

4. SZINKRON GÉPEK

$$a) I_n = \frac{S_n}{U_{nv}} = \frac{165000 \cdot 10^3}{\sqrt{3} \cdot 18000} = 5290 \text{ A}$$

$$U_n = \frac{U_{nv}}{\sqrt{3}} = \frac{18000}{\sqrt{3}} = 10400 \text{ V}$$

$$Z_n = \frac{U_n}{I_n} = \frac{10400}{5290} = 1,965 \Omega$$

$$X_d = \frac{Z_n}{100} \cdot X_{d\%} = \frac{1,965}{100} \cdot 170 = 3,34 \Omega$$

$$b) U_p = \sqrt{(I_n \cdot X_d \cdot \cos \varphi_n)^2 + (U_n + I_n \cdot X_d \cdot \sin \varphi_n)^2} =$$

$$= \sqrt{(5290 \cdot 3,34 \cdot 0,8)^2 + (10400 + 5290 \cdot 3,34 \cdot 0,6)^2} = 25350 \text{ V}$$

$$\sin \delta = \frac{I_n \cdot X_d \cdot \cos \varphi}{U_p} = \frac{5290 \cdot 3,34 \cdot 0,8}{25350} = 0,558 \rightarrow \delta = 33,9^\circ$$

$$M = \frac{3 \cdot U_n \cdot U_p}{2 \cdot \pi \cdot n_0 \cdot X_d} \cdot \sin \delta =$$

$$= \frac{3 \cdot 10400 \cdot 25350}{2 \cdot \pi \cdot 3000 \cdot 3,34} \cdot 0,558 = 4,2 \cdot 10^5 \text{ N}\cdot\text{m}$$

4.6. feladat

$$Z_n = 1,965 \Omega$$

$$X_d = 3,34 \Omega$$

$$\delta = 33,9^\circ$$

$$M = 4,2 \cdot 10^5 \text{ N}\cdot\text{m}$$

$$a) n_0 = 60 \cdot \frac{f}{p} = 60 \cdot \frac{50}{2} = 1500 \text{ 1/min}$$

$$b) I_a = \frac{P}{3 \cdot U_f \cdot \cos \varphi} = \frac{4000}{3 \cdot 220 \cdot 0,8} = 7,57 \text{ A}$$

$$c) \omega_{g0} = 2 \cdot \pi \cdot \frac{f}{p} = 2 \cdot \pi \cdot \frac{50}{2} = 157,07 \text{ 1/s}$$

$$M = \frac{P}{\omega_{g0}} = \frac{4000}{157,07} = 25,46 \text{ N}\cdot\text{m}$$

$$d) S = \frac{P}{\cos \varphi} = \frac{4}{0,8} = 5 \text{ kV}\cdot\text{A}$$

$$Q = S \cdot \sin \varphi = 5 \cdot 0,6 = 3 \text{ kvar}$$

4.7. feladat

$$n_0 = 1500 \text{ 1/min}$$

$$I_a = 7,57 \text{ A}$$

$$M = 25,46 \text{ N}\cdot\text{m}$$

$$S = 5 \text{ kV}\cdot\text{A}$$

$$Q = 3 \text{ kvar}$$