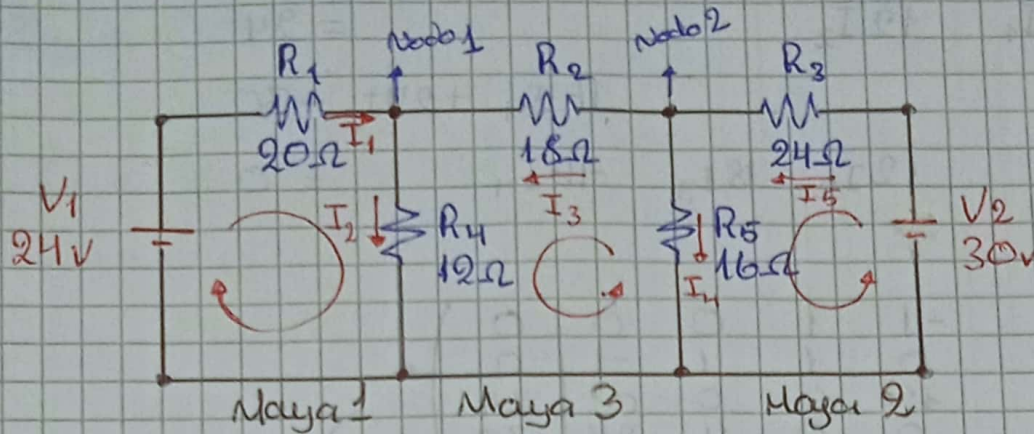


# Tarea Mallas

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Node 1  $\rightarrow I_2 = I_1 + I_3$

Node 2  $\rightarrow I_5 = I_3 + I_4$

Malla 1  $\sum V = \sum IR$

$$24V = 20I_1 + 12I_2$$

Malla 2

$$30V = 24I_5 + 16I_4$$

Malla 3

$$18I_3 + 12I_2 - 16I_4$$



$$\begin{aligned}
 I_1 - I_2 + I_3 &= 0 \\
 I_3 + I_4 - I_5 &= 0 \\
 20I_1 + 12I_2 &= 24 \\
 16I_4 + 24I_5 &= 30 \\
 12I_2 + 18I_3 - 16I_4 &= 0
 \end{aligned}$$

$$\left( \begin{array}{ccccc|c}
 1 & -1 & 1 & 0 & 0 & 0 \\
 0 & 0 & 1 & 1 & -1 & 0 \\
 20 & 12 & 0 & 0 & 0 & 24 \\
 0 & 0 & 0 & 16 & 24 & 30 \\
 0 & 12 & 18 & -16 & 0 & 0
 \end{array} \right)$$

Escalonada

$$\sim \left( \begin{array}{ccccc|c}
 I_1 & I_2 & I_3 & I_4 & I_5 & \\
 1 & -1 & 1 & 0 & 0 & 0 \\
 0 & 32 & -20 & 0 & 0 & 24 \\
 0 & 0 & 1 & +1 & -1 & 0 \\
 0 & 0 & 0 & 16 & 24 & 30 \\
 0 & 0 & 0 & 0 & \frac{351}{4} & \frac{1101}{16}
 \end{array} \right)$$

$$I_5 = \frac{(1101)(4)}{(16)(351)} = 0,78 \text{ A}$$

$$I_4 = \frac{30 - (24 \cdot 0,78)}{16} = 0,698 \text{ A}$$

$$I_3 = 0,085 \text{ A}$$

$$I_2 = 0,803 \text{ A}$$

$$I_1 = 0,718 \text{ A}$$

# Solución de Sistemas de Ecuaciones Lineales

Ingrese los coeficientes del sistema en las celdas y deje los campos en blanco si las variables no participan en la ecuación.

El sistema de ecuaciones:

$$\begin{cases} 1x_1 + -1x_2 + 1x_3 + 0x_4 + 0x_5 = 0 \\ 0x_1 + 0x_2 + 1x_3 + 1x_4 + -1x_5 = 0 \\ 20x_1 + 12x_2 + 0x_3 + 0x_4 + 0x_5 = 24 \\ 0x_1 + 0x_2 + 0x_3 + 16x_4 + 24x_5 = 30 \\ 0x_1 + 12x_2 + 18x_3 + -16x_4 + 0x_5 = 0 \end{cases}$$

Celdas



+

-

Solución por el Método de Gauss

Resolver

Mostrar números decimales

Limpiar

La solución por el método de Gauss

Transformar la matriz aumentada del sistema en una matriz en forma escalonada:

$$\left( \begin{array}{ccccc|c} 1 & -1 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 1 & -1 & 0 \\ 20 & 12 & 0 & 0 & 0 & 24 \\ 0 & 0 & 0 & 16 & 24 & 30 \\ 0 & 12 & 18 & -16 & 0 & 0 \end{array} \right) \xrightarrow{F_3 - 20 \cdot F_1 \rightarrow F_3} \left( \begin{array}{ccccc|c} 1 & -1 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 1 & -1 & 0 \\ 0 & 32 & -20 & 0 & 0 & 24 \\ 0 & 0 & 0 & 16 & 24 & 30 \\ 0 & 12 & 18 & -16 & 0 & 0 \end{array} \right) \xrightarrow{F_3 \leftrightarrow F_2} \left( \begin{array}{ccccc|c} 1 & -1 & 1 & 0 & 0 & 0 \\ 0 & 32 & -20 & 0 & 0 & 24 \\ 0 & 0 & 1 & 1 & -1 & 0 \\ 0 & 0 & 0 & 16 & 24 & 30 \\ 0 & 12 & 18 & -16 & 0 & 0 \end{array} \right) \xrightarrow{F_5 - \left(\frac{3}{8}\right) \cdot F_2 \rightarrow F_5}$$

$$\left( \begin{array}{ccccc|c} 1 & -1 & 1 & 0 & 0 & 0 \\ 0 & 32 & -20 & 0 & 0 & 24 \\ 0 & 0 & 1 & 1 & -1 & 0 \\ 0 & 0 & 0 & 16 & 24 & 30 \\ 0 & 0 & \frac{51}{2} & -16 & 0 & -9 \end{array} \right) \xrightarrow{F_5 - \left(\frac{51}{2}\right) \cdot F_3 \rightarrow F_5} \left( \begin{array}{ccccc|c} 1 & -1 & 1 & 0 & 0 & 0 \\ 0 & 32 & -20 & 0 & 0 & 24 \\ 0 & 0 & 1 & 1 & -1 & 0 \\ 0 & 0 & 0 & 16 & 24 & 30 \\ 0 & 0 & 0 & \frac{-83}{2} & \frac{51}{2} & -9 \end{array} \right) \xrightarrow{F_5 - \left(\frac{83}{32}\right) \cdot F_4 \rightarrow F_5} \left( \begin{array}{ccccc|c} 1 & -1 & 1 & 0 & 0 & 0 \\ 0 & 32 & -20 & 0 & 0 & 24 \\ 0 & 0 & 1 & 1 & -1 & 0 \\ 0 & 0 & 0 & 16 & 24 & 30 \\ 0 & 0 & 0 & 0 & \frac{351}{4} & \frac{1101}{16} \end{array} \right)$$

$$\begin{cases} x_1 - x_2 + x_3 = 0 \\ 32x_2 - 20x_3 = 24 \\ x_3 + x_4 - x_5 = 0 \\ 16x_4 + 24x_5 = 30 \\ \frac{351}{4}x_5 = \frac{1101}{16} \end{cases} \quad (1)$$

# La respuesta:

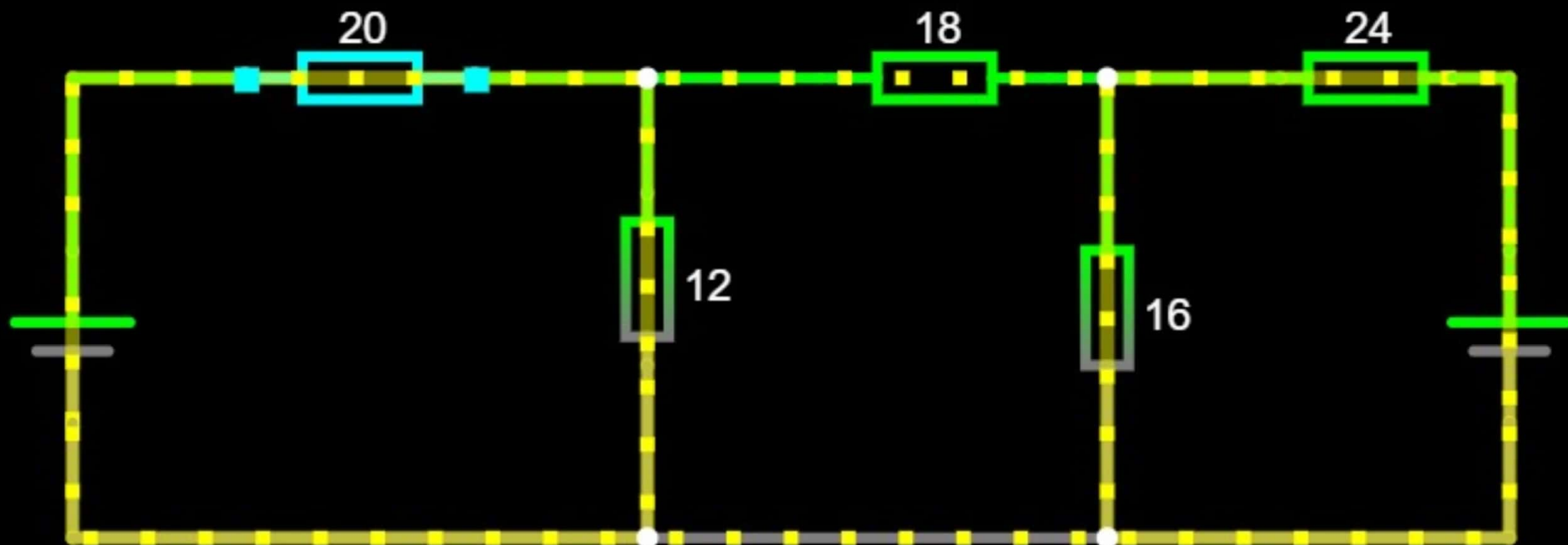
$$x_1 = \frac{28}{39}$$

$$x_2 = \frac{94}{117}$$

$$x_3 = \frac{10}{117}$$

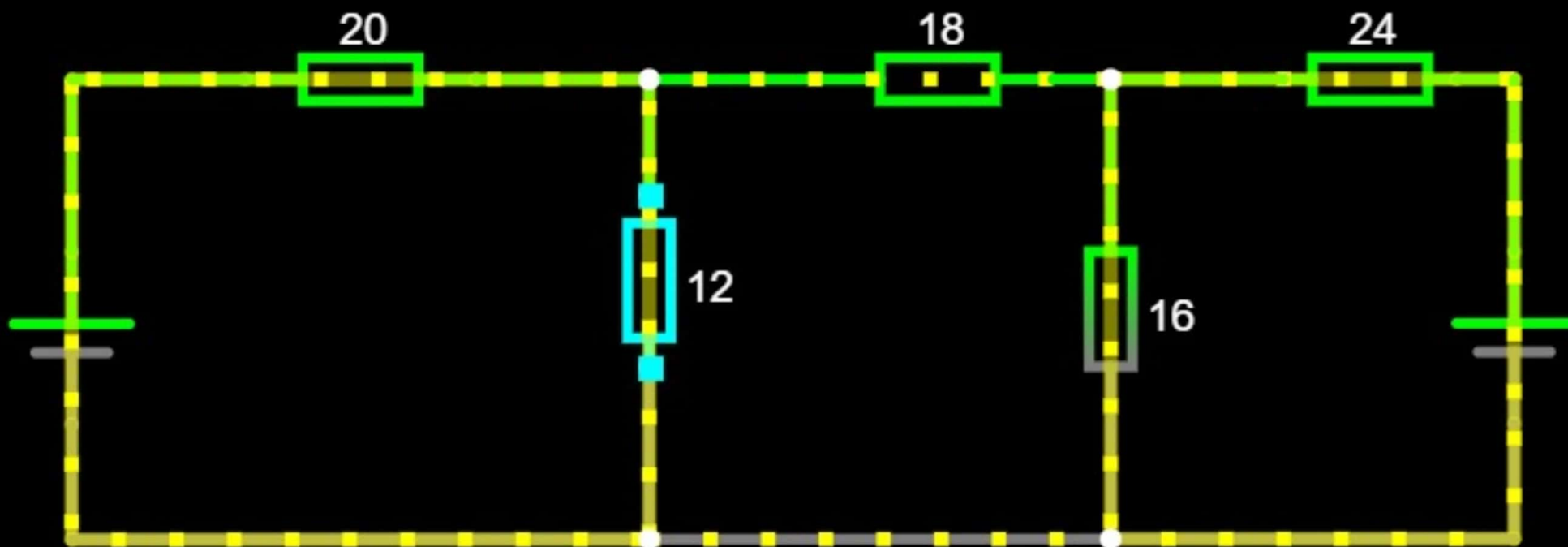
$$x_4 = \frac{109}{156}$$

$$x_5 = \frac{367}{468}$$

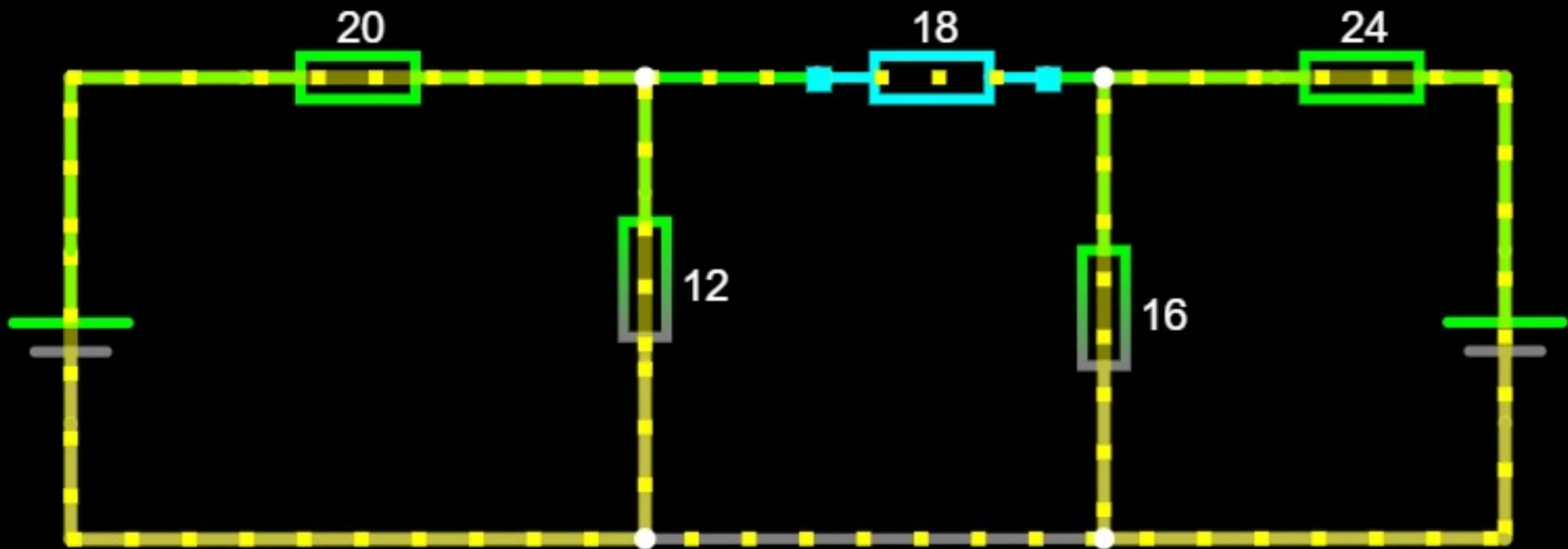


resistor  
 $I = 717.949 \text{ mA}$   
 $V_d = 14.359 \text{ V}$   
 $R = 20 \Omega$   
 $P = 10.309 \text{ W}$

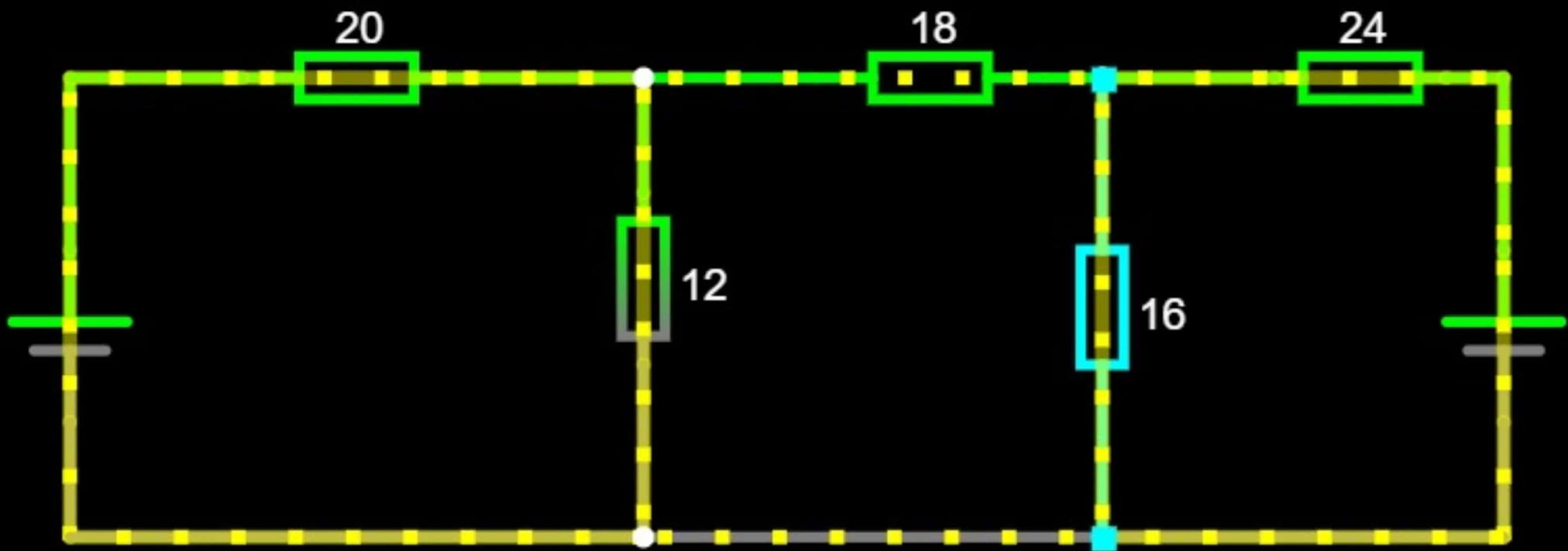




resistor  
 $I = 803.419 \text{ mA}$   
 $V_d = 9.641 \text{ V}$   
 $R = 12 \Omega$   
 $P = 7.746 \text{ W}$

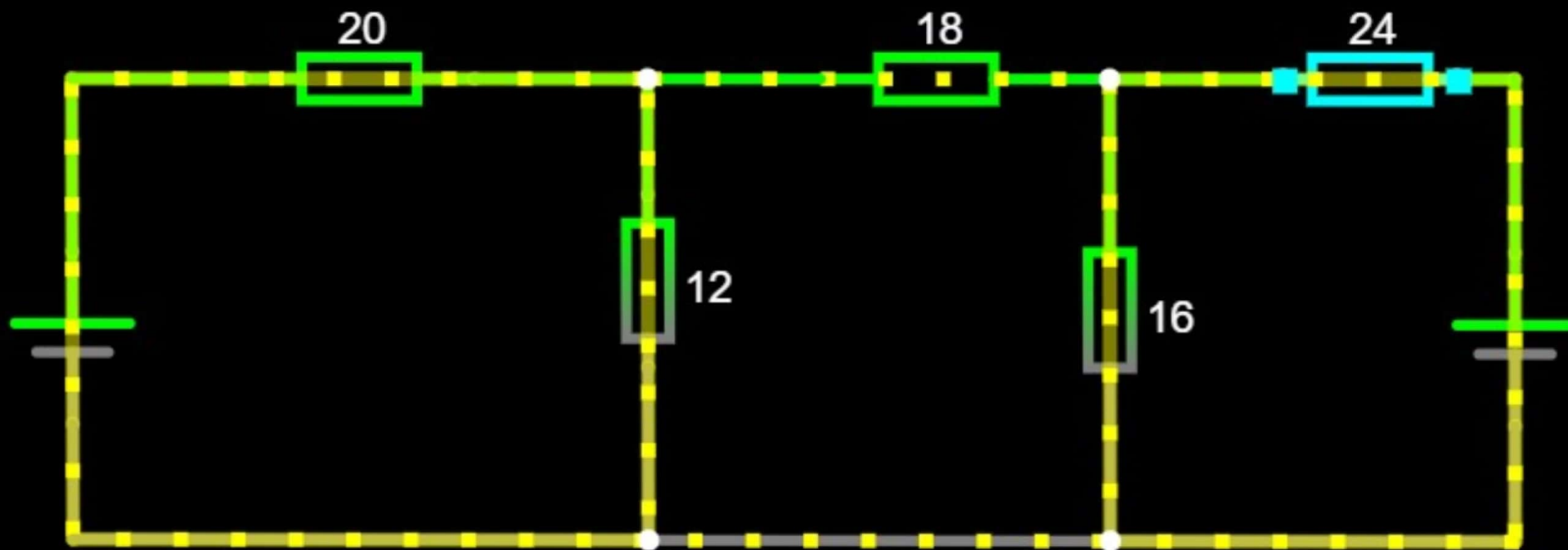


resistor  
 $I = 85.47 \text{ mA}$   
 $V_d = 1.538 \text{ V}$   
 $R = 18 \Omega$   
 $P = 131.492 \text{ mW}$



resistor  
 $I = 698.718 \text{ mA}$   
 $V_d = 11.179 \text{ V}$   
 $R = 16 \Omega$   
 $P = 7.811 \text{ W}$





resistor

$I = 784.188 \text{ mA}$

$V_d = 18.821 \text{ V}$

$R = 24 \Omega$

$P = 14.759 \text{ W}$