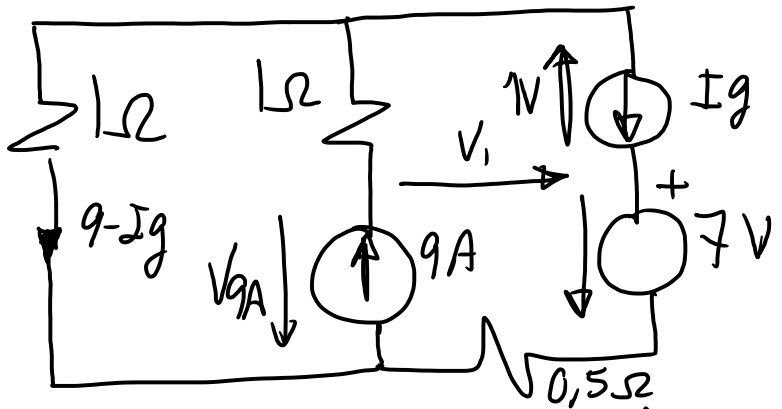
- EJERCICIO 1



LKT → $7 + 0{,}5Ig - 1(9-Ig) - 1 = 0 \Rightarrow \boxed{Ig = 2A}$

$V_1 = 9 \cdot 1 - 1 = 8V$

$\boxed{W = \frac{1}{2} 5(7)^2 + \frac{1}{2} 10(8)^2 + \frac{1}{2} 10(7)^2 = 687{,}5\ J}$

$\boxed{P_{Ig} = 1 \cdot I_S = 1 \cdot 2 = 2W}$ (generada)

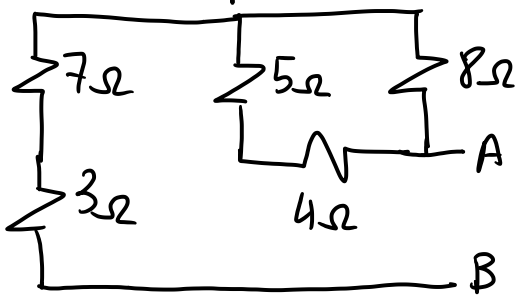
$V_{gA} = 1 \cdot 9 + 1 \cdot (9 - I_S) = 16V$

$\boxed{P_{gA} = V_{gA} \cdot 9 = 16 \cdot 9 = 144W}$ (generada)

$\boxed{P_{7V} = 7 \cdot 2 = 14W}$ (consumida)

- EJERCICIO 2

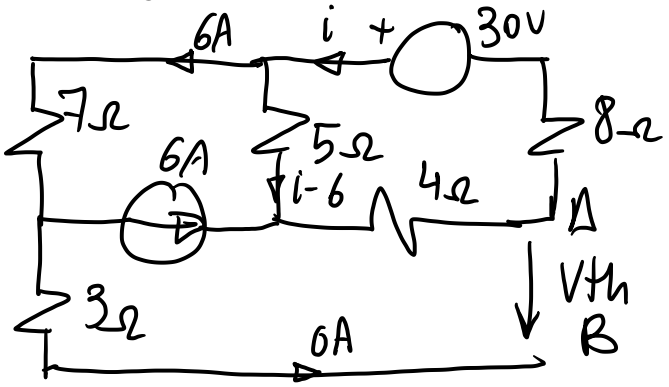
Para calcular la Resistencia Thevenin pasivamos las fuentes independientes



$R_{th} = 7 + 3 + 8 // (5+4) = 14{,}23\Omega$

$\boxed{R^{max} = R^{th} = 14{,}23\Omega}$

Calculamos la tensión Thevenin a c. abierto



LKT → $30 = 5(i-6) + 4i + 8i \Rightarrow i = 3{,}52A$

LKT → $V_{th} = -4i - 5(i-6) + 7 \cdot 6 \Rightarrow V_{th} = 40{,}23V$

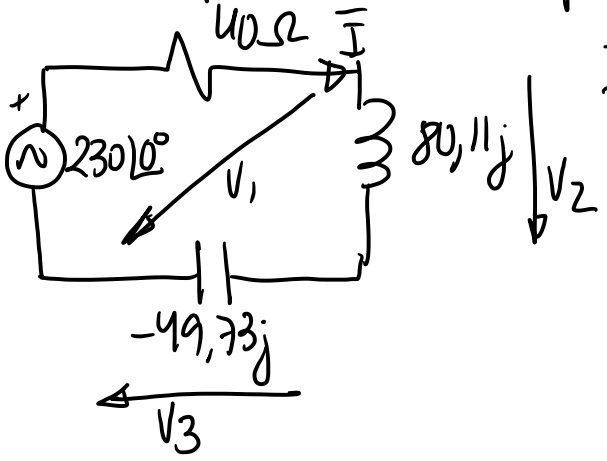
$p^{max} = \frac{V_{th}^2}{4R^{max}} = \frac{40{,}23^2}{4 \cdot 14{,}23} \Rightarrow \boxed{p^{max} = 28{,}44W}$

- EJERCICIO 3

$f = 50\ Hz \quad \omega = 2\pi f = 100\pi\ rad/s$

$Z_L = L\omega j = 25\sqrt{} \cdot 10^{-3} \cdot 100\pi j = 80{,}11j$

$Z_C = 1/C\omega j = 1/64 \cdot 10^{-6} \cdot 100\pi j = -49{,}73j$



$$\bar{I} = \frac{230|0^\circ}{40 + 80{,}11j - 49{,}73j} = 4{,}57|-37{,}27^\circ\ A$$

$\bar{V}_2 = 80{,}11j\,\bar{I} = 366{,}82|52{,}78^\circ\ V$

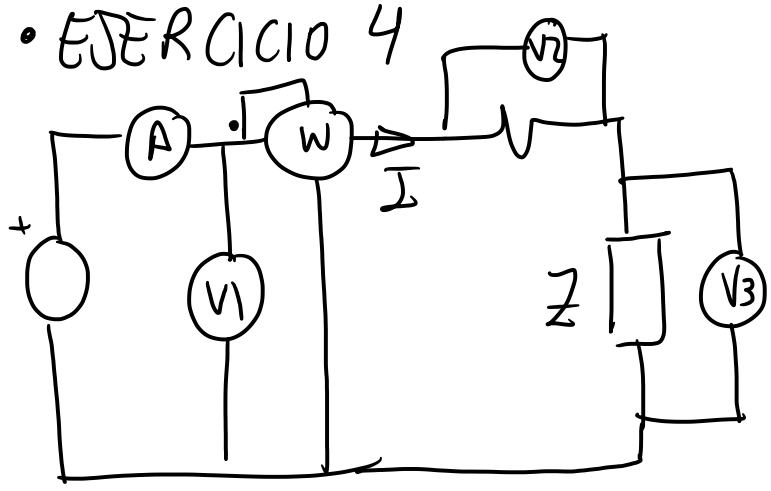
$\bar{V}_3 = -49{,}73\bar{I} = 227{,}71|-127{,}21^\circ\ V$

$\bar{V}_1 = \bar{V}_2 + \bar{V}_3 = 139{,}11|52{,}78^\circ\ V$

$\cos(-37{,}27^\circ) = 0{,}7957 \rightarrow$ inductivo

$W = 230 \cdot 4{,}57 \cdot 0{,}7957 = 836{,}45\ W$

- EJERCICIO 4



$P_S = 0{,}8S_S \Rightarrow \phi_S = 36{,}86^\circ$

$W = 230 \cdot 1{,}1 \cdot 0{,}8 = 202{,}4\ W$

$$C = \frac{P_g\ t_S\ 36{,}86}{2\pi 50 (230)^2} \Rightarrow C = 9{,}13\mu F$$

$\bar{I} = 1{,}1|0^\circ \quad \bar{V}_2 = 77|0^\circ \quad \bar{V}_1 = 230|36{,}86^\circ$

$\bar{V}_3 = \bar{V}_1 - \bar{V}_2 \Rightarrow \bar{V}_3 = 174{,}61|52{,}15^\circ$

$$Z = \frac{\bar{V}_3}{\bar{I}} = \frac{174{,}61|52{,}15^\circ}{1{,}1|0^\circ} \Rightarrow Z = 158{,}73|52{,}15^\circ = 97{,}81 + j\,125{,}40$$

• EJERCICIO 5

Carga 1: $P_1 = 4500W$ $\cos\phi_1 = 0,6$ (cap) $\Rightarrow Q_1 = -6000VAr$

Carga 2: $|I_2| = 10A$, $\cos\phi_2 = 0,55$ (ind)

$P_2 = \sqrt{3} \cdot 220 \cdot 10 \cdot 0,55 = 2095,78W$

$Q_2 = \sqrt{3} \cdot 220 \cdot 10 \cdot \text{sen}(\arccos 0,55) = 3182,40var$

Carga 3: $S_3 = 5200VA$, $\cos\phi_3 = 0,8$ (ind) $\Rightarrow P_3 = 4160W$, $Q_3 = 3120var$

$S_3 = \sqrt{3}|V_3||I_3| \Rightarrow |I_3| = \dfrac{\sqrt{200}}{\sqrt{3} \cdot 220} \Rightarrow \boxed{|I_3| = 13,64A}$

método de un vatímetro: $Q_3 = \sqrt{3} W_3 \Rightarrow \boxed{W_3 = 1801,33W}$

$P_{23} = P_2 + P_3 = 6255,78W$ $Q_{23} = Q_2 + Q_3 = 6302,4var$ $S_{23} = 8880,03VA$

$S_{23} = \sqrt{3} \cdot 220 \cdot |I_2| \Rightarrow \boxed{|I_2| = 23,30A}$

$V_4 = 1 \cdot |I_2| \Rightarrow \boxed{V_4 = 23,30V}$

$P_L = 3 \cdot 1 \cdot |I_2|^2 = 1629,23W$ $Q_L = 0 var$

$P_{23L} = 7885,01 W$ $Q_{23L} = Q_{23} = 6302,4Var$ $S_{23L} = 10094,2VA$

$S_{23L} = \sqrt{3} \cdot |V_2| \cdot |I_2| \Rightarrow \boxed{|V_2| = 250,12V}$ $U_1 = V_2$

$P_{123L} = 12385,01W$ $Q_{123L} = 302,4var$ $S_{123L} = 12388,7VA$

$S_{123L} = \sqrt{3} \cdot |V_2| \cdot |I_1| \Rightarrow \boxed{|I_1| = 28,59A}$

$$\left.\begin{array}{l} P_{123L} = W_1 + W_2 \\ Q_{123L} = \sqrt{3}(W_2 - W_1) \end{array}\right\} \Rightarrow \begin{cases} W_1 = 6105,2W \\ W_2 = 6279,8W \end{cases}$$