

# Problemas 3

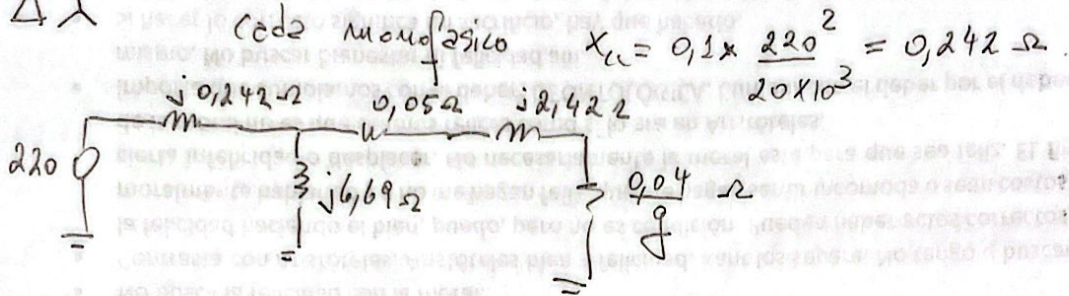
IF 07/2023

1)  $\bar{Z}_a = \frac{36/\sqrt{3}}{805} \angle \arccos \frac{1745}{\sqrt{3} \times 36 \times 805} = 0,1258 \angle 69,6^\circ = (0,09 + j0,242) \Omega$

$R_s = \frac{0,15}{3} = 0,05 \Omega \Rightarrow R_{2e} = 0,04 \Omega \quad X_1 + X_{2e} = 0,242 \Omega$

$\bar{Z}_0 = jX_0 \quad X_0 = \frac{440/\sqrt{3}}{38} = 6,69 \Omega$

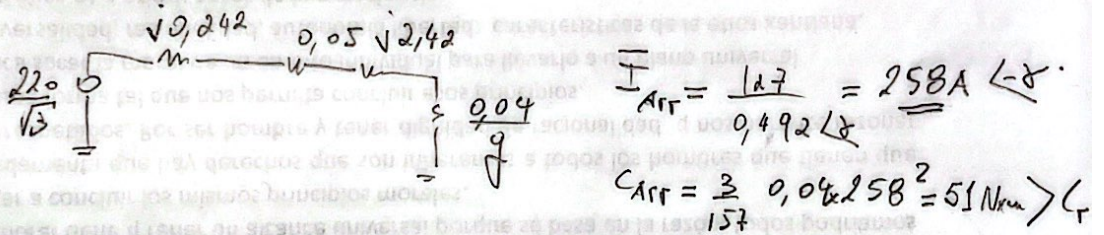
T)  $\Delta/\Delta$



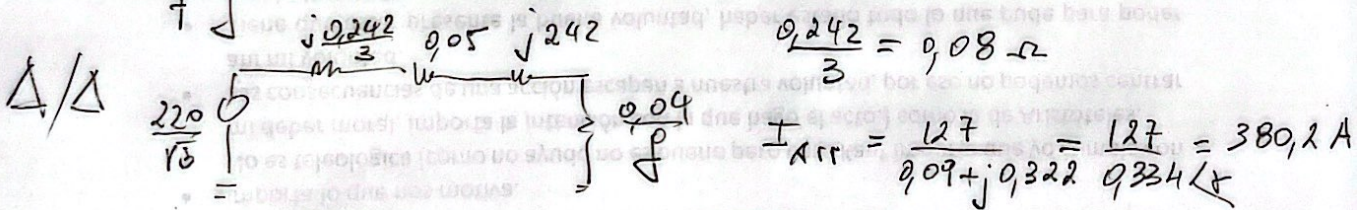
2)  $I_{Arr} = \frac{220}{0,09 + j4,84} = \frac{220}{0,492 \angle 79,47^\circ} = 447 \angle -79,47^\circ \text{ A}$

$C_{Arr} = \frac{3}{157} \times 0,04 \times 447^2 = 53 \text{ Nm} > C_r \Rightarrow \text{Arranca.}$

3)  $\Delta/\Delta$

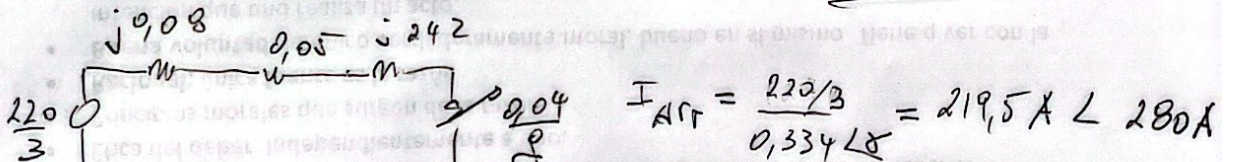


Em esta configuração arranca  $I_{Arr} < 280 \text{ A} \Rightarrow$  Solução  
 outras configurações



$\Rightarrow I_{Arr} > 280 \text{ A} \Rightarrow$  No serve.

$\Delta/\Delta$

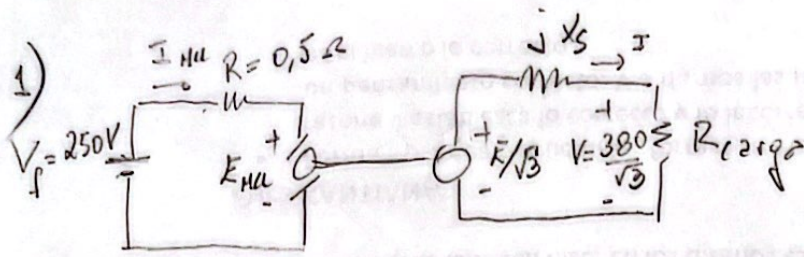


$C_{Arr} = \frac{3}{157} \times 0,04 \times 219,5^2 = 36,8 \text{ Nm}$

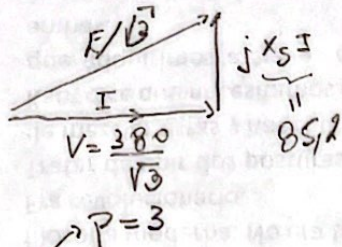
$C_{Arr} < C_r \Rightarrow$  No Arranca

# Problema 2

IE 20/07/2023



$$x_s = 0,4 \times \frac{400^2}{40 \times 10^3} = 1,6 \Omega$$



$$P = \sqrt{3} \times 380 \times I = 35 \times 10^3$$

$$I = \frac{35 \times 10^3}{\sqrt{3} \times 380} = 53,2 \text{ A}$$

$$E = \sqrt{3} \times \sqrt{(380/\sqrt{3})^2 + 0,5^2} = \sqrt{3} \times 235,6 = 407,6$$

$$f = 50 \text{ Hz} \Rightarrow M_s = 1000 \text{ rpm} \Rightarrow E = \frac{1000 \times 100}{450} i = 133,3 i \Rightarrow \underline{i = 3,1 \text{ A}}$$

$$E_{Mca} I_{Mca} = 35 \times 10^3 \quad I_{Mca} = \frac{250 - E_{Mca}}{0,45}$$

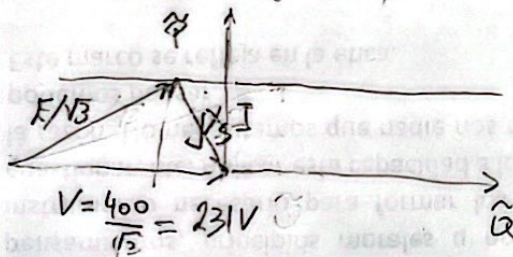
$$E_{Mca} \left( \frac{250 - E_{Mca}}{0,45} \right) = 35 \times 10^3 \Rightarrow E_{Mca} = 125 \text{ V} \quad I_{Mca} = 277,8 \text{ A}$$

$$M = 1000 \text{ rpm} \Rightarrow A \phi(i_{Mca}) \cdot 1000 = 125 \Rightarrow A \phi(i_{Mca}) = 0,125$$

$$A \phi(i_{Mca}) = \frac{600 \times i_{Mca}}{3000} = \frac{i_{Mca}}{5} = 0,125 \Rightarrow \underline{i_{Mca} = 0,625 \text{ A}}$$

$$\text{1º) com } f = 50 \text{ Hz} \Rightarrow M = 1000 \text{ rpm.} \quad V = \frac{400}{\sqrt{3}} \quad \frac{E}{\sqrt{3}} = 235,6 \text{ V}$$

$$E_{Mca} = 125 \text{ V} \quad I_{Mca} = 277,8 \Rightarrow P = 35 \text{ kW}$$



$$\tilde{P} = \frac{1,6 \times 35 \times 10^3}{\sqrt{3} \times 400} = 80,9$$

$$\tilde{Q} = 231 - \sqrt{235,6^2 - 80,9^2} = 9,7 \Rightarrow Q = \sqrt{3} \times 400 \times \frac{9,7}{1,6} = 4022$$

$$\Rightarrow P = 35 \text{ kW} \quad Q = 4 \text{ kVAR consumida por HS}$$