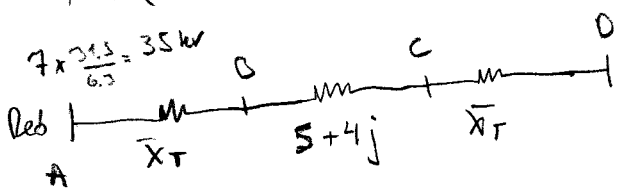
Problema 1

Nivel 31,5 kV



$P_D = 5$ MW

$Q_D = 5 \cdot Tg(\arccos 0,8) = 3,75$ MVAr

$$\bar{X}_T = 0,08 \times \frac{31,5^2}{10} j = 7,938\,j$$

U_D:

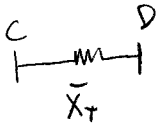
$$U_A^2 = U_D^2 + \frac{Z^2}{U_D^2} \cdot (P_D^2 + Q_D^2) + 2 \cdot [P_D \cos\varphi + Q_D \operatorname{sen}\varphi]$$

$$\bar{Z} = 5 + 4j + 2\bar{X}_T = 5 + 19,88\,j = 20,5 \angle 75,88^\circ \ (\Omega)$$

U_D = 31,77 kV ✓

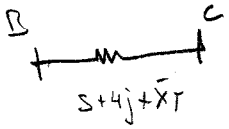
4,032 kV ✗

U_C:



$$U_C = \left| U_D + \frac{\bar{X}_T}{U_D} \cdot \hat{S}_D \right| = 32,73 \text{ kV}$$

U_B:

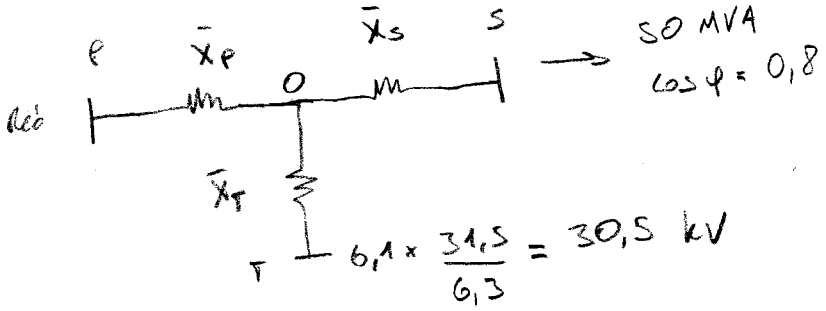


$$U_B = \left| U_D + \frac{(5+4j+\bar{X}_T)}{U_D} \cdot \hat{S}_D \right| = 33,99 \text{ kV}$$

$$\Delta U_{BC} = 33,99 - 32,73 = 1,26 \text{ kV} \checkmark$$

Problema 2

Nivel 31,5 kV



$P_S = 50 \times 0,8 = 40$ MW

$Q_S = 50 \times \text{sen}(\text{Arccos } 0,8) = 30$ MVAr

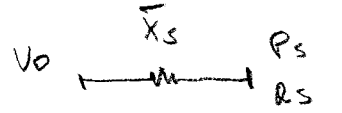
$U_O = U_T = 30,5$ kV

$\bar{X}_{PS} = 0,11 \times \frac{31,5^2}{120} j = 0,9096\,j$ (Ω)

$\bar{X}_{PT} = 0,35 \times \frac{31,5^2}{120} j = 2,894\,j$ (Ω)

$\bar{X}_{ST} = 0,25 \times \frac{31,5^2}{120} j = 2,067\,j$ (Ω)

$\bar{X}_P = 0,8683\,j$ $\quad \bar{X}_S = 0,0413$



$$U_O^2 = U_S^2 + \frac{X_S^2}{U_S^2} \cdot \left(P_S^2 + Q_S^2\right) + 2 X_S Q_S$$

$U_S = 30,46$ kV

$0,678$ kV ✗

$\bar{S}_P = \bar{S}_S + \frac{\bar{X}_S}{U_S^2} \cdot S_S^2 = 40 + 32,45j$ (MVA)

$40 + 4977j$ (MVA) ✗