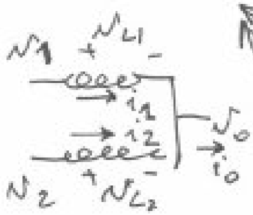
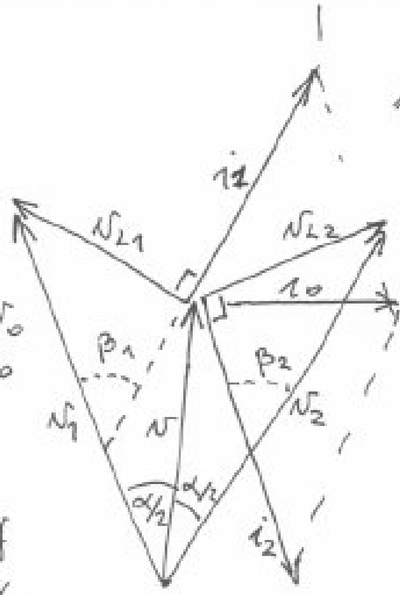
a)





SOLO HAY REACTIVA A FREC DE RED.
SE CONSIDERARA SOLO PRIMER ARMONICO.

POR SIMETRIA $|v_{L1}| = |v_{L2}|$

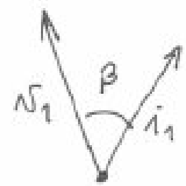
$\Rightarrow |i_1| = |i_2|$

POR SIMETRIA $\beta_1 = \beta_2 = \beta$

$\omega = 2\pi f$

$\omega T_0 = \alpha$

$T = \dfrac{1}{f}$



$P_1 = P > 0$

$Q_1 = Q$

$P_2 = -P < 0$

$Q_2 = Q$

b)

$$v_2(t) = v_1(t - T_0)$$

$$\left\| \begin{array}{l} v_0(n) = 0 \quad \forall\, n \neq 1 \\ v_0(1) = v \end{array} \right.$$

$$i_1(n) = \frac{v_1(n) - v_0(n)}{L\omega n j} \qquad i_2(n) = \frac{v_2(n) - v_0(n)}{L\omega n j}$$

LUEGO $\quad i_0(n) = i_1(n) + i_2(n) \quad \Rightarrow$

$$i_0(n) = \frac{v_1(n) + v_2(n) - 2\, v_0(n)}{L\omega n j}$$

$$v_2(n) = v_1(n)\, e^{-j 2\pi n f T_0}$$

$$i_0(n) = \frac{v_1(n)\left(1 + e^{-j2\pi n f T_0}\right) - 2\, v_0(n)}{L\omega n j}$$

Si quiero $i_0(5) = 0$ como $v_0(5) = 0 \Rightarrow$

$$\left(1 + e^{-j2\pi n f T_0}\right) = 0 \Rightarrow 2\pi n f T_0 \Big|_{n=5} = \pi \Rightarrow T_0 = \frac{T}{10}$$

$$\alpha = \frac{2\pi}{10} \ (36°)$$

c)