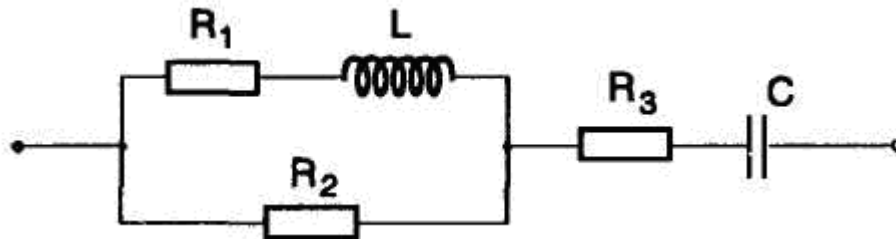


6.125

Komponenterne i det viste kredsløb har følgende værdier: $R_1 := 250 \cdot \Omega$, $R_2 := 1000 \cdot \Omega$,
 $R_3 := 200 \cdot \Omega$, $L := 540 \text{ j} \cdot \text{mH}$



Kapacitansen C har en størrelse, som medfører at faseforskydningsvinklen for den samlede kreds er 0° .

Spændingen over hele kredsløbet er $U := 120 \cdot \text{V}$ med frekvensen $f := 50 \cdot \text{Hz}$.

- Beregn C i μF
- Beregn alle strømme i kredsen.

$$X_L := 2 \cdot \pi \cdot f \cdot L = 169.646i \Omega$$

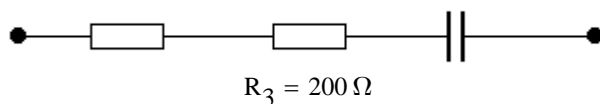
$$Z_1 := R_1 + X_L = (250 + 169.646i) \Omega$$

$$Z_P := \left(\frac{1}{Z_1} + \frac{1}{R_2} \right)^{-1} = (214.469 + 106.61i) \Omega \quad Z_{\text{Palt}} := \frac{Z_1 \cdot R_2}{Z_1 + R_2} = (214.469 + 106.61i) \Omega$$

$$|Z_P| = 239.505 \Omega$$

- Beregn C i μF

$$Z_P = (214.469 + 106.61i) \Omega$$



$$X_C := \text{Im}(Z_P)$$

$$X_C = 106.61 \Omega$$

$$C := \frac{1}{2\pi \cdot f \cdot X_C}$$

$$C = 29.857 \cdot \mu\text{F}$$

b) Beregn alle strømme i kredsen

$$Z_{\text{res}} := \operatorname{Re}(Z_{\text{P}}) + R_3 = 414.469 \Omega$$

$$I := \frac{U}{Z_{\text{res}}} = 0.29 \text{ A}$$

$$U_{\text{P}} := I \cdot Z_{\text{P}} = (62.095 + 30.866i) \text{ V}$$

$$|U_{\text{P}}| = 69.343 \text{ V}$$

$$I_{\text{R1}} := \frac{U_{\text{P}}}{R_1 + X_{\text{L}}} = (0.227 - 0.031i) \text{ A}$$

$$|I_{\text{R1}}| = 0.23 \text{ A}$$

$$I_{\text{R2}} := \frac{U_{\text{P}}}{R_2} = (0.062 + 0.031i) \text{ A}$$

$$|I_{\text{R2}}| = 0.069 \text{ A}$$

$$I_{\text{R1alt}} := I \cdot \frac{R_2}{R_2 + Z_1} = (0.227 - 0.031i) \text{ A}$$

$$I_{\text{R2alt}} := I \cdot \frac{Z_1}{R_2 + Z_1} = (0.062 + 0.031i) \text{ A}$$

