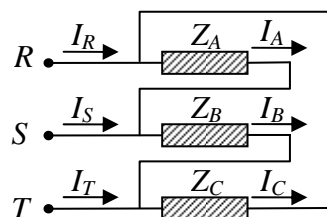


Coloquio Diciembre 2005
65.04 – Electrotecnia General “B”

- 1) Cargas $Z_A = 10 \angle 45^\circ \Omega$, $Z_B = 10 \angle 60^\circ \Omega$, $Z_C = 10 \angle -30^\circ \Omega$.

- a) Calcular S_A , S_B , S_C y S_{TTC} .
 b) Calcular S_R , S_S , S_T y S_{TTG} .
 c) Comparar (a) y (b).



Generadores: $U_{RO} = 173 \angle 90^\circ \text{ V}$, $U_{SO} = 173 \angle -30^\circ \text{ V}$, $U_{TO} = 173 \angle 210^\circ \text{ V}$.

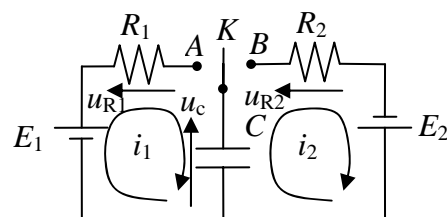
- 2) $E_1 = 100 \text{ V}$, $E_2 = 200 \text{ V}$, $R_1 = 200 \Omega$, $R_2 = 100 \Omega$

$t \leq 0$: $u_c = 0$

$t = 0$: $K \rightarrow A$

$t = 20 \text{ ms}$: $K \rightarrow B$

Hallar y representar u_{R1} , u_{R2} , u_c , i $0 \leq t \leq 70 \text{ ms}$



- 3) (Componentes simétricas): Encontrar las componentes de directa, inversa y homopolar (U_{R1} , U_{R2} , U_{R0})

Sistema generador: $U_R = 200 \angle 90^\circ \text{ V}$, $U_S = 300 \angle 0^\circ \text{ V}$, $U_T = 400 \angle 225^\circ \text{ V}$.

$$\begin{aligned}
1) \quad S_A &= 9000 \angle 45^\circ \text{ VA} \\
S_B &= 9000 \angle 60^\circ \text{ VA} \\
S_C &= 9000 \angle -30^\circ \text{ VA} \\
S_{TTC} &= 21.000 \angle 25,37^\circ \text{ VA}
\end{aligned}$$

$$\begin{aligned}
S_R &= 10.300 \angle 7,5^\circ \text{ VA} \\
S_S &= 9600 \angle 52,5^\circ \text{ VA} \\
S_T &= 2690 \angle 15^\circ \text{ VA} \\
S_{TTG} &= 21.000 \angle 25,37^\circ \text{ VA}
\end{aligned}$$

$$\begin{aligned}
2) \quad i_1(t) &= \frac{E_1}{R_1} \exp\left(-\frac{t}{\tau_1}\right) \quad 0 \leq t \leq 20 \text{ ms} \quad \text{con } \tau_1 = R_1 C. \\
i_2(t) &= \frac{-E_2 - U_1}{R_2} \exp\left(\frac{t_1 - t}{\tau_2}\right) \quad 20 \text{ ms} (t_1) \leq t \leq 70 \text{ ms} \quad \text{con } \tau_2 = R_2 C.
\end{aligned}$$

$$\text{Obs.: } U_1 = u_c(20\text{ms}) = E_1 \left[1 - \exp\left(-\frac{20\text{ms}}{\tau_1}\right) \right].$$

$$u_c = \begin{cases} E_1 \left[1 - \exp\left(-\frac{t}{\tau_1}\right) \right] & (0 \leq t \leq 20\text{ms}) \\ -E_2 + (E_2 + U_1) \cdot \exp\left(\frac{t_1 - t}{\tau_2}\right) & (20\text{ms} \leq t \leq 70\text{ms}) \end{cases}$$

$$u_{R1}(t) = E_1 \cdot \exp\left(-\frac{t}{\tau_1}\right) \quad 0 \leq t \leq 20 \text{ ms} \quad \text{con } \tau_1 = R_1 C.$$

$$u_{R2}(t) = (-E_2 - U_1) \cdot \exp\left(\frac{t_1 - t}{\tau_2}\right) \quad 20 \text{ ms} (t_1) \leq t \leq 70 \text{ ms} \quad \text{con } \tau_2 = R_2 C.$$

3) Usando el operador $\alpha = \exp[-j 2\pi/3]$ se puede despejar el sistema y resulta:

$$U_{RH} = 1/3 \cdot (U_R + U_S + U_T) \quad \rightarrow \quad \boxed{U_{RH} = 28,2 \angle -78,3^\circ \text{ V}}$$

$$U_{RI} = 1/3 \cdot (U_R + \alpha U_S + \alpha^2 U_T) \quad \rightarrow \quad \boxed{U_{RI} = 95,77 \angle -34,6^\circ \text{ V}}$$

$$U_{RD} = 1/3 \cdot (U_R + \alpha^2 U_S + \alpha U_T) \quad \rightarrow \quad \boxed{U_{RD} = 294,45 \angle 106,7^\circ \text{ V}}$$