

3. EGYENÁRAMÚ GÉPEK

3.1. Egyenáramú motorok

a) A motor áramfelvétele

$$I_n = \frac{P_n}{U_k \cdot \eta} = \frac{10000}{220 \cdot 0,88} = 51,6 \text{ A}$$

b) A motor névleges nyomatéka

$$\omega = \frac{2 \cdot \pi \cdot n}{60} = \frac{2 \cdot \pi \cdot 1500}{60} = 157 \text{ 1/s}$$

$$M_n = \frac{P_n}{\omega} = \frac{10000}{157} = 63,3 \text{ N}\cdot\text{m}$$

$$\left. \begin{aligned} M_i &= k' \cdot I_i^2 \\ M_n &= k' \cdot I_n^2 \end{aligned} \right\} \rightarrow \frac{M_i}{M_n} = \frac{k' \cdot I_i^2}{k' \cdot I_n^2} = \frac{I_i^2}{I_n^2}$$

$$I_i = I_n \cdot \sqrt{\frac{M_i}{M_n}} = 51,6 \cdot \sqrt{1,8} = 69,23 \text{ A}$$

3.1.8. feladat

$$I_n = 51,6 \text{ A}$$

$$M_n = 63,3 \text{ N}\cdot\text{m}$$

$$I_i = 69,23 \text{ A}$$

3.1.9. feladat

$$a) M = \frac{P_n}{2 \cdot \pi \cdot n} = \frac{16500}{2 \cdot \pi \cdot 25} = 105,03 \text{ N}\cdot\text{m}$$

$$I = \frac{P_n}{U_k \cdot \eta} = \frac{16500}{220 \cdot 0,86} = 87,21 \text{ A}$$

$$b) U_i = U_k - I_a \cdot R_b = 220 - 87,21 \cdot 0,14 = 207,8 \text{ V}$$

$$P_{tek} = I_a^2 \cdot R_b = 87,21^2 \cdot 0,14 = 1064,78 \text{ W}$$

$$c) U_k = c_U \cdot \Phi \cdot n + I_a \cdot R_b$$

$$c_U \cdot \Phi = \frac{U_k - I_a \cdot R_b}{n} = \frac{220 - 87,21 \cdot 0,14}{25} = 8,312 \text{ V}\cdot\text{s}$$

$$R_{sz} = \frac{U_k - c_U \cdot \Phi \cdot n}{I_a} - R_b = \frac{220 - 8,312 \cdot 25}{87,21} - 0,14 = 0,476 \Omega$$

$$d) U_k = c_U \cdot \Phi \cdot n^{**} + \frac{I_a}{2} \cdot (R_b + R_{sz})$$

$$n^{**} = \frac{U_k - \frac{I_a}{2} \cdot (R_b + R_{sz})}{c_U \cdot \Phi} = \frac{220 - 43,605 \cdot (0,14 + 0,476)}{8,312} = 23,24 \text{ 1/s}$$

$$n^{**} = 23,24 \text{ 1/s} = 1394,4 \text{ 1/min}$$

$$M = 105,03 \text{ N}\cdot\text{m}$$

$$I = 87,21 \text{ A}$$

$$U_i = 207,8 \text{ V}$$

$$P_{tek} = 1064,78 \text{ W}$$

$$R_{sz} = 0,476 \Omega$$

$$n^{**} = 1394,4 \text{ 1/min}$$