



$$R = 10 \Omega$$

$$C = 10 \text{ mF}$$

$$U = 100$$

$$\varphi_u = \frac{\pi}{2}$$

$$f = 60 \text{ [Hz]}$$

$$j^2 = -1$$

$$\sin \frac{\pi}{2} = 1$$

$$\cos \frac{\pi}{2} = 0$$

$$\underline{u} = u \cdot e^{j \cdot \varphi_u}$$

$$\underline{i} = i \cdot e^{j \cdot \varphi_i}$$

$$\underline{u} = \underline{z} \cdot \underline{i}$$

$$\underline{i} = \underline{y} \cdot \underline{u}$$

$$\underline{z} = \frac{1}{\underline{y}}$$

$$\underline{z}_{R1} = 10 \text{ [}\Omega\text{]}$$

$$\underline{z}_{C1} = j \cdot X_C = -j \cdot \frac{1}{\omega C} = -j \cdot \frac{1}{2\pi \cdot 60 \cdot 10^{-2}}$$

$$= -j \cdot \frac{10^2}{120\pi} = -j \cdot 0,27 \text{ [}\Omega\text{]}$$

$$\underline{z}_{AB} = \frac{1}{\underline{y}_{AB}}$$

$$\underline{y}_{AB} = \frac{1}{\underline{z}_{R1}} + \frac{1}{\underline{z}_{C1}} = \underline{y}_{R1} + \underline{y}_{C1} = \frac{1}{10} + \frac{1}{-j \cdot 0,27} = \frac{1}{10} + j \cdot \frac{1}{0,27} =$$

$$\underline{y}_{AB} = \frac{1}{10} + j \cdot 3,7 = 0,1 + j \cdot 3,7 \text{ [S]}$$

$$\underline{i} = \underline{u} \cdot \underline{y}_{AB} = [100 \cdot e^{j \frac{\pi}{2}}] \cdot [0,1 + j \cdot 3,7] = [100 [\cos \frac{\pi}{2} + j \cdot \sin \frac{\pi}{2}]] \cdot [0,1 + j \cdot 3,7]$$

$$= 100 \cdot j \cdot (0,1 + j \cdot 3,7) = j \cdot 10 - 370 \text{ [A]}$$

$$\underline{S} = \underline{u} \cdot \underline{i}^* = \underbrace{j \cdot 100}_{\underline{u}} \cdot \underbrace{(-j \cdot 10 + 370)}_{\underline{i}^*} = 4000 - j \cdot 37000 = 1 \cdot 10^3 - j \cdot 37 \cdot 10^3$$

$$P = \text{Re } \underline{S} = 1000 \text{ [W]}$$

$$Q = \text{Im } \underline{S} = 37000 \text{ [Var]}$$

$$S = 37014 \text{ [V} \cdot \text{A]}$$

$$\varphi = \alpha \tan\left(\frac{Q}{P}\right) = 1,54 \text{ [rad]} = 88,24 \text{ [deg]}$$

$$S = \sqrt{P^2 + Q^2} = \sqrt{1000^2 + 37000^2} = 37014 \text{ [VA]}$$

