

$$Z_L := j \cdot 20 \cdot \Omega \quad Z_R := 30 \cdot \Omega \quad Z_C := -j \cdot 20 \cdot \Omega \quad U := 10 \cdot V$$

$$Z_E := \frac{Z_R \cdot Z_C}{Z_R + Z_C} \quad Z_E = (9.231 - 13.846j) \cdot \Omega \quad |Z_E| = 16.641 \Omega \quad \varphi := \arg(Z_E) \quad \varphi = -56.31 \cdot \text{Grad}$$

$$Z := Z_L + Z_E \quad Z = (9.231 + 6.154j) \cdot \Omega \quad |Z| = 11.094 \Omega \quad \varphi := \arg(Z) \quad \varphi = 33.69 \cdot \text{Grad}$$

$$I := \frac{U}{Z} \quad I = (0.75 - 0.5j) \text{ A} \quad |I| = 0.901 \text{ A} \quad \varphi := \arg(I) \quad \varphi = -33.69 \cdot \text{Grad}$$

$$U_L := I \cdot Z_L \quad U_L = (10 + 15j) \text{ V} \quad |U_L| = 18.028 \text{ V} \quad \varphi := \arg(U_L) \quad \varphi = 56.31 \cdot \text{Grad}$$

$$U_R := I \cdot Z_E \quad U_R = -15j \text{ V} \quad |U_R| = 15 \text{ V} \quad \varphi := \arg(U_R) \quad \varphi = -90 \cdot \text{Grad}$$

$$U_C := U_R$$

$$I_R := \frac{U_R}{Z_R} \quad I_R = -0.5j \text{ A} \quad |I_R| = 0.5 \text{ A} \quad \varphi := \arg(I_R) \quad \varphi = -90 \cdot \text{Grad}$$

$$I_C := \frac{U_C}{Z_C} \quad I_C = 0.75 \text{ A} \quad |I_C| = 0.75 \text{ A} \quad \varphi := \arg(I_C) \quad \varphi = -3.393 \times 10^{-15} \cdot \text{Grad}$$

$$f := 1 \cdot \text{kHz}$$

$$X_L := 20 \cdot \Omega$$

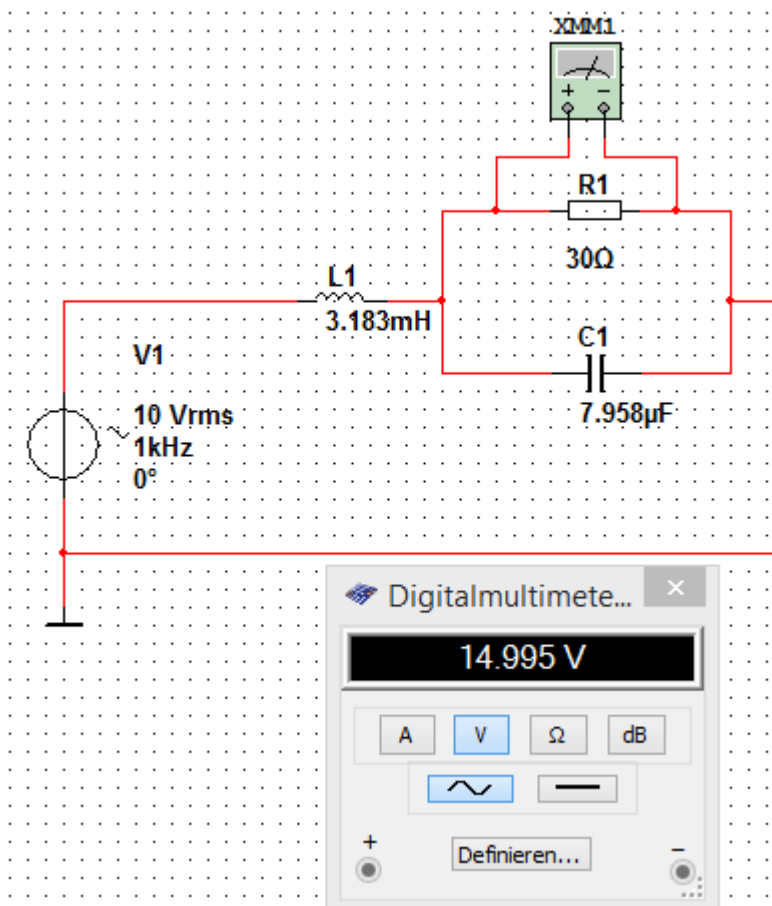
$$X_C := 20 \cdot \Omega$$

$$L := \frac{X_L}{2 \cdot \pi \cdot f}$$

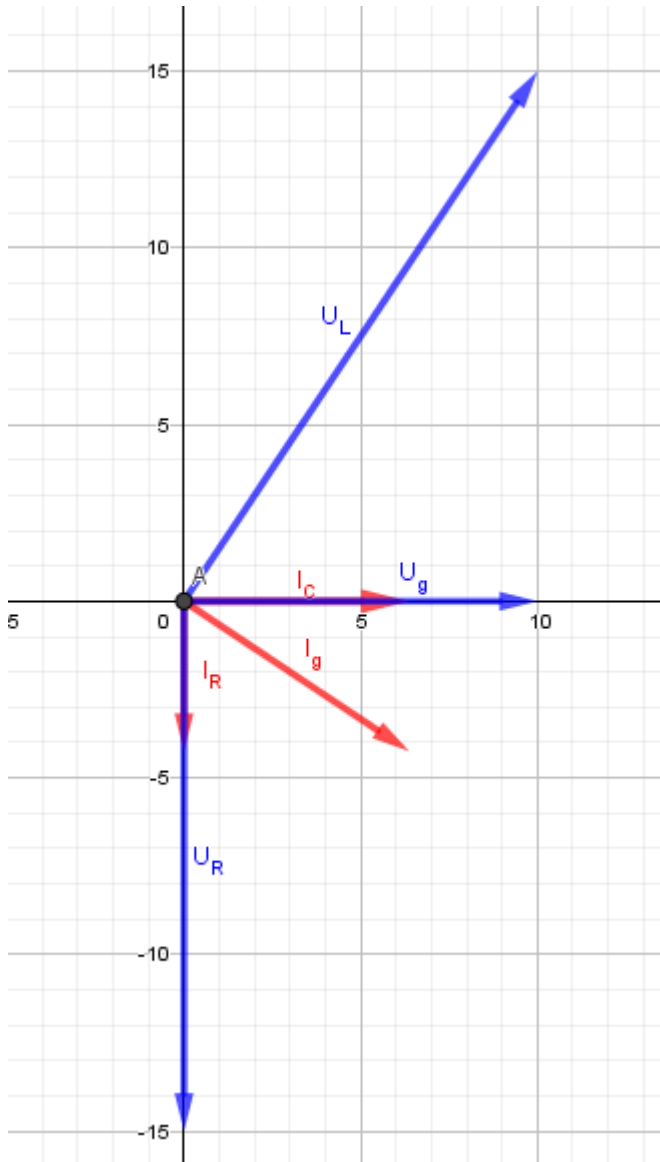
$$L = 3.183 \text{ mH}$$

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

$$C = 7.958 \mu\text{F}$$



Zeigerbild:



Alternative Lösung mittels Parallel-Reihen-Umwandlung:

$X_L = 20 \Omega$ $X_C = 20 \Omega$ $R := 30 \Omega$ $U = 10 \text{ V}$

$$Z_E := \frac{1}{\sqrt{\left(\frac{1}{R}\right)^2 + \left(\frac{1}{X_C}\right)^2}} \quad Z_E = 16.641 \Omega \quad \varphi_E := \arccos\left(\frac{Z_E}{R}\right) \quad \varphi_E = 56.31 \cdot \text{Grad}$$

$RR := Z_E \cdot \cos(\varphi_E) \quad RR = 9.231 \Omega$ $XCR := Z_E \cdot \sin(\varphi_E) \quad XCR = 13.846 \Omega$ also gesamt-ind.

$$Z := \sqrt{RR^2 + (X_L - XCR)^2} \quad Z = 11.094 \Omega \quad \varphi_g := \arccos\left(\frac{RR}{Z}\right) \quad \varphi_g = 33.69 \cdot \text{Grad}$$

$I := \frac{U}{Z} \quad I = 901.388 \cdot \text{mA}$ $U_L := I \cdot X_L \quad U_L = 18.028 \text{ V}$

$URC := I \cdot Z_E \quad URC = 15 \text{ V}$

$I_R := \frac{URC}{R} \quad I_R = 500 \cdot \text{mA}$ $I_C := \frac{URC}{X_C} \quad I_C = 750 \cdot \text{mA}$