

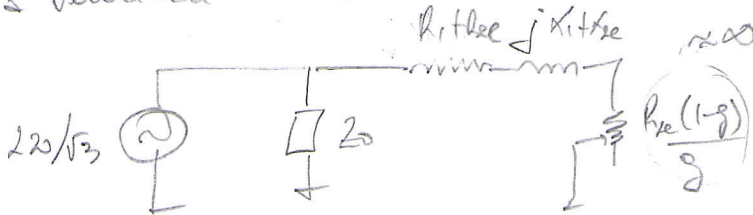
PROBLEMAS



1 - Motor en vacío:

$$P = P_0 + P_{FyR} + P_g \approx 400W$$

MI a velocidad sincrónica



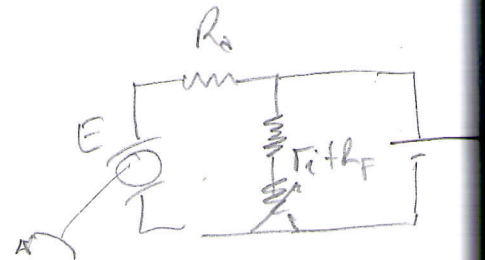
$$R_f + R_g = 25\Omega \Rightarrow i = \frac{50}{25\Omega} = 2A$$

En esta situación

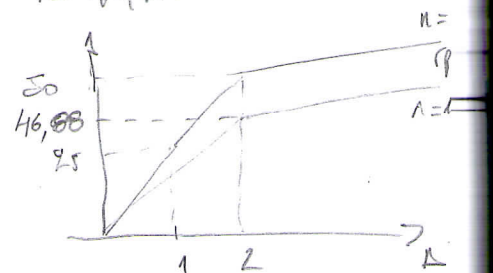
$$P_{FyR} = E \cdot I = E \frac{(V - E)}{R_a} = 46,88 \cdot \frac{(50 - 46,88)}{1,2}$$

$$P_{FyR} = 146,3W$$

$$P_0 = 400 - 146,3W = 253,7W$$



$$P = P_{FyR}$$



$$E_{e1500} = \frac{50}{1600} \cdot 1500 = 46,88$$

con $i = 2$

2 - MI entrega máxima potencia cuando Mce entrega la máxima potencia a su vez
Máxima potencia entregada por Mce:

$$P_{Mce} = E I = E \left(\frac{V - E}{R_a} \right) = \frac{EV}{R_a} - \frac{E^2}{R_a}$$

$$\frac{dP_{Mce}}{dE} = \frac{V}{R_a} - \frac{2E}{R_a} = 0 \quad E = \frac{V}{2} = 25V \Rightarrow P_{Mce \max} = 25 \cdot \frac{(50 - 25)}{1,2} = 625W$$

$$P_{MI} = 625 - \left(P_{FyR} + P_0 + P_{\text{pérdidas}} \right) = 225W$$

o 1/3 red

3 -

En RI la potencia necesaria convertida es $625 - 146,3 = 478,7$

$$\frac{3 R_{se} (1-g)}{g} I_{2e}^2 = 478,7 W$$

Siendo $g = \frac{n - n_s}{n_s}$ la corriente generada

$$\frac{3 R_{se} (1-g)}{g} \frac{U^2}{(R_1 + \frac{R_{se}}{g})^2 + (X_1 + X_2)^2} = 478,7 W$$

$$\frac{3 R_{se} (1-g)}{g} U^2 = 478,7 \left[\frac{R_1^2}{g^2} + R_{se}^2 + 2 R_1 R_{se} g + g^2 (X_1 + X_2)^2 \right]$$

$$\left[-R_{se} U^2 - 478,7 R_1^2 - 478,7 (X_1 + X_2)^2 \right] g^2 + \left[R_{se} U^2 - 478,7 \cdot 2 R_1 R_{se} \right] g - 478,7 R_{se}^2 =$$

$$R_{se} = 0,71 \Omega \quad R_1 = 0,6 \Omega$$

$$X_1 + X_2 = 3,4 \Omega$$

$$U = 220$$

$$\text{Con } g = 0,0072$$

$$g \rightarrow \frac{0,0072}{0,8403}$$

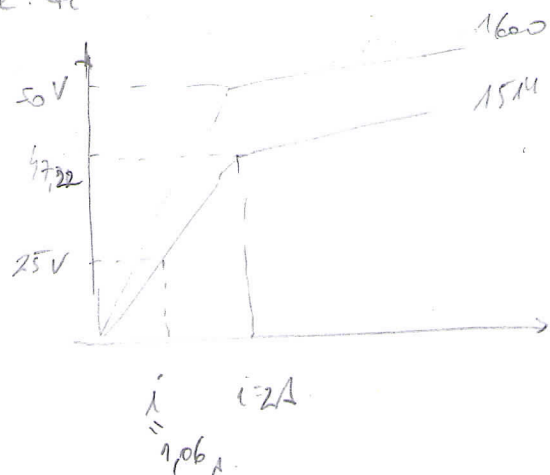
$$\Rightarrow n = (15 \cdot 0,0094 + 15) \\ n = 1511 \text{ r.p.m.}$$

La corriente de excitación sale de

$$E_{e1511} = 25 V$$

$$E_{1511} = \frac{50}{1600} \cdot 1511 = 47,22$$

$$i = \frac{25 \cdot 2 A}{47,22 V} = 1,06 A$$



$$R_i + R_f = \frac{50}{1,06} = 47,2 \Omega$$

$$I_{2e} = \frac{220 \sqrt{3}}{R_{se} / g} = \frac{220 \sqrt{3}}{0,71 / 0,0072} = 1,3 A \quad \text{Pérdidas Joule} = 3 (R_1 + R_{se}) I_{2e}^2$$

$$= 3 \cdot 1,31 \cdot 1,3^2 = 6,6 W$$

$$P_{\text{Pérdidas Joule}} \ll P_{F_1 R}$$