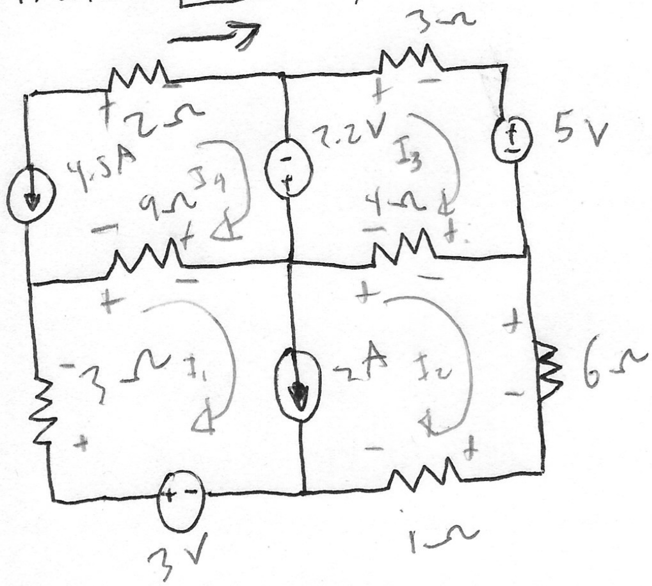
Nota:
el signo se tomara negativo si el elemento analizado tiene $\boxed{+\ -}$ $\longrightarrow$, en caso contrario $\boxed{-\ +}$ $\longrightarrow$ será Positivo



Para resolver el circuito hacemos uso de supermalla y retiramos la fuente de 2A

Entonces tendriamos que

$I_1 - I_2 = 2A$

despejando I_1

$I_1 = 2A + I_2 \ldots\ldots$ (3)

Para I_1 e I_2

$-3\Omega \cdot I_1 + 9\Omega \cdot I_4 - 9\Omega I_1 + 4\Omega \cdot I_3 - 4\Omega \cdot I_2 - 6\Omega \cdot I_2 - 1\Omega \cdot I_2 + 3V = 0$

$\Rightarrow -12\Omega \cdot I_1 - 11\Omega I_2 + 4\Omega I_3 + 9\Omega I_4 = -3V \ldots\ldots$ (0)

Para I_3

$-3\Omega \cdot I_3 - 5V + 4\Omega \cdot I_2 - 4\Omega I_3 - 2.2V = 0$

$\Rightarrow -7\Omega I_3 + 4\Omega \cdot I_2 = 7.2V \ldots\ldots$ (1)

Para I_4 podemos suponer que $I_4 = -4.5A \ldots\ldots$ (2)

ahora sustituyendo (2) en (0) ademas (3)

$-12\Omega(2A + I_2) - 11\Omega I_2 + 4\Omega I_3 + 9\Omega(-4.5A) = -3V$

$-24V - 12\Omega I_2 - 11\Omega I_2 + 4\Omega I_3 - 40.5V = -3V$

$\Rightarrow -23\Omega \cdot I_2 + 4\Omega I_3 = 61.5V \ldots\ldots$ (4)

Resolviendo el sistema de 2x2

$$\left(\begin{array}{cc|c} 4 & -7 & \frac{36}{5} \\ -23 & 4 & \frac{123}{2} \end{array}\right)\left(\tfrac{1}{4}\right) = \left(\begin{array}{cc|c} 1 & -\frac{7}{4} & \frac{9}{5} \\ -23 & 4 & \frac{123}{2} \end{array}\right)(23) = \left(\begin{array}{cc|c} 1 & -\frac{7}{4} & 9/5 \\ 0 & -\frac{145}{4} & \frac{1029}{10} \end{array}\right)$$

$$\left(\begin{array}{cc|c} 1 & -\frac{7}{4} & 9/5 \\ 0 & 1 & \frac{2058}{725} \end{array}\right)\left(\tfrac{7}{4}\right) = \left(\begin{array}{cc|c} 1 & 0 & 9813/1450 \\ 0 & 1 & \frac{2058}{725} \end{array}\right)$$

$\Rightarrow \quad I_2 = 6.7675$

$\quad\quad I_3 = 2.8386$

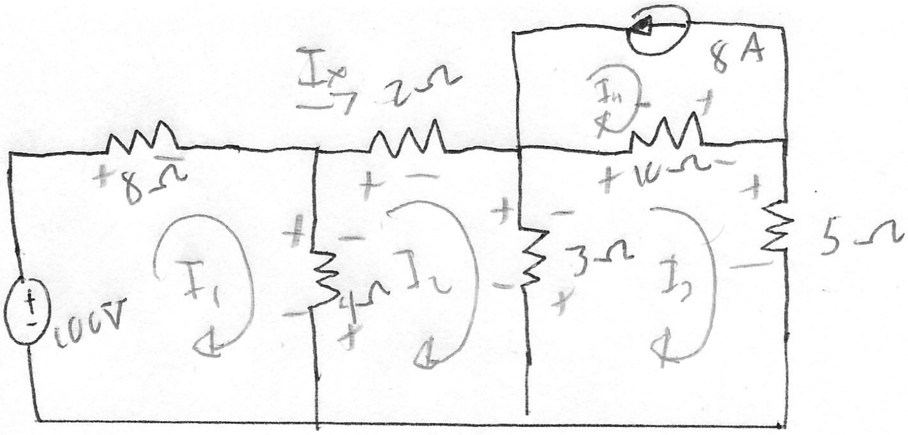
Para determinar la potencia de la fuente de 2.2 V

$P = (I) \cdot \bar{V}$

pero $\quad I = I_4 - I_3$

$P = (4.5A - 2.8386)(2.2v)$

$\boxed{P = 3.6550}$



Podemos suponer que $I_4 = -8A$ y. $I_x = I_2$

para I_1

$-8\Omega \cdot I_1 + 4\Omega I_2 - 4\Omega I_1 + 100V = 0$

$-12\Omega I_1 + 4\Omega I_2 = -100V$ 0

para I_2

$-2\Omega I_2 + 3\Omega I_3 - 3\Omega I_2 + 4\Omega I_1 - 4\Omega I_2 = 0$

$4\Omega I_1 - 9\Omega I_2 + 3\Omega I_3 = 0$ 1

Para I_3

$3\Omega I_2 - 3\Omega I_3 - 5\Omega I_3 - 10(I_3 + 8) = 0$

$3\Omega I_2 - 18\Omega I_3 = -80V$ 2

Resolviendo el sistema de 3x3

$$\left(\begin{array}{ccc|c} -12 & 4 & 0 & -100 \\ 4 & -9 & 3 & 0 \\ 0 & 3 & -18 & 80 \end{array}\right)\left(-\tfrac{1}{12}\right) = \left(\begin{array}{ccc|c} 1 & -\tfrac{1}{3} & 0 & \tfrac{25}{3} \\ 4 & -9 & 3 & 0 \\ 0 & 3 & -18 & 80 \end{array}\right)(-4) = \left(\begin{array}{ccc|c} 1 & -\tfrac{1}{3} & 0 & \tfrac{25}{3} \\ 0 & -\tfrac{23}{3} & 3 & -\tfrac{100}{3} \\ 0 & 3 & -18 & 80 \end{array}\right)$$

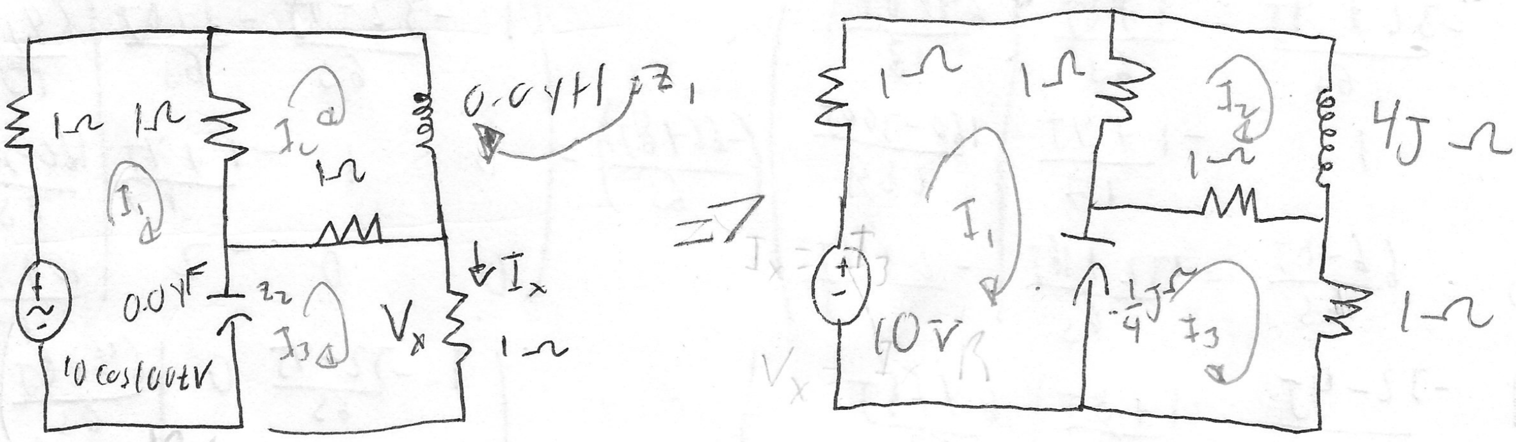
$$\left(\begin{array}{ccc|c} 1 & -\tfrac{1}{3} & 0 & \tfrac{25}{3} \\ 0 & 1 & -\tfrac{9}{23} & \tfrac{100}{23} \\ 0 & 3 & -18 & 80 \end{array}\right)(-3) = \left(\begin{array}{ccc|c} 1 & -\tfrac{1}{3} & 0 & \tfrac{25}{3} \\ 0 & 1 & -\tfrac{9}{23} & \tfrac{100}{23} \\ 0 & 0 & -\tfrac{387}{23} & \tfrac{1540}{23} \end{array}\right)\left(-\tfrac{23}{387}\right)$$

$$= \left(\begin{array}{ccc|c} 1 & -\frac{1}{3} & 0 & 25/3 \\ 0 & 1 & -\frac{9}{23} & 100/23 \\ 0 & 0 & 1 & \frac{1540}{387} \end{array}\right) \left(\frac{9}{23}\right) \Rightarrow \left(\begin{array}{ccc|c} 1 & -\frac{1}{3} & 0 & 25/3 \\ 0 & 1 & 0 & 120/43 \\ 0 & 0 & 1 & \frac{1540}{387} \end{array}\right)$$

$\Rightarrow I_2 = 2.7906$

Como $I_x = I_2$, entonces

$$\boxed{I_x = 2.7906}$$



$$Z_1 = 10^2(0.04H)J = 4J\,\Omega$$

$$I_x = I_3$$

$$Z_2 = -\frac{1}{10^2(0.04F)}J = -\frac{1}{4}J\,\Omega$$

$$(I_1)\quad -I_1 - I_1 + I_2 + \frac{1}{4}J I_1 - \frac{1}{4} I_3 J + 10 = 0$$

$$\Rightarrow \left(\frac{1}{4}J - 2\right) I_1 + I_2 - \frac{1}{4}J I_3 = -10$$

$$(I_2)\quad -4J I_2 - I_2 + I_3 - I_2 + I_1 = 0$$

$$\Rightarrow I_1 + (-2-4J) I_2 + I_3 = 0$$

$$(I_3)\quad -I_3 + \frac{1}{4}J I_3 - \frac{1}{4}J I_1 - I_3 + I_2 = 0$$

$$\Rightarrow -\frac{1}{4}J I_1 + I_2 + \left(\frac{1}{4}J - 2\right) I_3 = 0$$

$$\left(\begin{array}{ccc|c} \frac{-8+J}{4} & 1 & -\frac{J}{4} & -10 \\ 1 & -2-4J & 1 & 0 \\ -\frac{J}{4} & 1 & \frac{-8+J}{4} & 0 \end{array}\right) \left(\frac{-32-4J}{65}\right) = \left(\begin{array}{ccc|c} 1 & \frac{-32-4J}{65} & \frac{-1+8J}{65} & \frac{64+8J}{13} \\ 1 & -2-4J & 1 & 0 \\ -\frac{J}{4} & 1 & \frac{-8+J}{4} & 0 \end{array}\right)$$

$$= \left(\begin{array}{ccc|c} 1 & \frac{-32-4J}{65} & -\frac{1+8J}{65} & \frac{64+8J}{13} \\ 0 & -\frac{98-256J}{65} & \frac{66-8J}{65} & -\frac{64-8J}{13} \\ -\frac{J}{4} & 1 & \frac{-8+J}{4} & 0 \end{array}\right) \left(\frac{J}{4}\right) = \left(\begin{array}{ccc|c} 1 & \frac{-32-4J}{65} & \frac{-1+8J}{65} & \frac{64+8J}{13} \\ 0 & -\frac{98-256J}{65} & \frac{66-8J}{65} & -\frac{64-8J}{13} \\ 0 & \frac{66-8J}{65} & -\frac{132+16J}{65} & \frac{-2+16J}{13} \end{array}\right)$$

$$\left(\begin{array}{ccc|c} 1 & \frac{-32+4J}{65} & \frac{-1+8J}{65} & \frac{64+8J}{13} \\ 0 & 1 & \frac{-1+4J}{17} & \frac{160-300J}{289} \\ 0 & \frac{66-8J}{65} & \frac{-132+16J}{65} & \frac{-2+16J}{13} \end{array}\right) \left(\frac{-66+8J}{65}\right) = \left(\begin{array}{ccc|c} 1 & \frac{-32-4J}{65} & \frac{-1+8J}{65} & \frac{64+8J}{13} \\ 0 & 1 & \frac{-1+4J}{17} & \frac{160-300J}{289} \\ 0 & 0 & -2 & \frac{-10+40J}{17} \end{array}\right)$$

$$= \left(\begin{array}{ccc|c} 1 & \frac{-32-4J}{65} & \frac{-1+8J}{65} & \frac{64+8J}{65} \\ 0 & 1 & \frac{-1+4J}{17} & \frac{160-300J}{289} \\ 0 & 0 & 1 & \frac{5-20J}{17} \end{array}\right) \begin{array}{c} \left(\frac{1-4J}{17}\right) \\ \left(\frac{1-8J}{65}\right) \end{array} = \left(\begin{array}{ccc|c} 1 & \frac{-32-4J}{65} & 0 & \frac{64+8J}{65} \\ 0 & 1 & 0 & \frac{5-20J}{17} \\ 0 & 0 & 1 & \frac{5-20J}{17} \end{array}\right)$$

$$= \left(\begin{array}{ccc|c} 1 & 0 & 0 & 5 \\ 0 & 1 & 0 & \frac{5-20J}{17} \\ 0 & 0 & 1 & \frac{5-20J}{17} \end{array}\right)$$

$$\Rightarrow \boxed{I_x = I_3 = \frac{5-20J}{17}\,A = 0.294 - 1.1764J\ A}$$

$$I_x(t) = \frac{5\sqrt{17}}{17}\cos(100t - 75.963^\circ)\ A$$