Trabajo a Nivel 13,8 kV

$$\bar{U}_p = 155 \times \frac{13,8}{150} = 14260 \text{ kV}$$

Generador

$$\bar{x}_{gs} = 0,15j \cdot \frac{13,8^2}{50} = 0,5713\,j$$

$$\bar{x}_{go} = \bar{x}_{gs}$$

$$\bar{x}_{go} = 0,06j \cdot \frac{13,8^2}{50} = 0,2285\,j$$

Trafos

$$\bar{x}_{ps} = 0,07j \cdot \frac{13,8^2}{50} = 0,2667j\ (\Omega) \qquad \bar{x}_p = 0,2285j\ (\Omega)$$

$$\bar{x}_{pt} = 0,15j \cdot \frac{13,8^2}{50} = 0,5713j\ (\Omega) \qquad \bar{x}_s = 0,0381j\ (\Omega)$$

$$\bar{x}_{st} = 0,1j \cdot \frac{13,8^2}{50} = 0,3809j\ (\Omega) \qquad \bar{x}_t = 0,3428j\ (\Omega)$$

Condensadores

$$\bar{z}_c = \frac{1}{2j \cdot \pi \cdot 50 \cdot 0,5 \times 10^{-3}} = -6,366\,j\ (\Omega)$$

Línea:

$$\bar{z}_{LS} = 0,85j \times \left(\frac{13,8}{150}\right)^2 = 0,0072\,j\ (\Omega)$$

$$\bar{z}_{Lo} = 2j \cdot \left(\frac{13,8}{150}\right)^2 = 0,0169\,j\ (\Omega)$$

Reactancia Neutro

$$\bar{x}_t = 1j\ (\Omega)$$

Carga:

$$40j \cdot \left(\frac{13,8}{60}\right)^2 = 2,116\,j\ (\Omega)$$

Corrientes antes del defecto

$$\bar{I}_{odg} = \frac{U_p/\sqrt{3}}{\left[\bar{z}_{LS} + \bar{x}_p + (\bar{x}_s + \bar{z}) \,\|\, (\bar{x}_t + \bar{z}_c)\right]} = -2294j\ (A)$$

$$\bar{I}_{odc} = \bar{I}_{odg} \cdot \frac{(\bar{x}_s + \bar{z})}{(\bar{x}_{st} + z + z_c)} = 1277\,j\ (A)$$

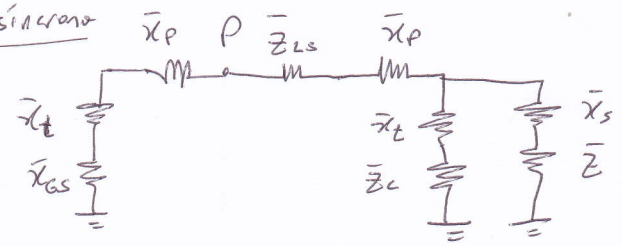
Tensiones previas

$$\bar{V}_{odg} = \bar{I}_{odg} \cdot \left[\bar{x}_{pt} + \bar{z}_{LS} + \bar{x}_p + (\bar{x}_s + \bar{z}) \,\|\, (x_t + z_c)\right] = 9544\ (V)$$

$$\bar{V}_{odc} = \bar{I}_{odc} \cdot \bar{z}_c = 8130\ (V)$$

Trabajo a nivel 150 kV

Redes de secuencia síncrona y asíncrona

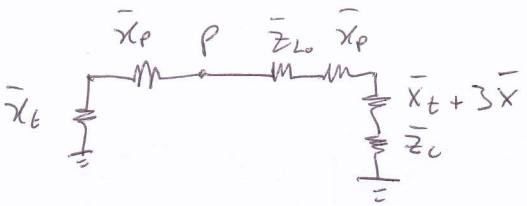


$\bar{Z}_s = \bar{Z}_a$

$$\bar{Z}_s = \bar{Z}_a = (x_{pt} + x_{GS}) \,//\, \left[\bar{x}_p + \bar{Z}_{LS} + (\bar{x}_t + z_c) // (\bar{x}_s + \bar{z}) \right] = 0{,}8667\,j \ (\Omega)$$

$$\bar{f}_{dg} = \frac{\bar{Z}_s}{\bar{x}_{GS} + \bar{x}_{pt}} = 0{,}7585 \quad ; \quad \bar{f}_{dc} = \frac{(1 - f_{dg}) \cdot \left[(x_t + z_c) // (\bar{z} + \bar{x}_s) \right]}{\bar{x}_t + \bar{z}_c} = -0{,}1344$$

Red de secuencia cero



$$\bar{Z}_o = (x_{pt}) \,//\, (\bar{z}_{Lo} + \bar{x}_{pt} + 3\bar{x} + \bar{z}_c) = 0{,}7192\,j \ (\Omega)$$

$$\bar{f}_{hg} = 0 \quad ; \quad \bar{f}_{hc} = \frac{\bar{Z}_o}{\bar{Z}_{Lo} + x_{pt} + 3\bar{x} + z_c} = -0{,}2589$$

CC 1FT

$$\bar{I}_d = \bar{I}_i = \bar{I}_h = \frac{\bar{U}_p / \sqrt{3}}{\bar{Z}_s + \bar{Z}_a + \bar{Z}_o} = -3357\,j \ (A)$$

Por G:

$$\bar{I}_{dg} = \bar{I}_d \cdot \bar{f}_{dg} + \bar{I}_{odg} = -4840\,j \ (A)$$

$$\bar{I}_{ig} = -\bar{I}_i \cdot \bar{f}_{dg} = 2546\,j \ (A)$$

$$\bar{I}_{hg} = 0$$

Por C: sentido de neutro hacia P

$$\bar{I}_{dc} = \bar{I}_d \cdot \bar{f}_{dc} - \bar{I}_{odc} = -8258\,j \ (A)$$

$$\bar{I}_{ic} = \bar{I}_i \cdot \bar{f}_{dc} = 4513\,j \ (A)$$

$$\bar{I}_{hc} = \bar{I}_h \cdot \bar{f}_{hc} = 869{,}1 \ (A)$$

Tensión en G:

$$\bar{U}_{dg} = -\bar{I}_d \cdot \bar{f}_{dg} \cdot \bar{x}_{GS} + \bar{U}_{odg} = 8089 \ (V)$$

$$\bar{U}_{ig} = \bar{I}_i \cdot \bar{f}_{ig} \cdot \bar{x}_{GS} = 1455 \ (V)$$

$$\bar{U}_{hg} = 0$$

Tensión en C:

$$\bar{U}_{dc} = -\bar{I}_d \cdot \bar{f}_{dc} \cdot \bar{z}_c + \bar{U}_{odc} = 5257 \ (V)$$

$$\bar{U}_{ic} = -\bar{I}_i \cdot \bar{f}_{ic} \cdot \bar{z}_c = -2873 \ (V)$$

$$\bar{U}_{hc} = -\bar{I}_h \cdot \bar{f}_{hc} \cdot \bar{z}_c = -5533 \ (V)$$

$$\bar{S}_G = 3 \cdot \bar{U}_{dg} \cdot \hat{\bar{I}}_{dg} + 3\bar{U}_{ig} \cdot \hat{\bar{I}}_{ig} = 106{,}3 \ MVAr$$

$$\bar{S}_C = 3 \cdot \bar{U}_{dc} \hat{\bar{I}}_{dc} + 3\bar{U}_{ic} \cdot \hat{\bar{I}}_{ic} + 3\bar{U}_{hc} \cdot \hat{\bar{I}}_{hc} = 31{,}34 \ MVAr$$