

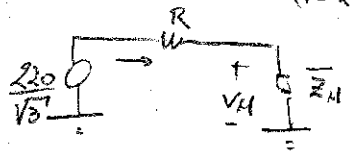
Problema 2

1)  $\bar{Z}_a = \frac{25\sqrt{3}}{50} \angle \arccos\left(\frac{1600}{\sqrt{3} \times 25 \times 50}\right) = 0,29 \angle 42,3^\circ = (0,21 + j 0,19) \Omega$

$R_1 = 0,16 \Omega$     $R_{2c} = 0,05 \Omega$     $X_1 + X_{2c} = 0,19 \Omega$

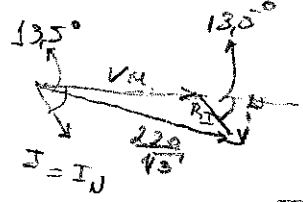
$30 \times 10^3 = \frac{U_N^2}{R_{2c}} \cdot \frac{1}{\cos^2 \phi} \Rightarrow \cos \phi = 0,032 \Rightarrow \bar{I}_{2cN} = \frac{220/\sqrt{3}}{0,05} \times 0,032 = 84,3 A$

$\bar{I}_0 = 20 \angle -\arccos\left(\frac{800}{\sqrt{3} \times 220 \times 20}\right) = 20 \angle -84^\circ = (1 - j 19,9) A \Rightarrow \boxed{\bar{I}_N = 86 \angle -13,5^\circ} \quad \boxed{\cos \phi_N =}$



$R = \frac{100}{59 \times 35} = 0,05 \Omega$

$\frac{220}{\sqrt{3}} \angle \phi = R \cdot \bar{I} + \bar{V}_M$

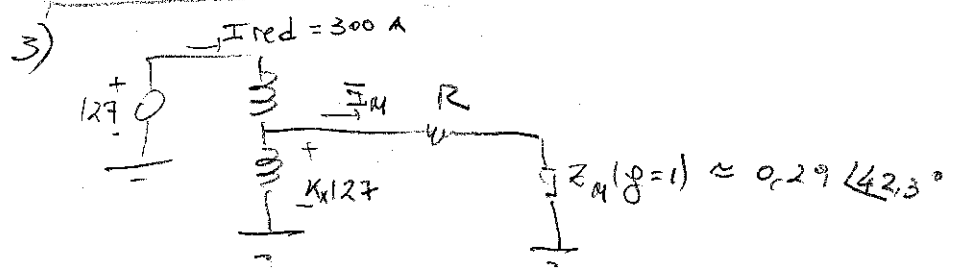


$\bar{V}_M = \sqrt{\left(\frac{220}{\sqrt{3}}\right)^2 - (R \bar{I}_N \sin \phi)^2} - R \bar{I}_N \cos \phi = 122,8 V \Rightarrow \boxed{U_M = 212,4 V} \neq$

2)  $\bar{Z}_M(y=1) = \bar{Z}_0 // \bar{Z}_a$     $\bar{I}_{Ar} = \frac{127}{R + (\bar{Z}_0 // \bar{Z}_a)}$     $\bar{Z}_0 = \frac{127}{20} \angle 89 = 6,35 \angle 84^\circ$   
 $\bar{Z}_a = 0,29 \angle 42,3^\circ$   
 $\bar{Z}_0 // \bar{Z}_a = \frac{1}{\frac{1}{6,35 \angle 84} + \frac{1}{0,29 \angle 42,3}} \approx 0,29 \angle 42,3^\circ$   
 $\Rightarrow \bar{I}_{Ar} = \frac{127}{0,05 + 0,19 \angle 42,3} = \frac{127}{0,26 + j 0,19} = \frac{127}{0,32 \angle 36,4}$

$\frac{397}{86} = 4,6$     $\hookrightarrow$  La protection opera.

$\Rightarrow \boxed{I_{Ar} = 397 A}$



$\bar{I}_M = \frac{127}{0,05 + 0,29 \angle 42,3}$     $397 \angle -36,4$   
 $I_{red} = K I_M \Rightarrow K = \sqrt{\frac{300}{397}}$   
 $\boxed{K = 87\%} \quad \boxed{I_M = 345,4 \angle -36,4}$

4)  $U_M \approx \sqrt{3} \cdot \sqrt{\left(\frac{0,07 \times 220}{\sqrt{3}}\right)^2 - \left(0,05 \times 345,4 \sin 36,4\right)^2} - \sqrt{3} \times 0,05 \times 345,4 \cos 36,4 = 166 V$   
 $\approx 190 V$     $\approx 24 V$

$C_{ArN} = 220^2 \times K$   
 $C_{Ar} = 166^2 \times K \Rightarrow \boxed{\frac{C_{Ar}}{C_{ArN}} = 0,57}$

*h2*