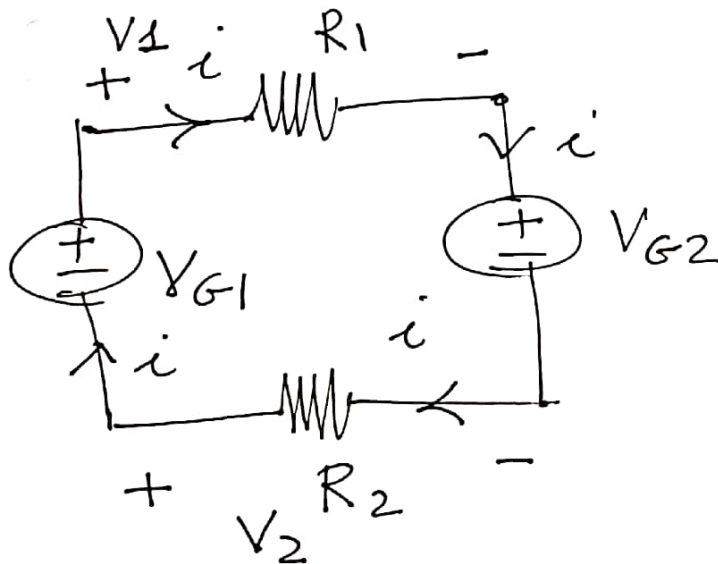
$$V_{G2} = 10 \text{ V}$$

? V_1, V_2 ,
? potenza assorbita
da R_1 e R_2
? potenza erogata
da V_{G1} e V_{G2} .

Soluzione

Ho una sola maglia.

Indico con i la corrente di maglia.



$$\text{KV: } -V_{G1} + V_1 + V_{G2} - V_2 = 0$$

Relazioni costitutive

$$V_1 = R_1 i; \quad V_2 = -R_2 i$$

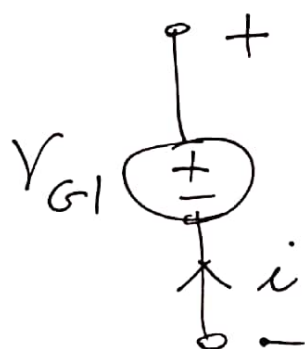
②

$$-V_{G1} + R_1 i + V_{G2} - R_2 i = 0$$

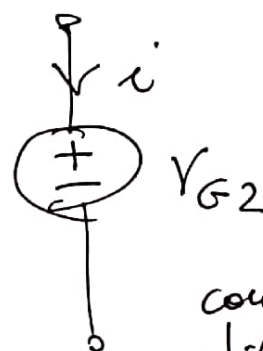
$$\Rightarrow i = \frac{V_{G1} - V_{G2}}{R_1 + R_2} = 1 \text{ Ampère}$$

$$V_1 = R_1 i = 2 \text{ V}; V_2 = -R_2 i = -3 \text{ V}$$

$$P_1 = R_1 i^2 = 2 \text{ W}; P_2 = R_2 i^2 = 3 \text{ W}$$



courant.
générateur



courant.
utilisateur

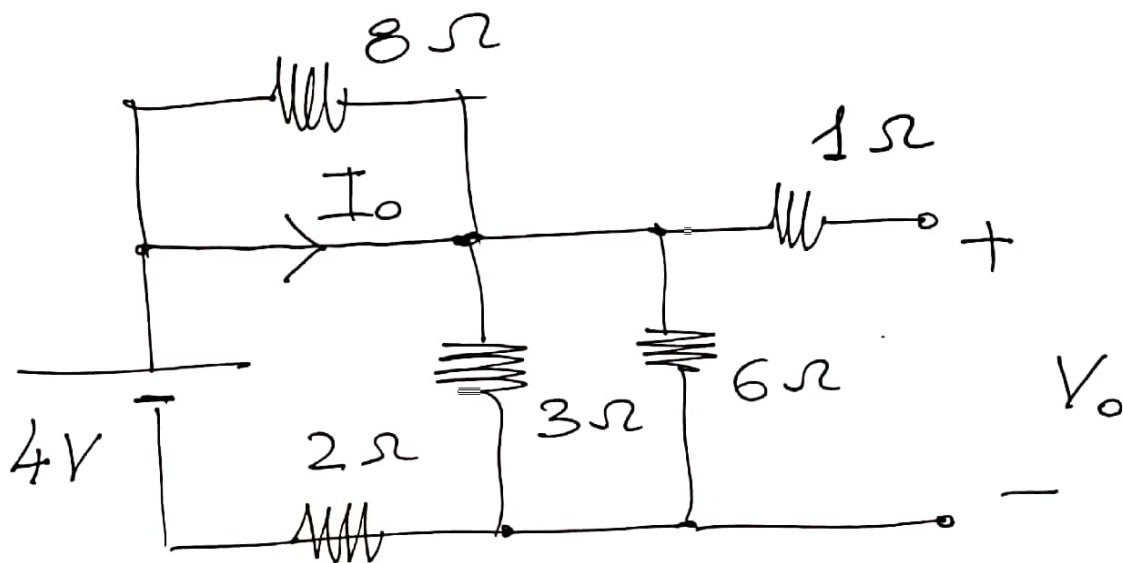
$$P_{G1} = V_{G1} i = 15 \text{ W} \text{ émise}$$

$$P_{G2} = -V_{G2} i = -10 \text{ W} \text{ émise.}$$

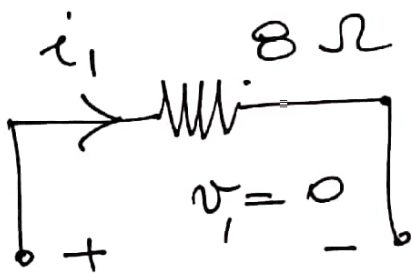
il générateur V_{G1} émet une puissance
réelle de 15 W

il générateur V_{G2} absorbe une puissance
réelle de 10 W (se charge).

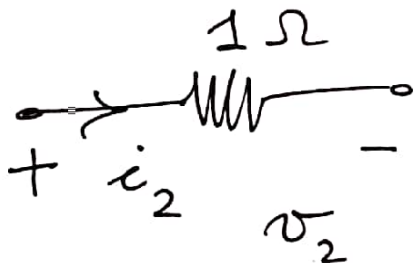
Esercizio



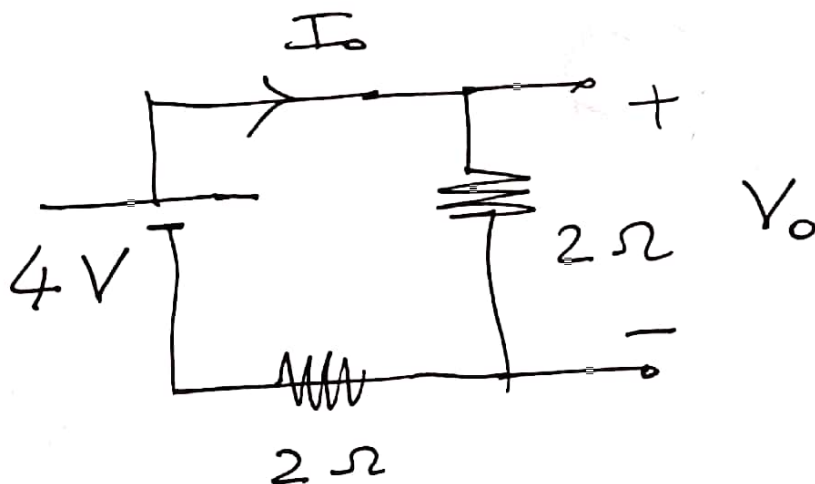
Soluzione Semplifichiamo il circuito.



$$\Rightarrow \begin{aligned} v_1 &= 0 \\ i_1 &= 0 \end{aligned}$$

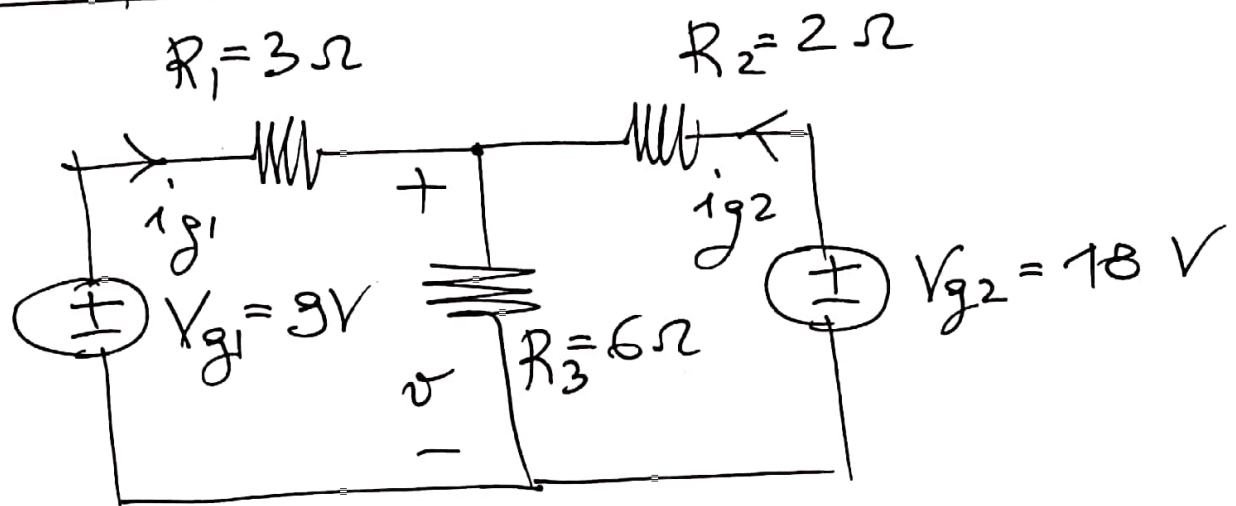


$$i_2 = 0 \Rightarrow v_2 = 0$$



$$\begin{aligned} I_0 &= 1 \text{ Ampere} \\ V_0 &= 2 \text{ Volt.} \end{aligned}$$

Esempio



? corrente e potenza istantanea erogate dai 2 generatori

Soluzione Using Millman

$$v = \frac{\frac{V_{G1}}{R_1} + \frac{V_{G2}}{R_2}}{\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}} = \frac{\frac{9}{3} + \frac{18}{2}}{\frac{1}{3} + \frac{1}{6} + \frac{1}{2}} = 12 \text{ Volt}$$

$$\text{KV: } V_{G1} = R_1 i_{g1} + v \Rightarrow$$

$$i_{g1} = \frac{V_{G1} - v}{R_1} = -1 \text{ Ampere}$$

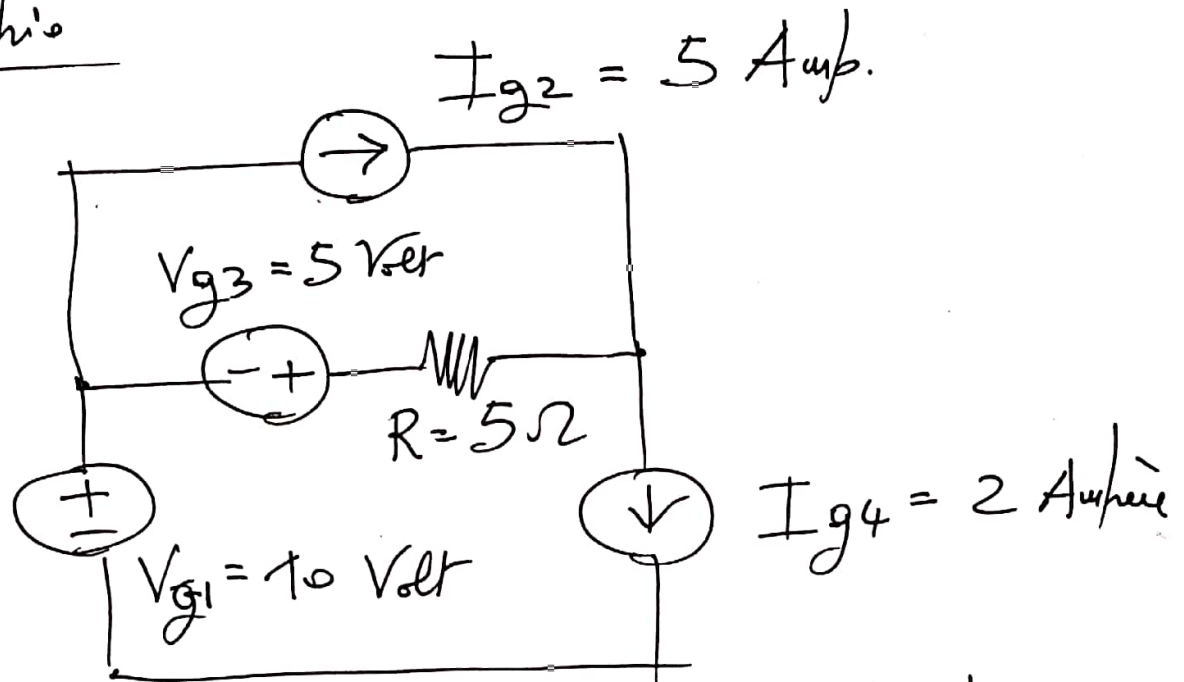
$$i_{g2} = \frac{V_{G2} - v}{R_2} = 3 \text{ Ampere}$$

Potenza erogata

$$P_{G1} = V_{G1} \cdot i_{g1} = -9 \text{ W}$$

$$P_{G2} = V_{G2} \cdot i_{g2} = 54 \text{ W}$$

Esempio

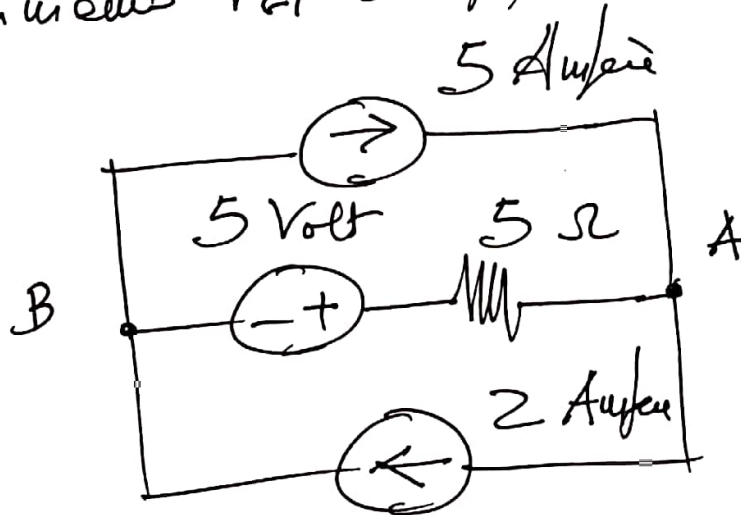


? determinare la potenza erogata dai 4 generatori.

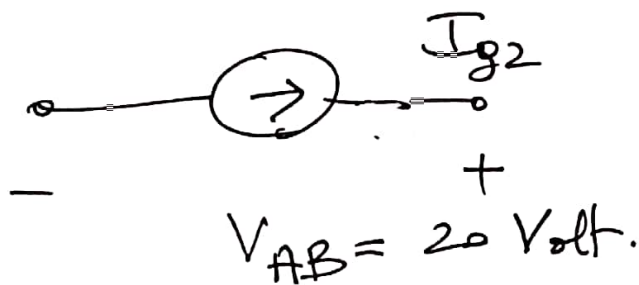
Soluzione. Si ha

$$P_{g1} = 10 \cdot 2 = 20 \text{ W}$$

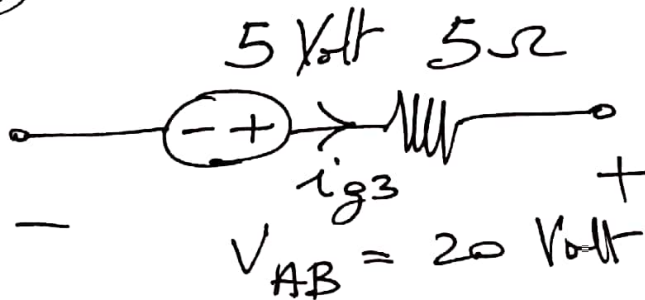
Eliminiamo V_{g1} e applichiamo Millman



$$V_{AB} = \frac{5 + \frac{5}{5} - 2}{\frac{1}{5}} = 20 \text{ Volt.}$$



$$P_{g2} = V_{AB} \cdot I_{g2} = 100 \text{ W}$$

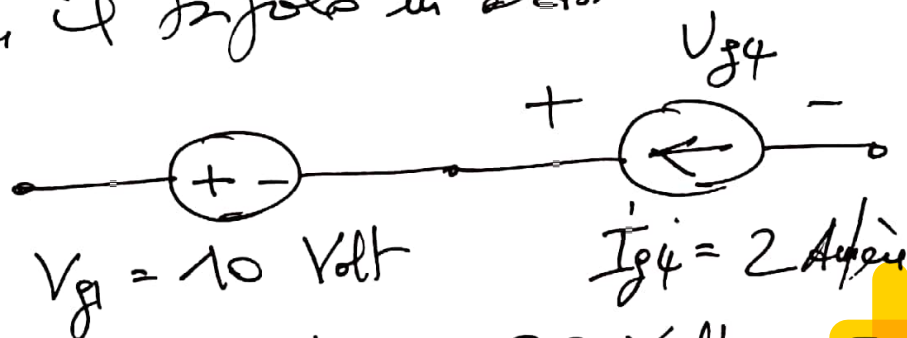


$$\text{KV: } 20 = -5 \cdot i_{g3} + 5 \Rightarrow$$

$$i_{g3} = -3 \text{ Ampere} \Rightarrow$$

$$P_{g3} = 5 \cdot (-3) = -15 \text{ W.}$$

Attenzione forniamo un ultimo indizio per il trifolo in basso



$V_{AB} = 20 \text{ Volt}$

$$\text{KV: } 20 = -V_{g4} - 10 \Rightarrow$$

$$V_{g4} = -30 \text{ Volt} \Rightarrow$$

$$P_{g4} = V_{g4} \cdot I_{g4} = -60 \text{ W.}$$