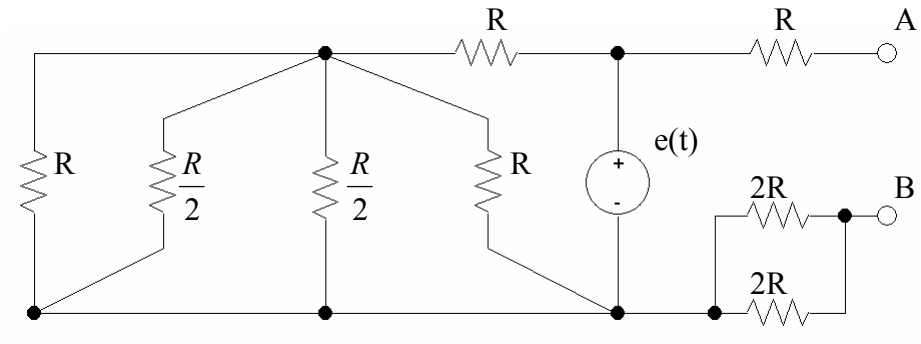
Esercitazione 2

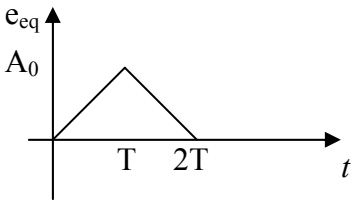
Esercizio 1:

Per il circuito in figura, posto R=$\frac{7}{2}\Omega$, ricavare l'equivalente Thevenin ai morsetti A e B.



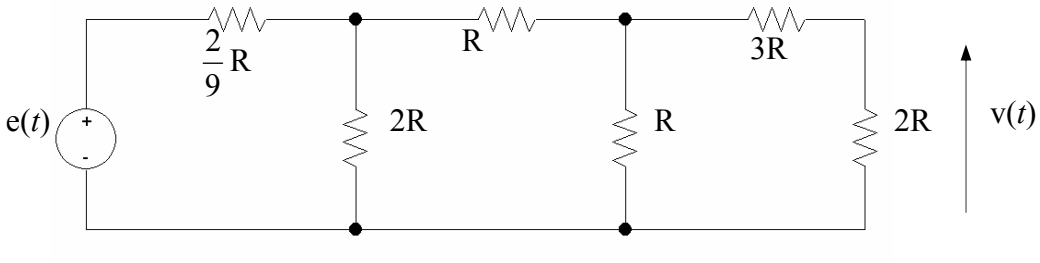
$$\begin{cases} 0 & t<0 \\ \frac{A_0}{T}t & 0\le t<T \\ -\frac{A_0}{T}(t-2T) & T\le t<2T \\ 0 & t\ge 2T \end{cases}$$

Risposta: $R_{eq}=7\Omega$



Esercizio 2:

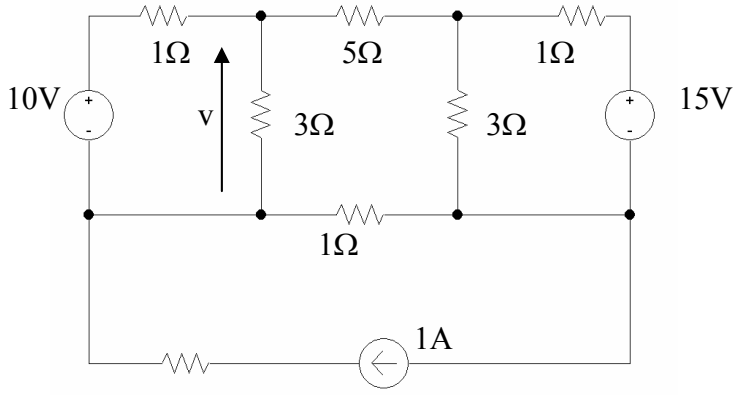
Calcolare v(t), noto e(t)=$E_0\sin(\omega t+\phi)$ V



Risposta: v(t) = $\frac{9}{61}$ e(t) V

Esercizio 3:

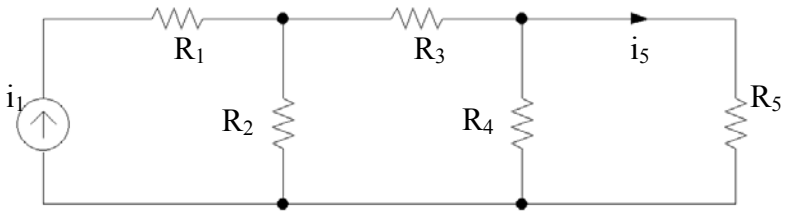
Nel circuito rappresentato determinare v



Risposta: $v = \frac{311}{40} = 7.775$ V

Esercizio 4:

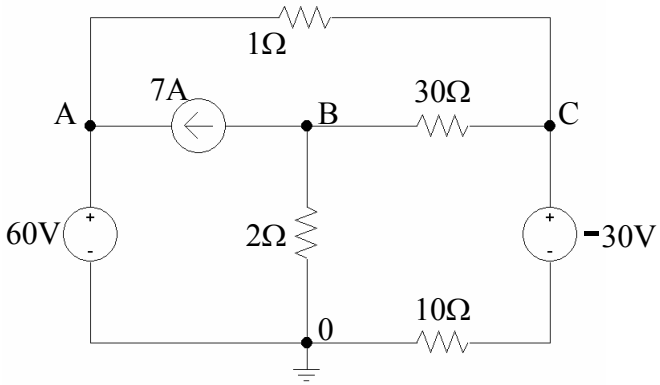
Determinare il valore di i_5, in funzione dei parametri del circuito. Il risultato dipende da R_1?



Risposta: $i_5 = \frac{R_2 R_4}{(R_2 + R_3)(R_4 + R_5) + R_4 R_5} i_1$

Esercizio 5:

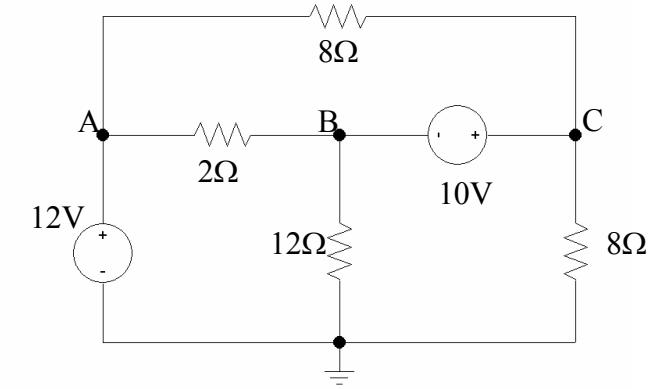
Trovare le tensioni ai nodi A,B,C rispetto al nodo di riferimento 0



Risposta: v_A=60V, v_B=-10V, v_C=50V

Esercizio 6:

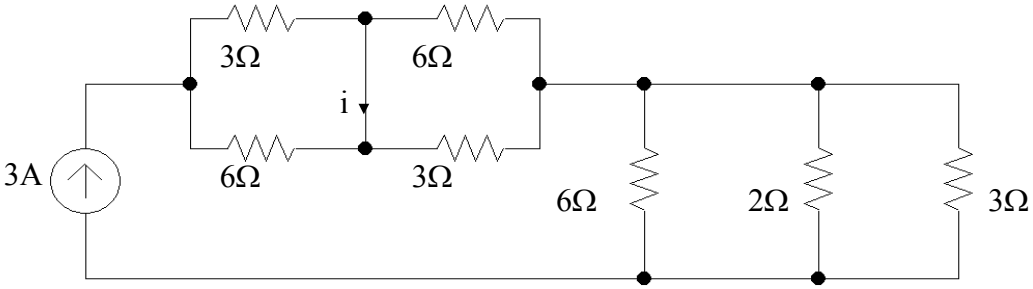
Calcolare v_A, v_B, v_C rispetto al nodo di riferimento



Risposta: v_A=12V, v_B=6V, v_C=16V

Esercizio 7:

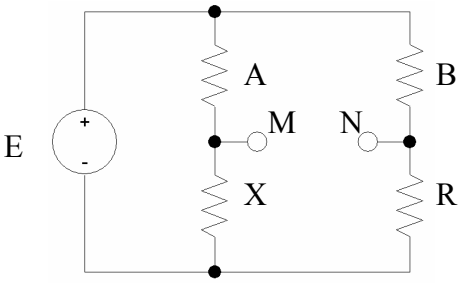
Determinare la corrente i



Risposta: i = 1A

Esercizio 8:

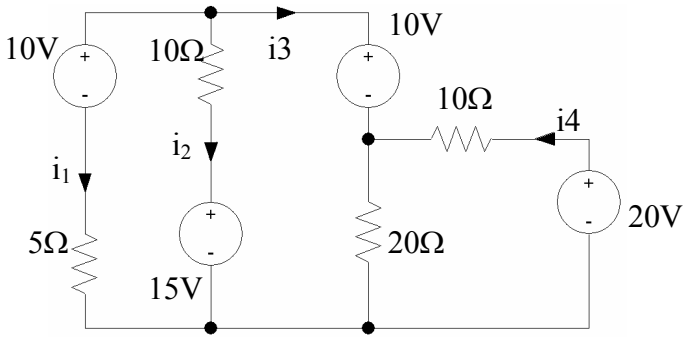
Determinare il generatore equivalente di tipo serie del bipolo M, N in funzione di E, A,R, B, X; la relazione che devono soddisfare A, B, R, X affinché sia v_{MN}=0V.



Risposta: $v_{MN} = \left(\frac{X}{A+X} - \frac{R}{B+R}\right)E$, R_e = (A||X+B||R), $v_{MN} = 0 \Leftrightarrow (AR = BX \ \forall \ E)$

Esercizio 9:

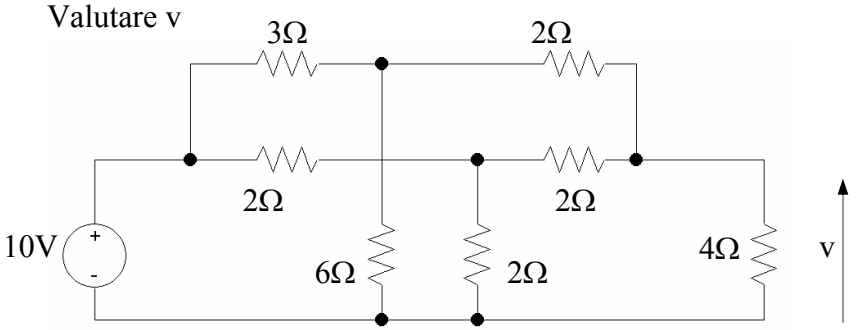
Valutare i_1, i_2, i_3, i_4



Risposta: $i_1 = \frac{10}{9}$A, $i_2 = \frac{1}{18}$A, $i_3 = -\frac{7}{6}$A, $i_4 = \frac{13}{9}$A

Esercizio 10:

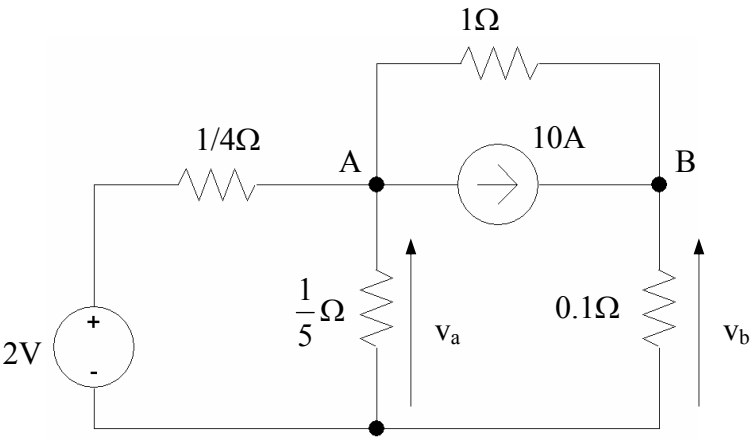
Valutare v



Risposta: v=4V

Esercizio 11:

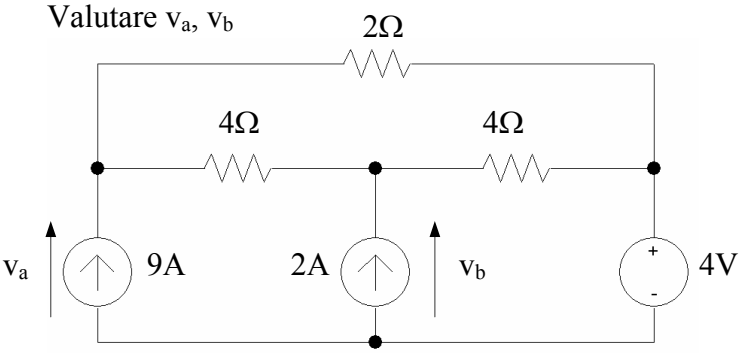
Calcolare le tensioni v_a, v_b



Risposta: v_a= - 0.1101 V, v_b= 0.8991 V

Esercizio 12:

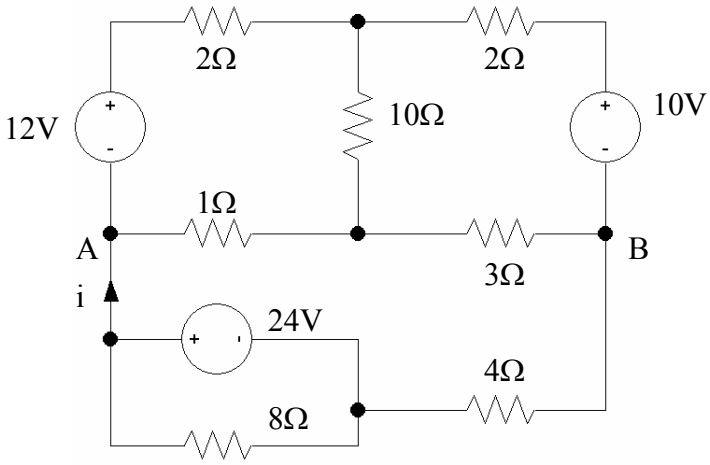
Valutare v_a, v_b



Risposta: v_a=20V, v_b=16V

Esercizio 13:

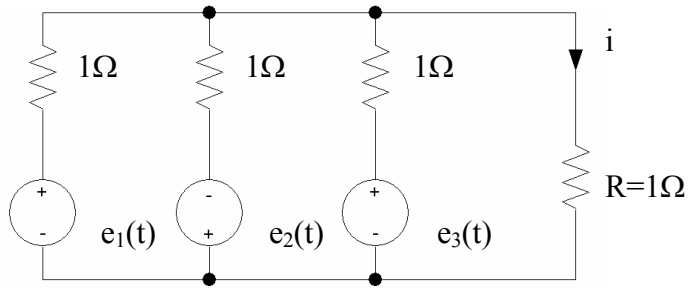
Determinare la corrente i, usando il circuito equivalente serie del bipolo (A,B)



Risposta: $i = \frac{1165}{284} \approx 4.1\text{A}$

Esercizio 14:

Calcolare la corrente i e la potenza entrante nel resistore R

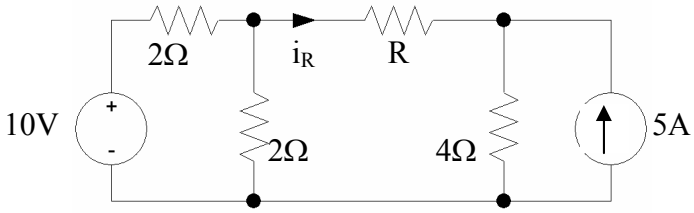


$e_1 = \cos(\omega t)\text{V}$
$e_2 = 2\cos(\omega t)\text{V}$
$e_3 = \sin(\omega t)\text{V}$

Risposta: $i = \frac{\sqrt{2}}{4}\sin\left(\omega t - \frac{\pi}{4}\right)\text{A}$, $P_R = \frac{1}{16}(1 + \sin 2\omega t)\text{W}$

Esercizio 15:

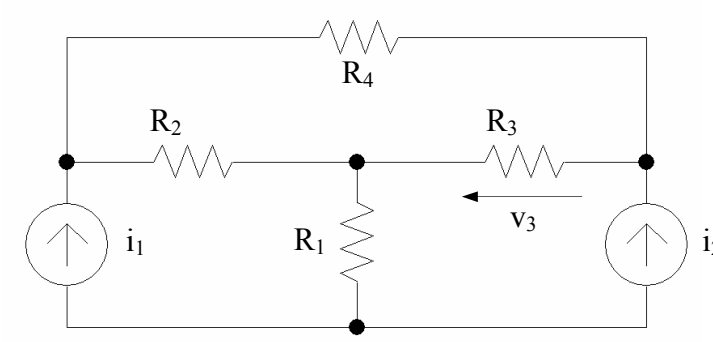
Mediante la rappresentazione Thevenin del bipolo ai capi del resistore R, calcolare la corrente i_R



Risposta: $i_R = -\frac{15}{5+R}\text{A}$

Esercizio 16:

Calcolare la tensione v_3

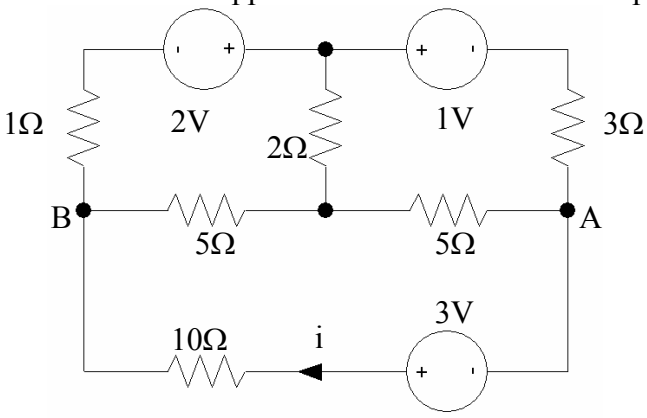


$R_i = i\Omega$
$i_1 = 6A$
$i_2 = 10A$

Risposta: $v_3 = -24V$

Esercizio 17:

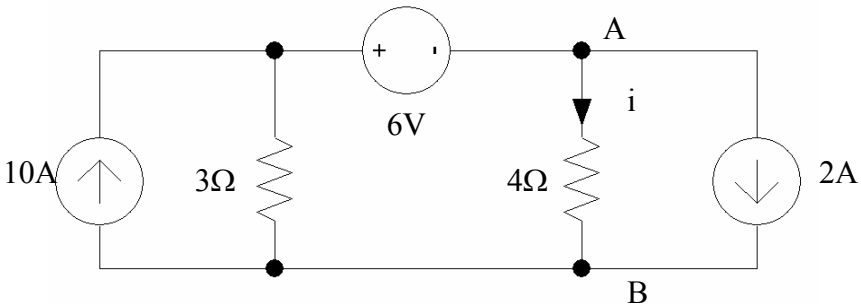
Mediante la rappresentazione Thevenin del bipolo tra A e B, calcolare la corrente i



Risposta: $i = \frac{149}{485} = 0.3A$

Esercizio 18:

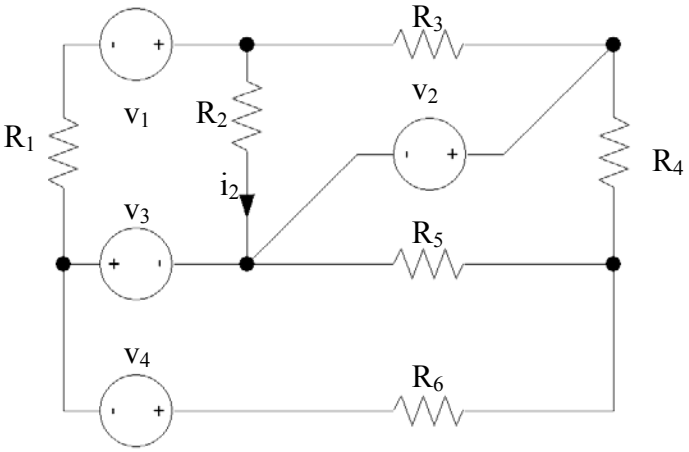
Calcolare la corrente i servendosi dell'equivalente Norton del bipolo A,B



Risposta: $i \approx 2.6A$

Esercizio 19:

Determinare il valore della corrente i_2

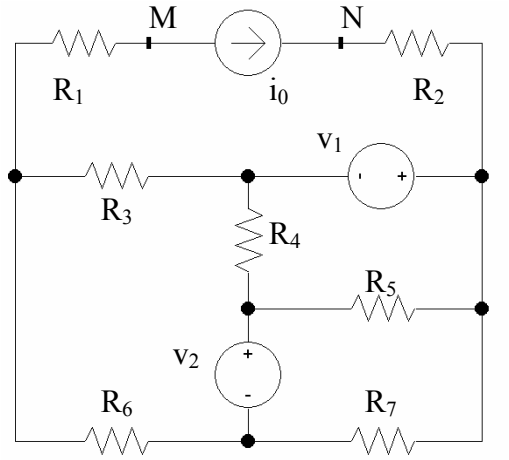


$R_i = 10i\ \Omega$
$v_i = 10i$ V

Risposta: $i_2 = \frac{14}{11}\text{A} \approx 1.27\text{A}$

Esercizio 20:

Determinare il valore della tensione v_{MN}

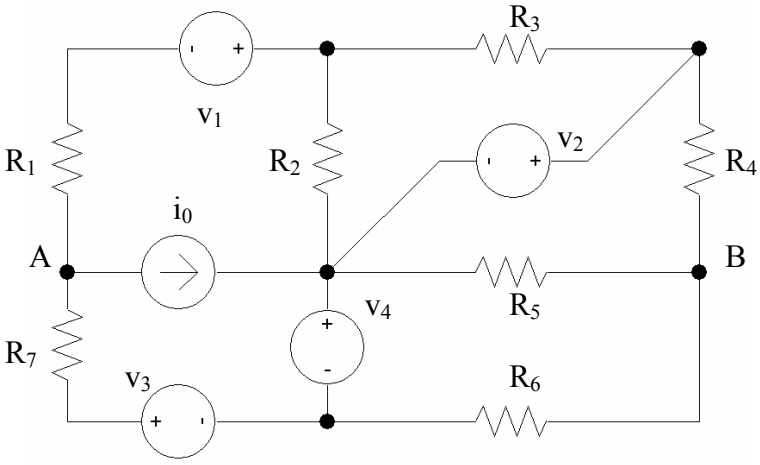


$R_i = 10i\ \Omega$
$v_i = 10i$ V
$i_0 = 1$A

Risposta: $v_{MN} = -64$V

Esercizio 21:

Determinare v_{AB}

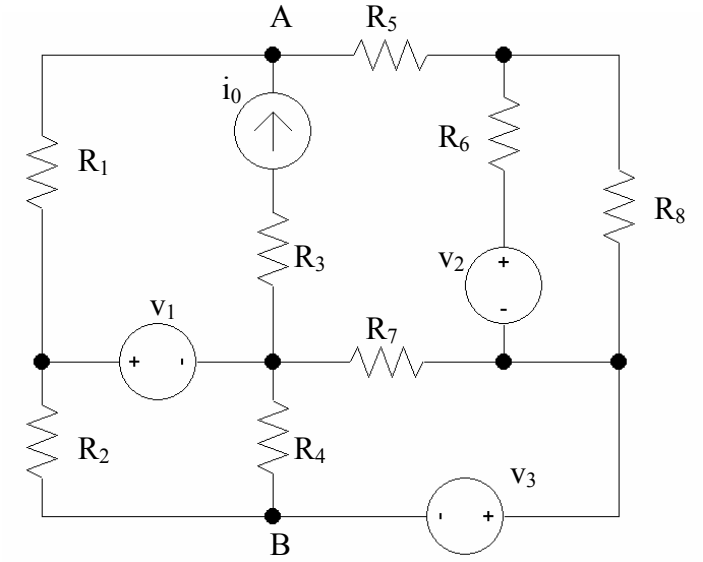


$R_i = 10i\ \Omega$
$v_i = 10i$ V
$i_0 = 1$A

Risposta: $v_{AB} = -\frac{15275}{851}\text{V} \approx -17.95\text{V}$

Esercizio 22:

Determinare v_{AB}

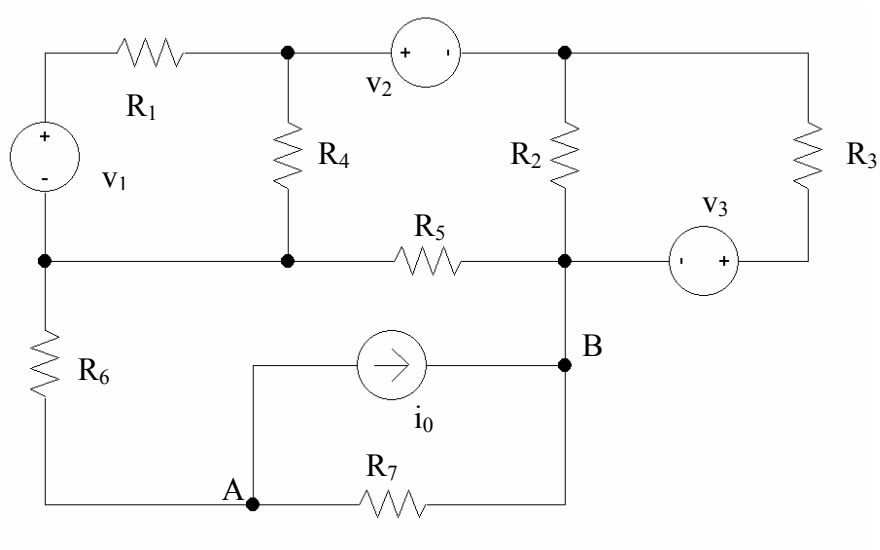


$R_i = 10i\ \Omega$
$v_i = 10i$ V
$i_0 = 1$A

Risposta: $v_{AB} = \frac{21845}{923}\text{V} \approx 23.7\text{V}$

Esercizio 23:

Determinare v_{AB} con Thevenin e Norton

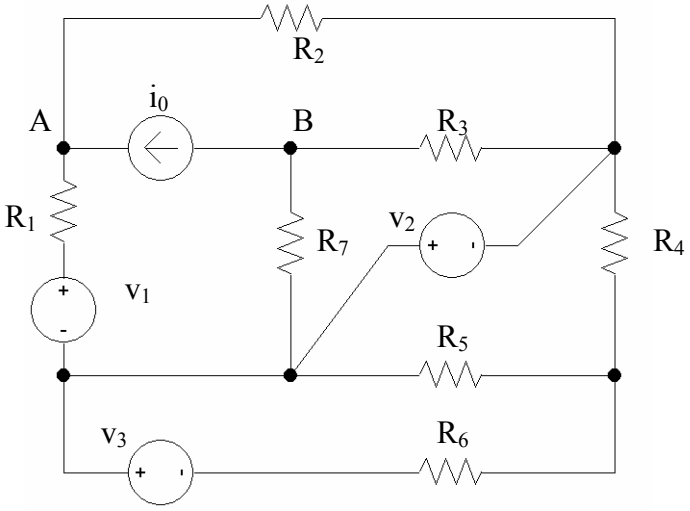


$R_i = 10i\ \Omega$
$v_i = 10i$ V
$i_0 = 1$A

Risposta: $v_{AB} = -\frac{2800}{101}\text{V} \approx -27.72\text{V}$

Esercizio 24:

Determinare v_{AB} con Thevenin



$R_i = 10i\ \Omega$
$v_i = 10i$ V
$i_0 = 1$A

Risposta: $v_{AB} \approx 41.6\text{V}$