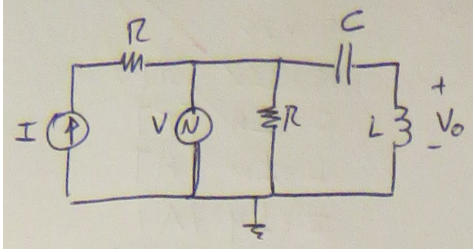
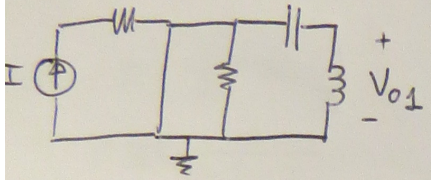
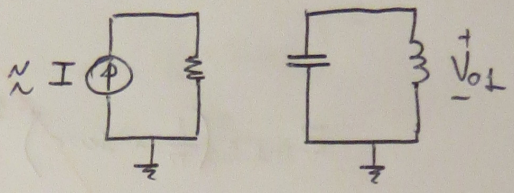
PREGUNTA 1



SUPERPOSICIÓN!

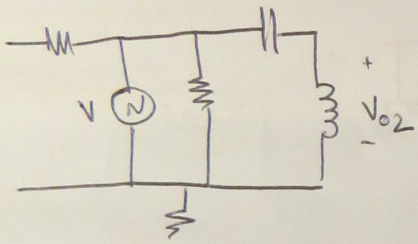
(I)

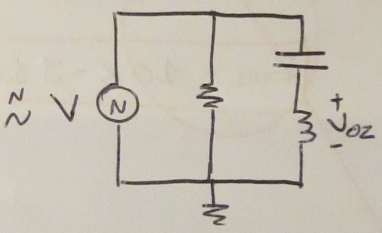




$\Rightarrow$ $\boxed{V_{o1} = 0}$

(V)





$\Rightarrow$

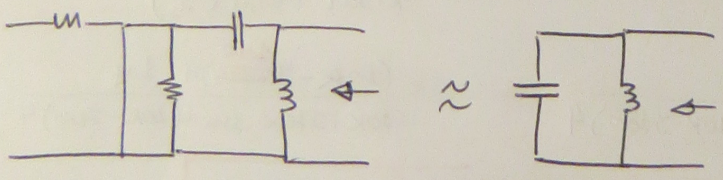
$$V_{o2} = \frac{j\omega L}{j\omega L + \frac{1}{j\omega C}} V$$

$$\boxed{V_{o2} = \frac{-V\omega^2 LC}{1-\omega^2 LC}}$$

$$\therefore \quad V_{TH} = V_{o1} + V_{o2} = -\frac{V\omega^2 LC}{1-\omega^2 LC}$$

$$\boxed{V_{TH} = -\frac{V\omega^2 LC}{1-\omega^2 LC}}$$

PARA Z_{TH}



$$Z_{TH} = \frac{1}{j\omega C} /\!/ j\omega L$$

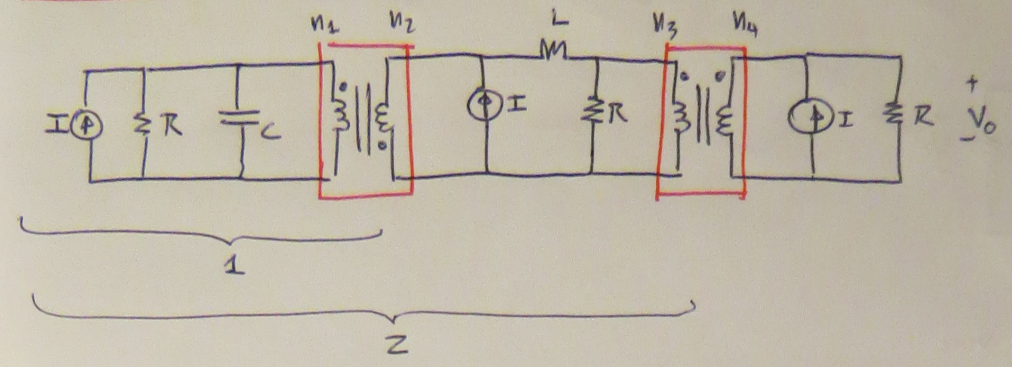
$$= \left(j\omega C + \frac{1}{j\omega L}\right)^{-1}$$

$$= \left(\frac{1-\omega^2 LC}{j\omega L}\right)^{-1}$$

$$\boxed{Z_{TH} = \frac{j\omega L}{1-\omega^2 LC}}$$

$$\Rightarrow \boxed{Z_{MAX} = -\frac{j\omega L}{1-\omega^2 LC}}$$

PREGUNTA 3



$n_1 = 10$ $n_2 = 20$
$n_3 = 10$ $n_4 = 25$
$R = 10K$ $C = 1n$
$L = 1m$ $I = 1A$
$\omega = 1000$

THEVENIN (1)

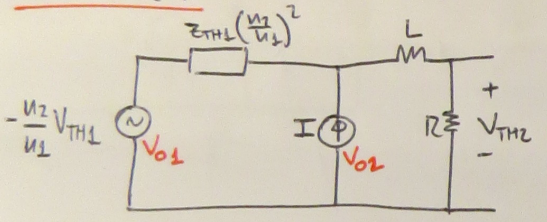
$$V_{TH1} = I\left(\frac{1}{R} + j\omega C\right)^{-1} = I\frac{R}{1+j\omega RC} = \frac{1A \cdot 10K}{1 + j1000 \cdot 10K \cdot 1n}$$

$$Z_{TH1} = \left(\frac{1}{R} + j\omega C\right)^{-1} = \frac{R}{1+j\omega RC} = \frac{10K}{1 + j1000 \cdot 10K \cdot 1n}$$

$$V_{TH1} = 10m - j0.1m \ [V] = 10m \angle -0.57 \ [V]$$

$$Z_{TH1} = 10K - j100 \ [\Omega] = 10K \angle -0.57 \ [\Omega]$$

THEVENIN (2)



$$V_{o1} = -\frac{n_2}{n_1} V_{TH1} \frac{R}{R + j\omega L + Z_{TH1}\left(\frac{n_2}{n_1}\right)^2} = -\frac{20}{10}(10m \angle -0.57)\frac{10K}{10K + j + (10K - j100)4}$$

$$V_{o1} = -4m + j8A \ [V] = 4m \angle 179.9 \ [V]$$

$$V_{o2} = \frac{Z_{TH1}\left(\frac{n_2}{n_1}\right)^2 I}{R + j\omega L + Z_{TH1}\left(\frac{n_2}{n_1}\right)^2} R = \frac{(10K \angle -0.57)4 \cdot 1A}{10K + j + (10K \angle -0.57)4} 10K$$

$$V_{o2} = 8m - j10A \ [V] = 8m \angle -0.07 \ [V]$$

$$\Rightarrow V_{TH2} = V_{o1} + V_{o2} = -4m + j7A = 4m \angle 179.9$$

$$V_{TH2} = 4m - j2.8A \ [V] = 4m \angle -0.04 \ [V]$$

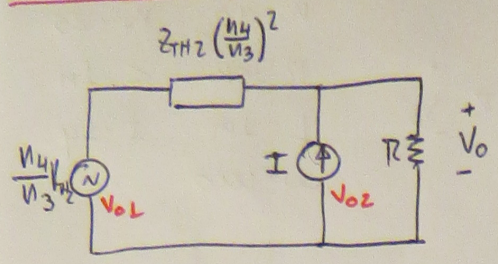
$$Z_{TH2} = R \,//\, j\omega L + Z_{TH1}\left(\frac{n_2}{n_1}\right)^2 = \left(\frac{1}{R} + \frac{1}{j\omega L + Z_{TH1}\left(\frac{n_2}{n_1}\right)^2}\right)^{-1}$$

$$\Vert$$

$$Z_{TH2} = \left(\frac{1}{10K} + \frac{1}{j + (10K \angle -0.57)4}\right)^{-1}$$

$$Z_{TH2} = 8K - j15.88 \ [\Omega] = 8K \angle -0.11 \ [\Omega]$$

THEVENIN FINAL



$$V_{o1} = \frac{R}{Z_{TH2}\left(\frac{n_4}{n_3}\right)^2 + R} \frac{n_4}{n_3} V_{TH2}$$

$$= \frac{10k}{(8k\angle -0.11)\left(\frac{2.5}{10}\right)^2 + 10k} \frac{2.5}{10} (4m\angle \cancel{179.9}\ -0.04)$$

$$V_{o1} = \cancel{-1.67m + j247m} \quad \rightarrow \quad 1.67m + j1.54 \ [V]$$
$$= \cancel{1.67m\angle 179.99} \quad 1.67m\angle 0.05 \ [V]$$

$$V_{o2} = \frac{Z_{TH2}\left(\frac{n_4}{n_3}\right)^2}{Z_{TH2}\left(\frac{n_4}{n_3}\right)^2 + R} IR$$

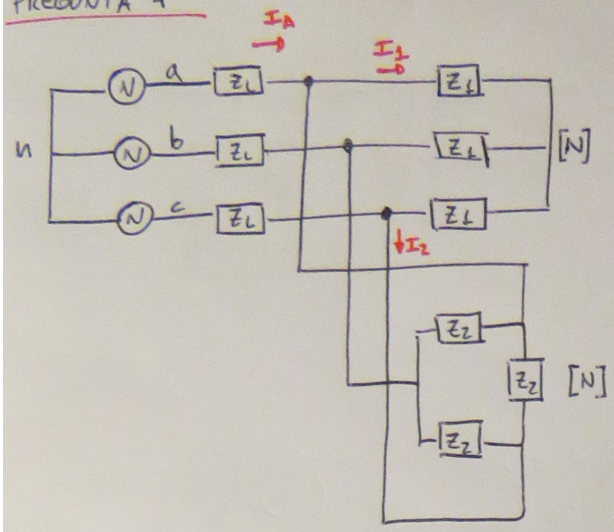
$$= \frac{(8k\angle -0.11)\,2.5^2}{(8k\angle -0.11)2.5^2 + 10k} 1_4\, 10k$$

$$V_{o2} = 8.3m - j2.67_4 \ [V]$$
$$= 8.3m\angle -0.018 \ [V]$$

$$V_o = V_{o1} + V_{o2}$$

$$V_o = 9.97m - j1.15_4 \ [V]$$
$$= 9.97m\angle -6.6m \ [V]$$
$$9.97m\angle -0.0066 \ [V]$$

PREGUNTA 4



$\dot{V}_{ab} = 380\angle 0$

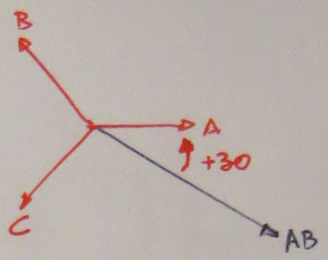
$Z_L = 0.1 + J0.5$

$Z_1 = 10 + J5$

$Z_2 = 30 + J15$

SECUENCIA NEGATIVA

TRIFÁSICO BALANCEADO



$\dot{V}_{ab} \rightarrow \dot{V}_{an} = 220\angle 30$

$Z_q = Z_1 // \frac{1}{3} Z_2 = 5 + J2.5$

$Z_T = Z_L + Z_q = 5.1 + J3$

$\dot{V}_{an} = 220\angle 30$

$\Rightarrow I_A = \frac{\dot{V}_{an}}{Z_T} = \frac{220\angle 30}{5.1+J3}$

$I_A = 37.18 - J0.3$

$= 37.18\angle -0.47$ [A]

$\therefore I_1 = 18.59 - J(0.15+0.15)$

$I_1 = 18.59 - J$

$I_1 = 18.59\angle -0.47$ [A]

$\rightarrow I_2 = 18.59\angle -120.47$ [A]

$\rightarrow \dot{V}_{Nn} = 0$ [V]

$Fdp = \cos(\phi_v - \phi_i)$

$= \cos(30 + 0.47)$

$Fdp = 0.862$

$S_{3\phi} = 3\dot{V}_{an} I_A^*$

$= 3(220\angle 30)(37.18\angle 0.47)$

$S_{3\phi} = 21149.86 + J12443.31$

$= 21.15K + J12.44K$

$S_{3\phi} = 21.15K$ [W] $+ J\,12.44K$ [VAr]