

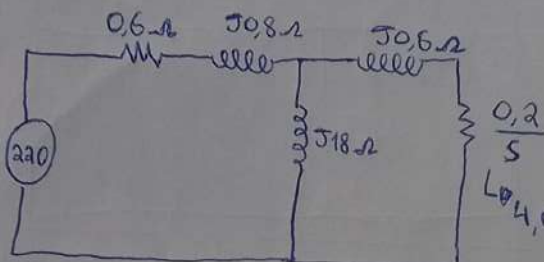
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P7 eletrotécnica

máquinas Assíncronas

lista 3

a)



\* condição em operação

$$L \cdot S = \frac{3500 - 3420}{3600}$$

$$S = 0,0500$$

$$L = \frac{0,2}{S} = 4,0000 \Omega$$

b)

\* mit ligado em Delta

$$Z_{eq} = (4,0000 + j0,6) \parallel j18$$

$$Z_{eq} = (4,0447 \angle 8,5308^\circ) \parallel (18 \angle 90^\circ)$$

$$Z_{eq} = \frac{(4,0447 \angle 8,5308^\circ) \times (18 \angle 90^\circ)}{(4,0447 \angle 8,5308^\circ) + (18 \angle 90^\circ)}$$

$$Z_{eq} = \frac{72,8046 \angle 98,5308^\circ}{19,0252 \angle 77,8633^\circ}$$

$$Z_{eq} = 3,8267 \angle 20,6675^\circ \Omega$$

$$Z_{eq_T} = (1,0000 \angle 53,1301^\circ) + (3,8267 \angle 20,6675^\circ)$$

$$Z_{eq_T} = 4,7012 \angle 27,2234^\circ \Omega //$$

$$I_F = \frac{220 \angle 0^\circ}{4,7012 \angle 27,2234^\circ} = 46,7966 \angle -27,2234^\circ A$$

$$I_L = 46,7966 \cdot \sqrt{3} = 81,0541 A // (\text{ligado em Delta})$$

$$c) P_{in} = \sqrt{3} \cdot V_L \cdot I_L \cdot \cos \phi \quad \cos \phi = 0,8892$$

$$P_{in} = \sqrt{3} \cdot 220 \cdot 81,0541 \cdot 0,8892$$

$$P_{in} = \sqrt{3} \cdot 15856,1273$$

$$P_{in} = 27463,6180 \text{ W} \rightarrow 27,4636 \text{ Kw}$$

$$L = 37,3654 \text{ CV}$$

$$P_{cUE} = 3 \cdot R_s \cdot I_F^2$$

$$P_{cUE} = 3 \cdot 0,6 \cdot (46,7966)^2$$

$$P_{cUE} = 3941,8592 \text{ W} \rightarrow 3,9419 \text{ Kw}$$

$$P_g = P_{in} - P_{cUE}$$

$$P_g = 27463,6180 - 3941,8592$$

$$P_g = 23521,7588 \text{ W} \rightarrow 23,5218 \text{ Kw}$$

$$P_{MD} = (1 - S) \cdot P_g$$

$$P_{MD} = (1 - 0,0500) \cdot 23521,7588$$

$$P_{MD} = 22345,6709 \text{ W} \rightarrow 22,3457 \text{ Kw}$$

$$P_o = P_{MD} - P_{ROT}$$

$$P_o = 22345,6709 - 1227,50$$

$$P_o = 21118,1709 \rightarrow 21,1182 \text{ Kw}$$

$$L = 28,7322 \text{ CV}$$

$$\eta \% = \frac{P_o}{P_{in}} \times 100$$

$$\eta \% = \frac{21118,1709}{27463,6180} \times 100$$

$$\eta \% = 76,8951 \%$$

$$d) \sigma_o = \frac{P_o}{NR \cdot \frac{2\pi}{60}}$$

$$\sigma_o = \frac{21118,1709}{3420 \cdot \frac{2\pi}{60}}$$

$$\sigma_o = 58,9660 \text{ Nm}$$

e)

$$\sigma_p = \frac{P_g}{N_s \cdot \frac{2\pi}{60}}$$

$$\sigma_p = \frac{23521,7588}{3600 \cdot \frac{2\pi}{60}}$$

$$\sigma_p = 62,3934 \text{ Nm}$$

f)

FP  
Atual: 0,8892  
esperado: 0,94

$$Q_3 = 27,4636 \cdot (0,5345 - 0,3630)$$

$$Q_3 = 4,1607 \text{ KVAR}$$

$$\phi_1 = 27,2271^\circ$$

$$\phi_2 = 19,9484^\circ$$

$$Q_1 = \frac{4,1607}{3}$$

$$Q_1 = 1,3869 \text{ KVAR}$$

$$\tan \phi_1 = 0,5345$$

$$\tan \phi_2 = 0,3630$$

$$C_f = \frac{Q_1}{2\pi f \cdot (VNC)^2} \times 10^6$$

$$C_f = \frac{1386,9118}{18246370,13} \times 10^6$$

$$C_f = 76,0103 \mu F //$$

g)

$f_p$

Atual: 0,8892

esperado: 1

$$Q_3 = 27,4636 \cdot (0,5145 - 0)$$

$$Q_3 = 14,1300 \text{ KVAR}$$

$$\phi_1 = 27,2271^\circ$$

$$\phi_2 = 0^\circ$$

$$Q_1 = \frac{14,1300}{3}$$

$$t_g \phi_1 = 0,5145$$

$$t_g \phi_2 = 0^\circ$$

$$Q_1 = 4,7100 \text{ KVAR}$$

$$C_f = \frac{4710}{2\pi f \cdot (VNC)^2} \times 10^6$$

$$C_f = \frac{4710}{376,9911 \cdot (127,0173)^2} \times 10^6$$

$$C_f = \frac{4710}{6082123,080} \times 10^6$$

$$C_f = 774,4006 \text{ MF} //$$

h)

$$Carneg = \frac{P_{penacab}}{P_{nominal}} \times 100$$

$$Carneg = \frac{21118,1709}{14700,0000} \times 100$$

$$Carneg = 143,6610\%$$

conclusão: O mit está sobrecarregado.