# fonctionnement des lignes

4 - $R_T = 0{,}25 \times 100 = 25\ \Omega$

$X_{LT} = 0{,}9 \times 100 = 90\ \Omega$

$B_T = 4 \times 10^{-4} \times 100 = 14 \times 10^{-4}$ S

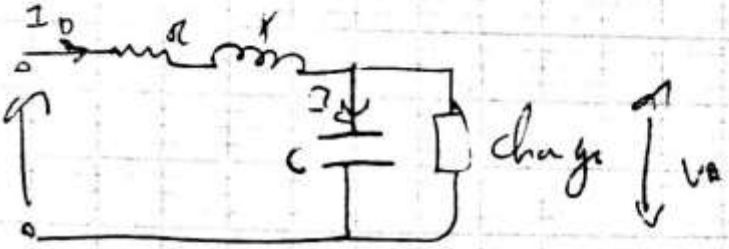
$V_A = 66$ kV

$$I_A = \frac{15000 \times 10^3}{66 \times 10^3 \times 0{,}9} = 252{,}48\ A$$

$\cos \varphi_A = 0{,}9 \rightarrow \sin \varphi_A = 0{,}6$

$\bar{V}_A = V_A + j0 = 66000$ V ; $\bar{I}_A = I_A (\cos \varphi_A - j \sin \varphi_A)$

$= 284 (0{,}9 - j\,0{,}1) = 227 - j\,120$ A




$\bar{I}_C = jB_C V_A = j\,92$ A

$\bar{I}_D = \bar{I}_A + \bar{I}_C = 227 - j\,28$

$I_D = 240$ A

$\Delta V = \bar{I}_D \bar{Z} = 11{,}915 + j\,16{,}21$

$\bar{V}_D = V_A + \bar{I}_D Z = 77{,}915 + j\,16{,}210$

$V_D = 79583$ V

Régulation $= \frac{V_D - V_A}{V_A} 100 = 20,58\ \%$

$\varphi_1 = \tan^{-1}(-78/227) = -18,96°$

$\varphi_2 = \tan^{-1}\left(\frac{16\,40}{719\,\Omega}\right) = 11,50°$

$\varphi_D = 18,96 + 11,50 = 30,46°$

$\cos \varphi_D = 0,86$ en retard

$\bar{V}_1 = \bar{V}_A + \bar{I}_A \frac{\bar{Z}}{2}$

$\bar{I}_c = j\omega C \bar{V}_1 = 2\pi f C \bar{V}_1$

$\bar{I}_D = \bar{I}_A + \bar{I}_c$

$\bar{V}_D = \bar{V}_1 + \bar{I}_D \frac{\bar{Z}}{2}$

II) courant de ligne $I = \frac{P_A}{\sqrt{3} V_L \cos \varphi}$

$= \frac{1\,500 \times 10^3}{\sqrt{3} \cdot 32 \cdot 10^3 \cdot 0,8} = 82\ A$

pertes = 5% de $P_A = 1\,500\,00 \times 0,05 = 7500\ kW$

pertes $= 3 I^2 R = 7500$

$R = \frac{7500}{3 \times 82^2} = 37,18\ \Omega$

Distance = 37,18 Km

R/Km = 1 Ω