

2.1.7. feladat

$$a) \quad a = \frac{U_{1n}}{U_{2n}} = \frac{400}{120} = 3,33$$

$$I_{1n} = \frac{S_n}{U_{1n}} = \frac{2500}{400} = 6,25 \text{ A}$$

$$I_{2n} = I_{1n} \cdot a = 6,25 \cdot 3,33 = 20,83 \text{ A}$$

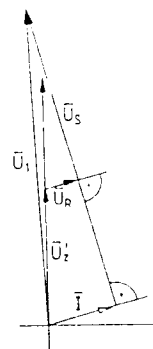
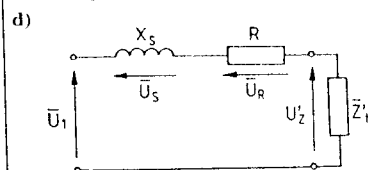
$$b) \quad U_{zn} = \frac{U_{1n}}{100} \cdot r = \frac{400}{100} \cdot 4 = 16 \text{ V}; \quad Z_z = \frac{U_{zn}}{I_{1n}} = \frac{16}{6,25} = 2,56 \Omega$$

$$I_{1n}^2 \cdot R = P_{1n} \rightarrow R = \frac{P_{1n}}{I_{1n}^2} = \frac{60}{6,25^2} = 1,536 \Omega$$

$$X_s = \sqrt{Z_z^2 - R^2} = \sqrt{2,56^2 - 1,53^2} = 2,052 \Omega$$

$$c) \quad I_{1z} = \frac{U_{1n}}{Z_z} = \frac{400}{2,56} = 156,25 \text{ A}$$

$$I_{2z} = a \cdot I_{1z} = 3,33 \cdot 156,25 = 520,83 \text{ A}$$



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

$$\sin \varphi = \sqrt{1 - \cos^2 \varphi} = \sqrt{1 - 0,7^2} = 0,7141$$

$$\Delta U = 6,25 \cdot 1,53 \cdot 0,7 + 6,25 \cdot 2,052 \cdot 0,7141 = 15,85 \text{ V}$$

$$U_2 = \frac{U_{1n} - \Delta U}{a} = \frac{400 - 15,85}{3,33} = 115,36 \text{ V}$$

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

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

$$\tan \varphi^* = -\frac{R}{X_s} = -\frac{1,536}{2,052} = -0,75; \quad \varphi^* = -36,81^\circ \quad \cos \varphi^* = 0,8 \text{ (kap.)}$$

$$a = 3,33$$

$$I_{1n} = 6,25 \text{ A}$$

$$I_{2n} = 20,83 \text{ A}$$

$$Z_z = 2,56 \Omega$$

$$R = 1,536 \Omega$$

$$X_s = 2,052 \Omega$$

$$I_{1z} = 156,25 \text{ A}$$

$$I_{2z} = 520,83 \text{ A}$$

$$\Delta U = 15,85 \text{ V}$$

$$U_2 = 115,36 \text{ V}$$

$$\varphi^* = -36,81^\circ$$