

$$f := 800 \cdot \text{Hz}$$

$$L := 4 \cdot \text{mH}$$

$$C := 7 \cdot \mu\text{F}$$

$$R_1 := 30 \cdot \Omega$$

$$R_2 := 20 \cdot \Omega$$

$$Z_{R1} := R_1$$

$$Z_{R2} := R_2$$

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

$$Z_C = -28.421j \Omega$$

$$Z_L := j \cdot 2 \cdot \pi \cdot f \cdot L$$

$$Z_L = 20.106j \Omega$$

$$Z_{E1} := Z_L + Z_{R1}$$

$$Z_{E1} = 30 + 20.106j \Omega$$

$$|Z_{E1}| = 36.115 \Omega$$

$$\arg(Z_{E1}) = 33.83 \text{ Grad}$$

$$Z_{E2} := Z_C + Z_{R2}$$

$$Z_{E2} = 20 - 28.421j \Omega$$

$$|Z_{E2}| = 34.752 \Omega$$

$$\arg(Z_{E2}) = -54.865 \text{ Grad}$$

$$Z := \frac{Z_{E1} \cdot Z_{E2}}{Z_{E1} + Z_{E2}}$$

$$Z = 24.256 - 4.976j \Omega$$

$$|Z| = 24.761 \Omega$$

$$\arg(Z) = -11.594 \text{ Grad}$$

Mit $U := 100 \cdot \text{V}$ erhalten wir: (für die Erstellung eines Zeigerbildes notwendig)

$$I := \frac{U}{Z}$$

$$I = 3.956 + 0.812j \text{ A}$$

$$|I| = 4.039 \text{ A}$$

$$\arg(I) = 11.594 \text{ Grad}$$

$$I_1 := \frac{U}{Z_{E1}}$$

$$I_1 = 2.3 - 1.542j \text{ A}$$

$$|I_1| = 2.769 \text{ A}$$

$$\arg(I_1) = -33.83 \text{ Grad}$$

$$I_2 := \frac{U}{Z_{E2}}$$

$$I_2 = 1.656 + 2.353j \text{ A}$$

$$|I_2| = 2.878 \text{ A}$$

$$\arg(I_2) = 54.865 \text{ Grad}$$

$$U_L := I_1 \cdot Z_L$$

$$U_L = 30.995 + 46.247j \text{ V}$$

$$|U_L| = 55.673 \text{ V}$$

$$\arg(U_L) = 56.17 \text{ Grad}$$

$$U_{R1} := I_1 \cdot Z_{R1}$$

$$U_{R1} = 69.005 - 46.247j \text{ V}$$

$$|U_{R1}| = 83.069 \text{ V}$$

$$\arg(U_{R1}) = -33.83 \text{ Grad}$$

$$U_C := I_2 \cdot Z_C$$

$$U_C = 66.88 - 47.065j \text{ V}$$

$$|U_C| = 81.78 \text{ V}$$

$$\arg(U_C) = -35.135 \text{ Grad}$$

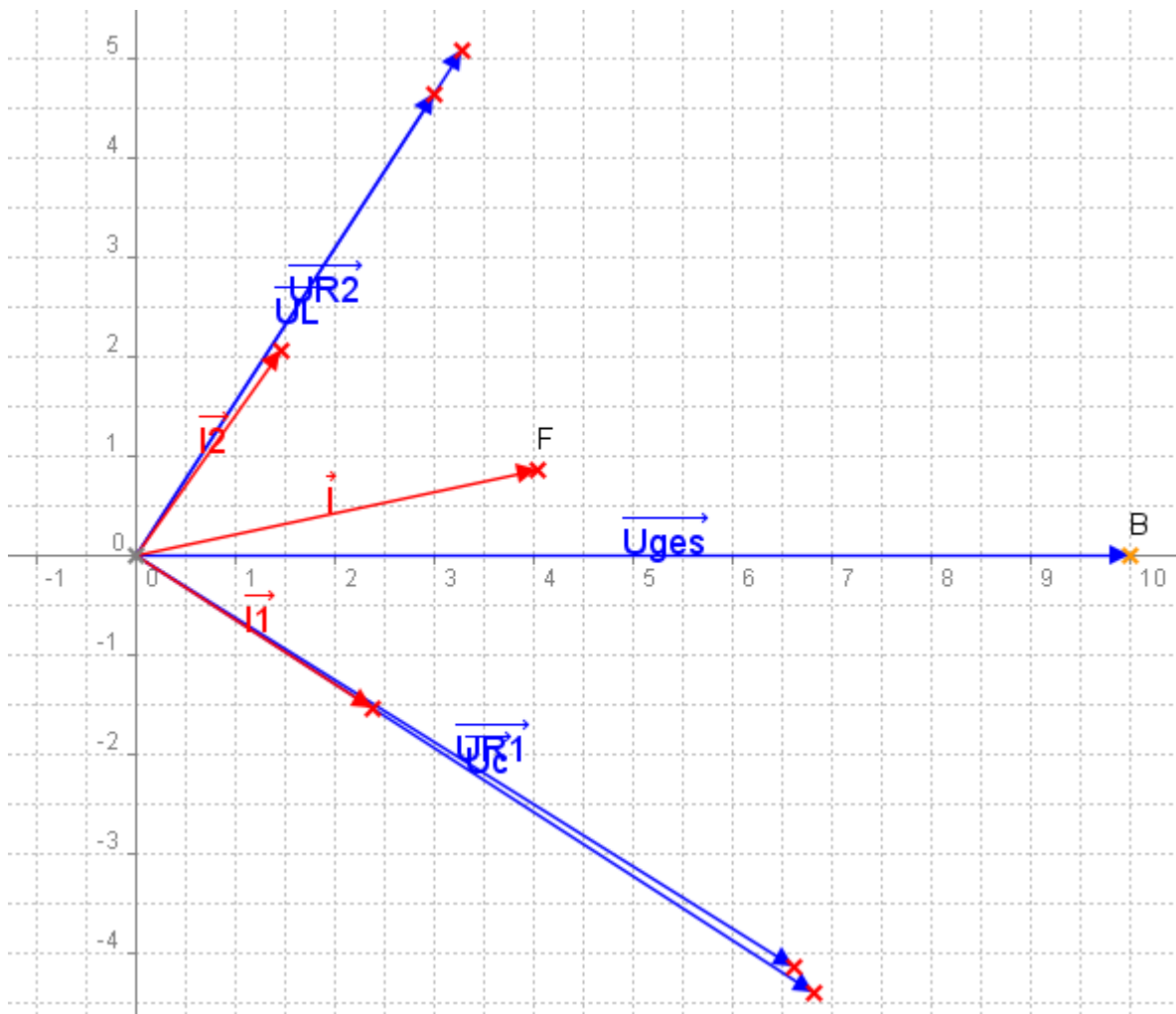
$$U_{R2} := I_2 \cdot Z_{R2}$$

$$U_{R2} = 33.12 + 47.065j \text{ V}$$

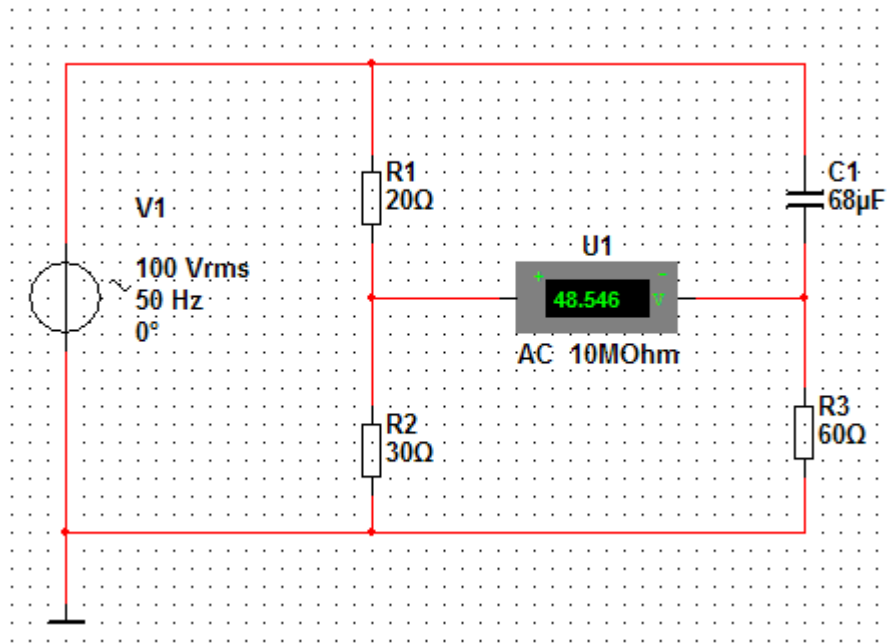
$$|U_{R2}| = 57.55 \text{ V}$$

$$\arg(U_{R2}) = 54.865 \text{ Grad}$$

Zeigerbild: (siehe auch GeoGebra Version)



A4)



Annahme:

$U := 100 \cdot V$

$f := 50 \cdot \text{Hz}$

$$Z_{R1} := 20 \cdot \Omega \quad Z_{R2} := 30 \cdot \Omega \quad C := 68 \cdot \mu\text{F} \quad Z_C := \frac{1}{j \cdot 2 \cdot \pi \cdot f \cdot C} \quad Z_C = -46.81j \Omega \quad Z_{R3} := 60 \cdot \Omega$$

$$U_{R2} := \frac{Z_{R2}}{Z_{R1} + Z_{R2}} \cdot U \quad U_{R2} = 60 \text{ V} \quad U_{R3} := \frac{Z_{R3}}{Z_C + Z_{R3}} \cdot U \quad U_{R3} = 62.163 + 48.498j \text{ V}$$

$$|U_{R3}| = 78.844 \text{ V} \quad \arg(U_{R3}) = 37.96 \text{ Grad}$$

$$U_A := U_{R2} - U_{R3} \quad U_A = -2.163 - 48.498j \text{ V} \quad |U_A| = 48.546 \text{ V} \quad \arg(U_A) = -92.554 \text{ Grad}$$

Für das Zeigerbild die weiteren elektrischen Größen:

$$I_{12} := \frac{U_{R2}}{Z_{R2}} \quad I_{12} = 2 \text{ A}$$

$$I_{C3} := \frac{U_{R3}}{Z_{R3}} \quad I_{C3} = 1.036 + 0.808j \text{ A} \quad |I_{C3}| = 1.314 \text{ A} \quad \arg(I_{C3}) = 37.96 \text{ Grad}$$

$$U_{R1} := U - U_{R2} \quad U_{R1} = 40 \text{ V}$$

$$U_C := U - U_{R3} \quad U_C = 37.837 - 48.498j \text{ V} \quad |U_C| = 61.512 \text{ V} \quad \arg(U_C) = -52.04 \text{ Grad}$$