PARCIAL ENERO 2025

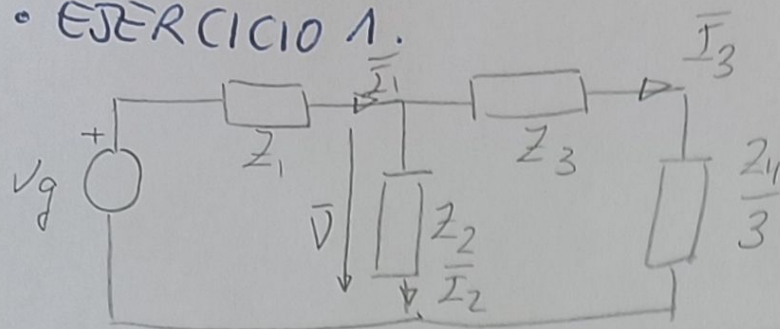## • EJERCICIO 1.

$\bar{I}_3 = 10\sqrt{3} \angle 0° \; A$

$\bar{V} = \left(Z_3 + \dfrac{Z_4}{3} \right) \bar{I}_3 = 10\sqrt{3}(4+7j) \; V = 139,64 \angle 60,25 \; V$

$\bar{S}_2(\text{trifásica}) = 1\omega + 400j$ $\qquad \bar{S}_2(\text{monofásica}) = \dfrac{1\omega}{3} + \dfrac{400}{3}j \; VA$

$\bar{S}_2(\text{mon}) = \dfrac{|V|^2}{Z_2^*} \Rightarrow Z_2 = \dfrac{3(189,64)^2}{1\omega - 400j} \Rightarrow Z_2 = 34,41 + 137,64j \; \Omega$

$\bar{I}_3 = \bar{I}_1 \dfrac{Z_2}{Z_2 + Z_3 + \frac{Z_4}{3}} \Rightarrow \bar{I}_1 = \dfrac{\bar{I}_3 \left(Z_2 + Z_3 + \frac{Z_4}{3} \right)}{Z_2} = 18,27 - 0,27j \; A = 18,27 \angle -0,84 \; A$

$\bar{V}_g = \bar{Z}_1 \bar{I}_1 + \bar{V} = (1+2j) \; 18,27 \angle -0,84 + 139,64 \angle 60,25 = 180,46 \angle 60,78° \; V$

$\boxed{A = 18,27 A} \quad \boxed{V_1 = 312,56 V} \quad \boxed{V_2 = 241,86 V}$

$Z_{eq} = Z_1 + (Z_2) \| (Z_3 + Z_4/3) = 4,69 + 8,69j. \quad Y_{eq} = 0,0481 - 0,08907j$

$\omega C^\lambda = 0,08907 \Rightarrow C^\lambda = 283,51 \mu F. \quad \boxed{C^\Delta = 94,506 \mu F}$

• EJERCICIO 2

Secuencia directa porque $w_2 > 0$ y la carga es inductiva.

$\boxed{W_4 = W_1 = 500 W.}$

$P_C = 3W_1 = 1500 \; W.$ $\qquad Q_C = \sqrt{3} \; W_2 = 1732,05 \; var.$

Coloco W_5 en fase b tal que W_3 y W_5 forman método 2 vatímetros.

$W_3 + W_5 = 1500 \Rightarrow W_5 = 1500 - W_3$

$(W_3 - W_5)\sqrt{3} = 1732,05 \Rightarrow (2W_3 - 1500)\sqrt{3} = 1732,05 \Rightarrow \boxed{W_3 = 1250 W}$

• EJERCICIO 3

Módulo de Z: $|Z| = \dfrac{|V_L|/\sqrt{3}}{|I_L|} = 3,464$

$\left.\begin{array}{l} \\ \end{array}\right\} Z = 3,464 \angle 22,17° \; \Omega$

Ángulo de Z: $W = |V_L| \cdot |I_L| \cdot \cos(\theta + 30) \Rightarrow \theta = 22,17°$

Cuando el interruptor se abre:

$\boxed{V = 150 V}$

$\bar{I} = \dfrac{150 \angle 30°}{2 \cdot Z} = 21,67 \angle 52,17° \rightarrow \boxed{A = 21,67 A}$

$W = 150 \cdot 21,67 \cdot \cos(-30 - 52,17) \Rightarrow \boxed{W = 442,83 W}$