

$$\textcircled{2} \quad \textcircled{a} \quad \sqrt{\bar{S}_1} = \sqrt{3} \cdot U_B \cdot \hat{I}_1 = \sqrt{3} \cdot U_B \cdot \frac{\hat{U}_B}{\sqrt{3} \hat{Z}_1} = \frac{U_B^2}{\hat{Z}_1} = \frac{(156 \times 10^3)^2}{R_1 + \hat{X}_{T1}} = 5,4 + 0,27j \text{ (MVA)}$$

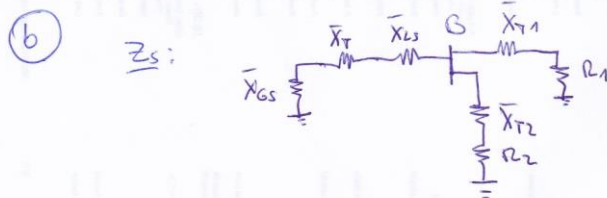
$$\bar{X}_{T1} = 0,106j \cdot \frac{150^2}{6} = 225j \text{ (}\Omega\text{)}$$

$$R_1 = \frac{595}{3} \times \frac{150^2}{31,5^2} = 4497$$

$$\sqrt{\bar{S}_2} = \frac{(156 \times 10^3)^2}{R_2 + \hat{X}_{T2}} = 4,32 + 0,173j \text{ (MVA)}$$

$$R_2 = 248 \times \frac{150^2}{31,5^2} = 5624 \Omega$$

$$P_G = 5,4 + 4,32 = 9,72 \text{ MW}$$



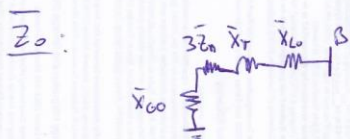
$$\bar{X}_{cs} = 0,15j \cdot \frac{150^2}{10} = 337,5j \text{ (}\Omega\text{)}$$

$$\bar{X}_T = 0,08j \cdot \frac{150^2}{10} = 180j \text{ (}\Omega\text{)}$$

$$\bar{Z}_s = (\bar{X}_{T1} + R_1) \parallel (\bar{X}_{T2} + R_2) \parallel (\bar{X}_{cs} + \bar{X}_T + \bar{X}_{LS}) = \frac{1}{\frac{1}{4497 + 225j} + \frac{1}{5624 + 225j} + \frac{1}{337,5j + 180j}}$$

$$\bar{Z}_s = 101 + 492j \text{ (}\Omega\text{)}$$

$$\hat{f}_d = \frac{101 + 492j}{\bar{X}_{cs} + \bar{X}_T + \bar{X}_{LS}} = \frac{101 + 492j}{518j} = 0,95 - 0,195j$$



$$\bar{Z}_n = 1j \cdot \frac{150^2}{13,8^2} = 118j \text{ (}\Omega\text{)}$$

$$\bar{X}_{co} = 0,05j \cdot \frac{150^2}{10} = 112,5j \text{ (}\Omega\text{)}$$

$$\bar{Z}_o = (\bar{X}_{co} + \bar{Z}_n + \bar{X}_T + \bar{X}_{Lo}) = 647j \text{ (}\Omega\text{)}$$

② Corriente por G antes del defecto

$$\bar{I}_{adg} = \frac{156/\sqrt{3} \text{ v} \cdot 10^3}{4437 + j225} + \frac{1}{5624 + j225} = 36 - 1,64j \text{ (A)}$$

Tensión en bornas del generador previo al defecto

$$\bar{U}_{adg} = \frac{156000}{\sqrt{3}} + \bar{I}_{adg} \cdot (\bar{X}_T + \bar{X}_{LS}) = 89471 + 6484j \text{ (V)}$$

$$\bar{I}_{Fallo} = \frac{156000/\sqrt{3}}{2 \cdot \bar{Z}_S + \bar{Z}_0} = 6,72 - 54,4j \text{ (A)}$$

Corriente por el generador

$$\bar{I}_{gd} = \bar{I}_{adg} + \bar{f}_d \cdot \bar{I}_{Fallo} = 31,8 - 54,6j \text{ (A)}$$

$$\bar{I}_{gi} = \bar{f}_d \cdot \bar{I}_{Fallo} = -4,2 - 53j \text{ (A)}$$

$$\bar{I}_{gh} = \bar{f}_0 \cdot \bar{I}_{Fallo} = 6,7 - 54,4j \text{ (A)}$$

Tensión en bornas del generador

$$\bar{U}_{gd} = \bar{U}_{adg} - \bar{I}_{gd} \cdot \bar{X}_{GS} = 72474 + 7895j \text{ (V)}$$

$$\bar{U}_{gi} = -\bar{I}_{gi} \cdot \bar{X}_{GS} = -17890 + 1418j \text{ (V)}$$

$$\bar{U}_{gh} = -\bar{I}_{gh} \cdot \bar{X}_{G0} = -6117 - 756j \text{ (V)}$$

$$\bar{S}_G = 3 \cdot \bar{U}_{gd} \cdot \hat{\bar{I}}_{gd} + 3 \bar{U}_{gi} \cdot \hat{\bar{I}}_{gi} + 3 \bar{U}_{gh} \cdot \hat{\bar{I}}_{gh} = 5,61 + 8,76j \text{ (MVA)}$$