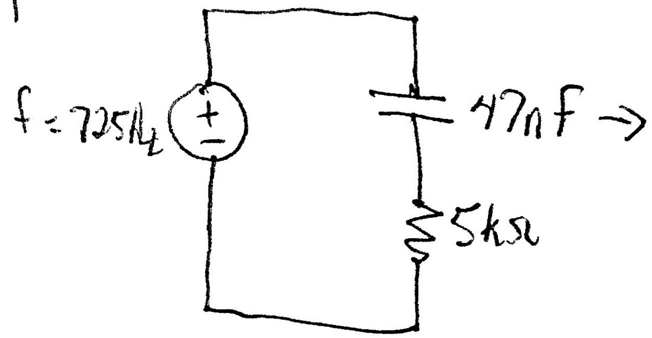
#1



$$\frac{1}{j\omega C} = -j4670\ \Omega$$

$\omega = 2\pi f = 4555$ rad/s

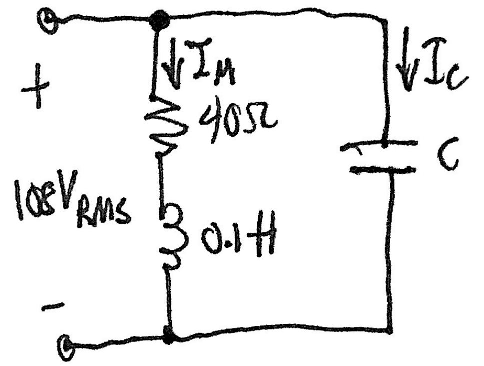
como están en serie la corriente es la misma

$|V_C| < |V_R|$

$Z = 5000 - j4670\ \Omega = 6842 \angle -43.04^{\circ}\ \Omega$

forma rectangular   forma polar

2



pf = 1.0 f = 60Hz

$$I_M = \frac{108}{R + j\omega L} = \frac{108}{40 + j37.7} = 1.43 - j1.35\ A$$

$$= 1.96 \angle -43.30^\circ\ A$$

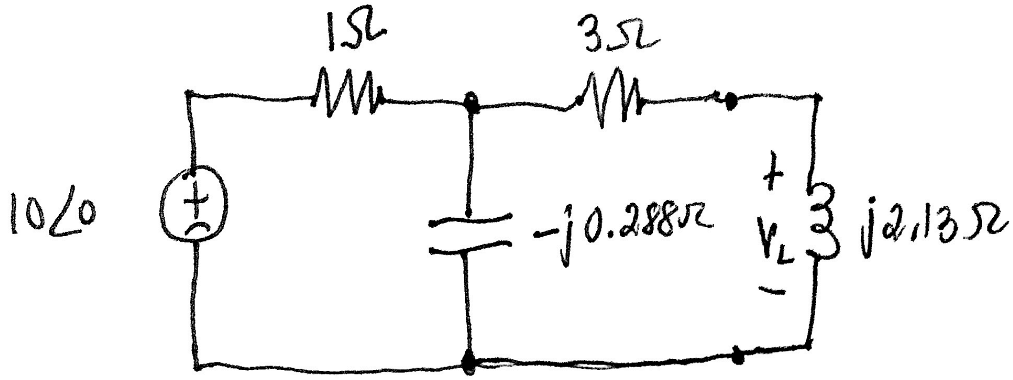
la corriente del capacitor debe cancelar la corriente imaginaria $-j1.35A$

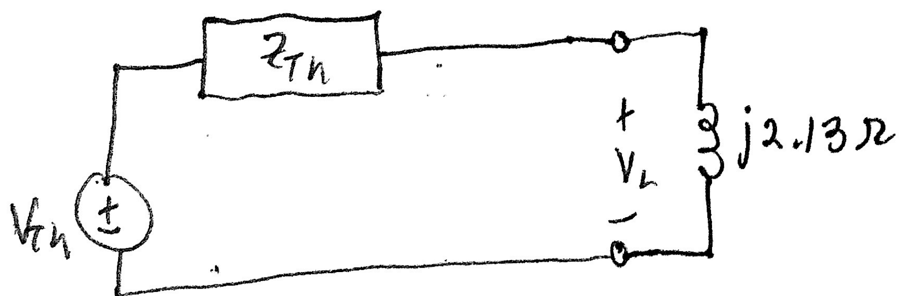
$$I_c = +j1.35A = j\omega C V_c$$

$$C = \frac{I_c}{j\omega V_c} = \frac{j1.35}{j(377)(108)} = 3.32 \times 10^{-5} F$$

$\underline{C = 0.033\ mF}$ para pf = 1.0

3





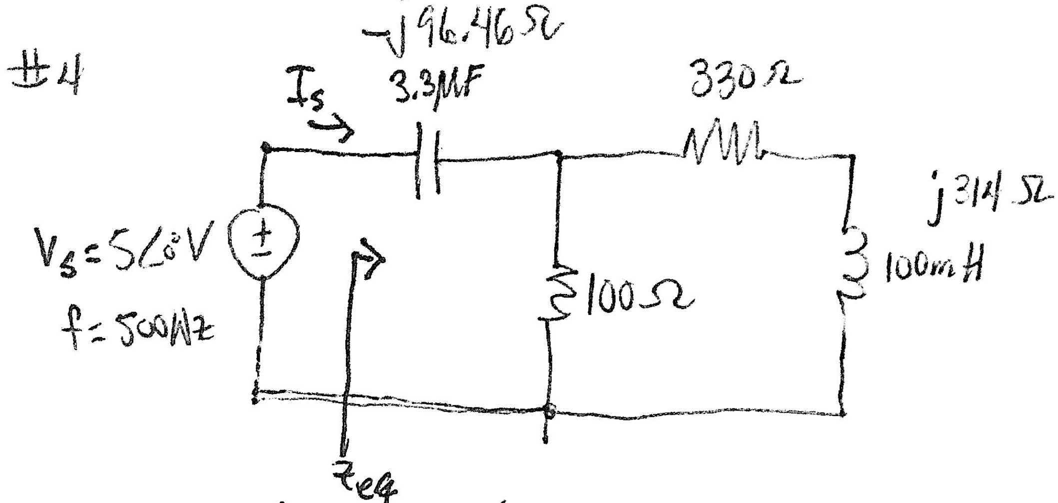
$Z_{Th} = 3.08 - j0.266\,\Omega = 3 + 1 \| (-j0.288)$

$$V_{Th} = \frac{10(-j0.288)}{1 - j0.288} = 2.77 \angle -73.93^\circ\, V$$

$$V_L = \frac{V_{Th}\,(j2.13)}{3.08 + j1.86} = \underline{\underline{1.64 \angle -15.06^\circ\ V}}$$

$V_{L_{RMS}} = 1.16\, V_{RMS} \angle -15.06^\circ$

#4



$\omega = 2\pi f = 3142$ rad/s

$$I_s = \frac{V_s}{Z_{eq}}$$

$$S = V_s I_s^* = V_s \left(\frac{V_s}{Z_{eq}}\right)^*$$

$$= \frac{V_s V_s^*}{Z_{eq}^*} = \frac{|V_s|^2}{Z_{eq}^*}$$

$|V_s| = 5$

$$Z_{eq} = -j96.46 + \frac{(100)(330+j314)}{100+330+j314}$$

$$= 80.28 - j82.06 = 114.8\angle -45.63^\circ$$

$$Z_{eq}^* = 114.8\angle 45.63^\circ$$

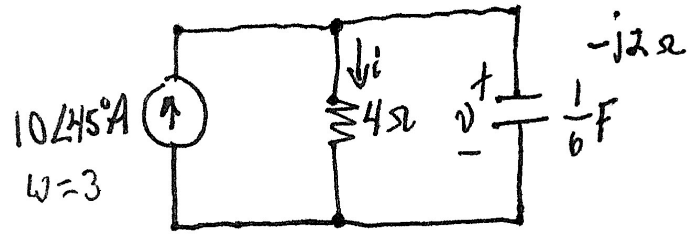
$$S = \frac{25}{114.8\angle 45.63^\circ} = 0.218\angle -45.63^\circ \text{ VA}$$

$$= \underset{(W)}{(0.152} \; \underset{(VAR)}{-j0.156)} \text{ VA}$$

#5 9.31

$$\frac{1}{j\omega C} = \frac{1}{j(3)(\frac{1}{6})} = -j2$$

a)

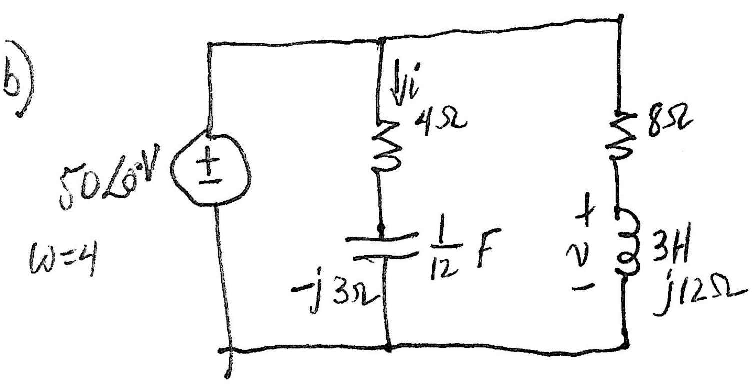


$$i = \frac{(10\angle 45°)(-j2)}{4-j2} = 4.47\angle -18.43° A$$

$$i(t) = 4.47\cos(3t - 18.43°) A$$

$$v(t) = i(t)(4) = 17.89\cos(3t - 18.43°) V$$

b)



$$\frac{1}{j\omega C} = \frac{1}{j(4)(\frac{1}{12})} = -j3 \qquad j\omega L = j(4)(3) = j12$$

$$i = \frac{50}{4-j3} = 10\angle 36.87° A$$

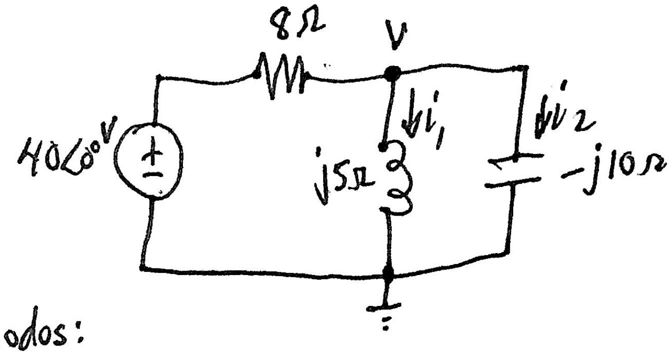
$$i(t) = 10\cos(4t + 36.87°) A$$

$$v = \frac{(50)(j12)}{8+j12} = 41.60\angle 33.69° V$$

$$v(t) = 41.60\cos(4t + 33.69°) V$$

#6

9.32 $f = 60Hz$



nodos:

$$V: \quad 0 = V\left(\frac{1}{j5} + \frac{1}{-j10}\right) - 40\left(\frac{1}{8}\right) \quad + \frac{1}{8})$$

$$V = \frac{5}{\frac{1}{8} + \frac{1}{j5} + \frac{1}{-j10}} = 31.23 \angle 38.66^\circ$$

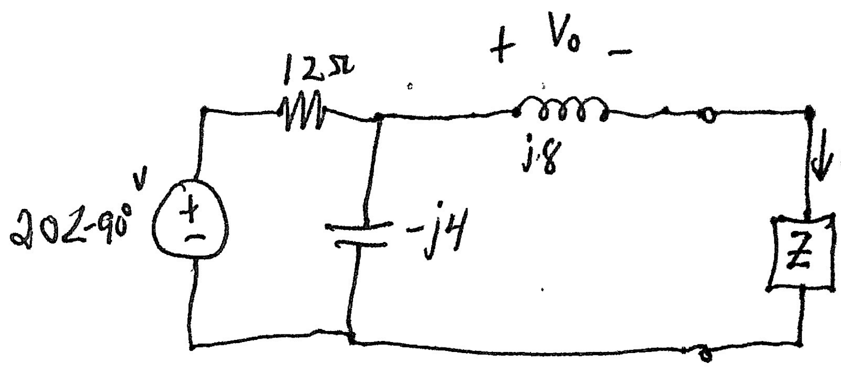
$$i_1 = \frac{V}{j5} = 6.25 \angle -51.34^\circ \qquad i_2 = \frac{V}{-j10} = 3.12 \angle 128.66^\circ$$

$\omega = 377 = 120\pi$

$i_1(t) = 6.25 \cos(377t - 51.34^\circ)$ A

$i_2(t) = 3.12 \cos(377t + 128.66^\circ)$ A

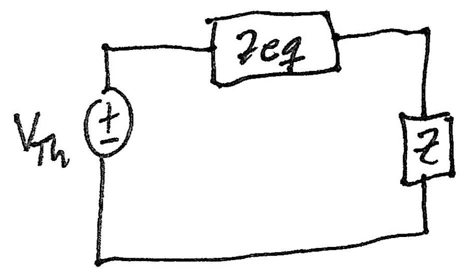
#7



$$i = \frac{V_o}{j8} = 0.5\angle -90^\circ \text{ A}$$

$$V_{Th} = \frac{(20\angle -90^\circ)(-j4)}{12-j4} = 6.32\angle -161.57^\circ \text{ V}$$

$$Z_{eq} = j8 + 12 \| (-j4) = 4.56\angle 74.74^\circ\ \Omega$$



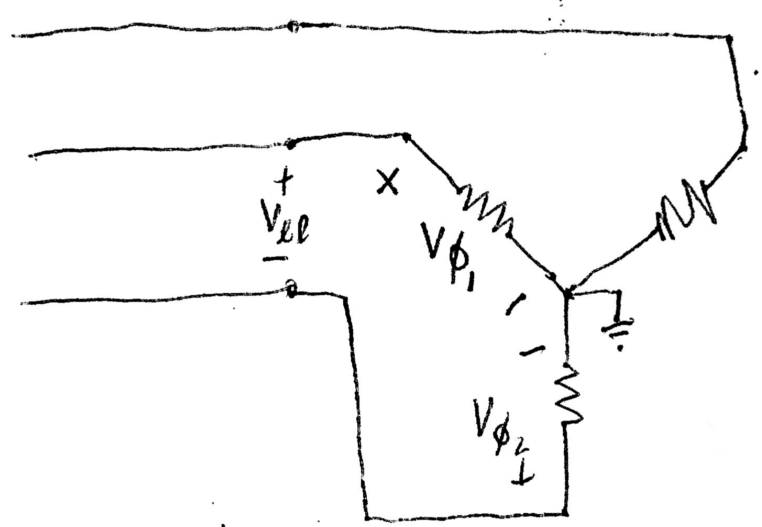
$$i = \frac{V_{Th}}{Z+Z_{eq}} \qquad Z+Z_{eq} = \frac{V_{Th}}{i} \qquad Z = \frac{V_{Th}}{i} - Z_{eq}$$

$$Z = \frac{6.32\angle -161.57^\circ}{0.5\angle -90^\circ} - 4.56\angle 74.74$$

$$= 16.63\angle -80.31^\circ\ \Omega$$

#8

Si el circuito está conectado en Y



Los Voltajes de fase V_{ϕ_1} y V_{ϕ_2} están fuera de fase por 120° y su suma es el voltaje de linea a linea.

$$V_{LL} = V_{\phi_1} - V_{\phi_2}$$

$$208\angle{+30^\circ} = 120\angle{0^\circ} - 120\angle{-120^\circ}$$

#9

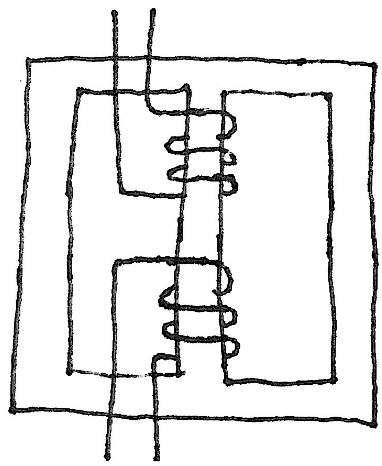
Si es un circuito balanceado y esta en Y se puede determinar la potencia de una fase y ese resultado multiplicar por 3.

$$S_{3\phi} = 3 S_{1\phi}$$

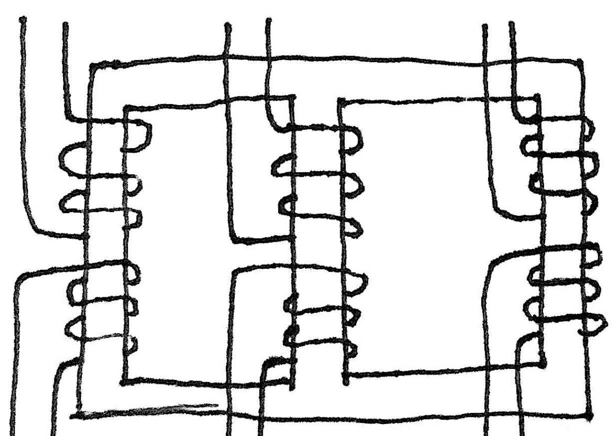
#10

la diferencia esta en el # de embobinados.

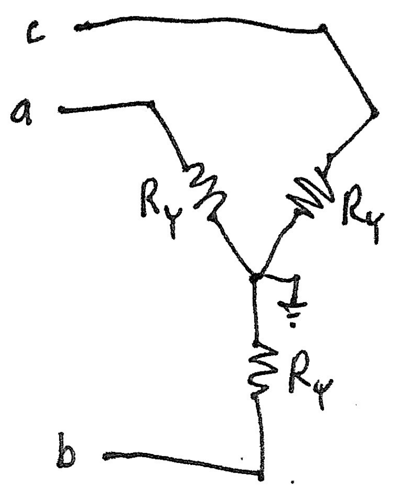
transformadores monofásicos solo tienen dos embobinados en el nucleo.



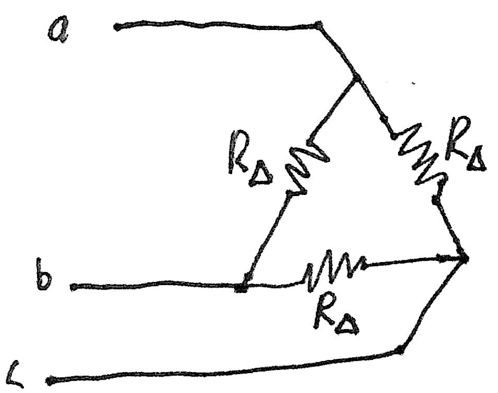
transformadores trifásicos tiene seis embobinados en el nucleo.



#11



conección en Y



conección en Δ

entre a y b tenemos en Y $R_Y + R_Y$

en Δ $R_\Delta \| (R_\Delta + R_\Delta)$

$$2R_Y = \frac{R_\Delta(2R_\Delta)}{R_\Delta + 2R_\Delta} = \frac{2R_\Delta^2}{3R_\Delta} = \frac{2}{3}R_\Delta$$

$$\boxed{R_Y = \frac{1}{3}R_\Delta}$$