$$Q_{új} = \sqrt{S_e^2 - P_{új}^2} = \sqrt{79{,}88^2 - 75{,}89^2} = 24{,}93 \text{ kvar}$$

$$Q_{szüks} = Q_e - Q_{új} = 66 - 24{,}93 = 41{,}07 \text{ kvar}$$

Q_szüks = 41,07 kvar

d) $$C_{szüks} = \frac{Q_{szüks} \cdot 10^6}{3 \cdot U_v^2 \cdot \omega} = \frac{41{,}07 \cdot 10^3 \cdot 10^6}{3 \cdot 380^2 \cdot 314} = 301{,}93 \ \mu\text{F}$$

C_szüks = 301,93 µF

$$\omega = 2 \cdot \pi \cdot f = 2 \cdot 3{,}14 \cdot 50 = 314 \ 1/\text{s}$$

7.8. feladat

a) $$S_1 = \frac{P_{fel1}}{\cos \varphi_1} = \frac{25000}{0{,}777} = 32175 \text{ V·A}$$

S_1 = 32,175 kV·A

b) $$Q_1 = S_1 \cdot \sin \varphi_1 \qquad \sin \varphi_1 = \sqrt{1 - \cos^2 \varphi_1} = \sqrt{1 - 0{,}777^2} = 0{,}6295$$

$$Q_1 = 32175 \cdot 0{,}6295 = 20254 \text{ var}$$

Q_1 = 20,254 kvar

c) $$S_2 = \frac{P_{le2}}{\eta_2 \cdot \cos \varphi_2} = \frac{50000}{0{,}82 \cdot 0{,}791} = 77087 \text{ V·A}$$

S_2 = 77,087 kV·A

d) $$Q_2 = S_2 \cdot \sin \varphi_2 \qquad \sin \varphi_2 = \sqrt{1 - \cos^2 \varphi_2} = \sqrt{1 - 0{,}791^2} = 0{,}6118$$

$$Q_2 = 77087 \cdot 0{,}6118 = 47163 \text{ var}$$

Q_2 = 47,163 kvar

e) $$P_2 = \frac{P_{le2}}{\eta_2} = \frac{50000}{0{,}82} = 60976 \text{ W}$$

$$P_ö = P_{fel1} + P_2 = 25000 + 60976 = 85976 \text{ W}$$

P_ö = 85,976 kW

f) $$Q_ö = Q_1 + Q_2 = 20254 + 47163 = 67417 \text{ var}$$

Q_ö = 67,417 kvar

g) $$S_ö = \sqrt{P_ö^2 + Q_ö^2} = \sqrt{85976^2 + 67417^2} = 109256 \text{ V·A}$$

S_ö = 109,256 kV·A

h) $$\cos \varphi = \frac{P_ö}{S_ö} = \frac{85956}{108961} = 0{,}7869$$

cos φ = 0,7869

i) $$Q_{új} = P_ö \cdot \operatorname{tg} \varphi' = 85976 \cdot 0{,}4843 = 41638 \text{ var}$$

Q_új = 41,638 kvar

j) $$Q_c = Q_ö - Q_{új} = 67417 - 41638 = 25779 \text{ var}$$

Q_c = 25,779 kvar

k) $$C = \frac{Q_c}{2 \cdot \pi \cdot f \cdot U^2} = \frac{25298}{2 \cdot \pi \cdot 50 \cdot 380^2} = 5{,}68 \cdot 10^{-4} \text{ F} = 568 \ \mu\text{F}$$

C = 568 µF