

2.1.8. feladat

$$a) a = \frac{U_{1n}}{U_{20}} = \frac{3200}{230} = 13,913$$

$$a = 13,913$$

$$I_{1n} = \frac{S_n}{U_{1n}} = \frac{10000}{3200} = 3,125 \text{ A}$$

$$I_{1n} = 3,125 \text{ A}$$

$$I_{2n} = \frac{S_n}{U_{20}} = \frac{10000}{230} = 43,478 \text{ A}$$

$$I_{2n} = 43,478 \text{ A}$$

$$b) R_2' = a^2 \cdot R_2 = 13,913^2 \cdot 0,06 = 11,61 \text{ } \Omega$$

$$X_{s2}' = a^2 \cdot X_{s2} = 13,913^2 \cdot 0,14 = 27,1 \text{ } \Omega$$

$$R = R_1 + R_2' = 12 + 11,61 = 23,614 \text{ } \Omega$$

$$X_s = X_{s1} + X_{s2}' = 24 + 27,1 = 51,1 \text{ } \Omega$$

$$Z_c = \sqrt{(R_1 + R_2')^2 + (X_{s1} + X_{s2}')^2} = \sqrt{23,614^2 + 51,1^2} = 56,29 \text{ } \Omega$$

$$Z_c = 56,29 \text{ } \Omega$$

$$c) I_{1c} = \frac{U_{1n}}{Z_c} = \frac{3200}{56,29} = 56,84 \text{ A}$$

$$I_{1c} = 56,84 \text{ A}$$

$$I_{2c} = I_{1c} \cdot a = 56,84 \cdot 13,913 = 790,89 \text{ A}$$

$$I_{2c} = 790,890 \text{ A}$$

$$d) \epsilon = \frac{100 \cdot I_{1n} \cdot Z_c}{U_{1n}} = \frac{3,125 \cdot 56,29}{3200} \cdot 100 = 5,49 \text{ } \%$$

$$\epsilon = 5,497 \text{ } \%$$

$$U_{zn} = I_{1n} \cdot Z_c = 3,125 \cdot 56,29 = 175,9 \text{ V}$$

$$U_{zn} = 175,9 \text{ V}$$

$$e) \sin \varphi = \sqrt{1 - \cos^2 \varphi} = \sqrt{1 - 0,75^2} = 0,6614$$

$$\Delta U = I_{1n} \cdot R \cdot \cos \varphi + I_{1n} \cdot X_s \cdot \sin \varphi =$$

$$= 3,125 \cdot 23,614 \cdot 0,75 + 3,125 \cdot 51,1 \cdot 0,6614 = 160,96 \text{ V}$$

$$U_2 = \frac{U_{1n} - \Delta U}{a} = \frac{3200 - 160,96}{13,913} = 218,43 \text{ V}$$

$$U_2 = 218,43 \text{ V}$$

$$f) \Delta U = I_{1n} \cdot R \cdot \cos \varphi^* + I_{1n} \cdot X_s \cdot \sin \varphi^* = 0 \rightarrow$$

$$\rightarrow R \cdot \cos \varphi^* = -X_s \cdot \sin \varphi^*$$

$$\operatorname{tg} \varphi^* = -\frac{R}{X_s} = -\frac{23,61}{51,1} = -0,4621 \rightarrow$$

$$\rightarrow \varphi^* = -24,8^\circ; \cos \varphi^* = 0,907 \text{ (kap.)}$$

$$\varphi^* = -24,8^\circ$$