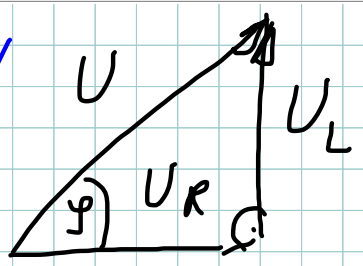
103/3 $\varphi = 60°$ $U_R = 120\,V$



$$U = \frac{U_R}{\cos\varphi} = \frac{120}{\cos 60} = 240\,V$$

$$U_L = \sqrt{U^2 - U_R^2} = \sqrt{240^2 - 120^2} =$$

$$= 207{,}8\,V$$

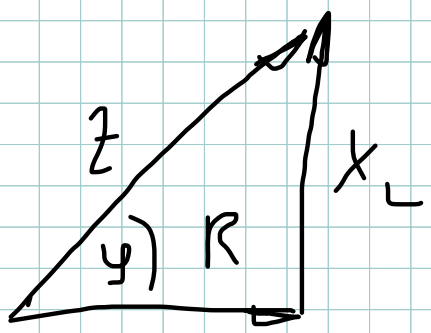
$$\operatorname{tan}\varphi = \frac{U_L}{U_R} \Rightarrow U_L = U_R \cdot \operatorname{tan}\varphi =$$

$$= 120 \cdot \operatorname{tan} 60 =$$

$$= 207{,}8\,V$$

103/4 $R = 26\,\Omega$ $f = 50\,Hz$

$U = 230\,V$ $I = 6{,}8\,A$



$$Z = \frac{U}{I} = \frac{230}{6{,}8} = 33{,}8\,\Omega$$

$$X_L = \sqrt{Z^2 - R^2} = \sqrt{33{,}8^2 - 26^2} = 21{,}6\,\Omega$$

$$L = \frac{X_L}{2\pi f} = \frac{21{,}6}{2 \cdot \pi \cdot 50} = 68{,}9\,mH$$

$$U_R = I \cdot R = 6{,}8 \cdot 26 = 176{,}8\,V$$

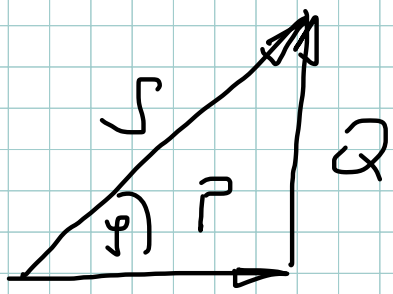
$$U_L = I \cdot X_L = 6{,}8 \cdot 21{,}6 = 146{,}9\,V$$

103/5 $U = 230\ V$ $f = 50\ Hz$

$\cos\varphi = 0,6$ $I = 0,18\ A$

$S = U \cdot I = 230 \cdot 0,18 =$

$= 41,4\ VA$

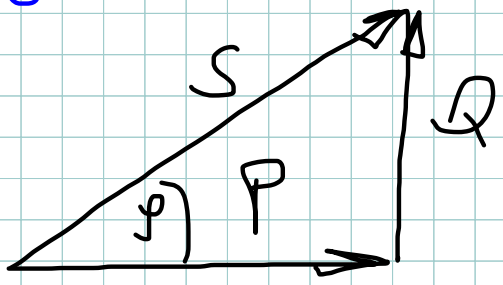


$P = S \cdot \cos\varphi = 41,4 \cdot 0,6 = 24,84\ W$

$Q = \sqrt{S^2 - P^2} = \sqrt{41,4^2 - 24,84^2} = 33,1\ Var$

103/10 $U = 230\,V$ $I = 0{,}43\,A$

$\cos\varphi = 0{,}45$

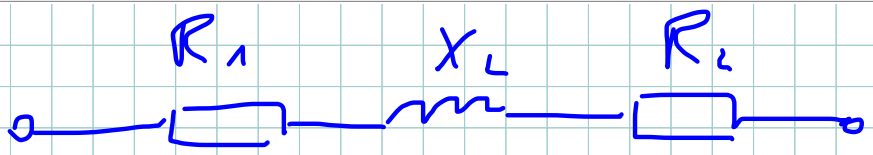


$$S = U \cdot I = 230 \cdot 0{,}43 = 98{,}9\ VA$$

$$P = S \cdot \cos\varphi = 98{,}9 \cdot 0{,}45 = 44{,}5\ W$$

$$Q = \sqrt{S^2 - P^2} = \sqrt{98{,}9^2 - 44{,}5^2} = 88{,}3\ Var$$

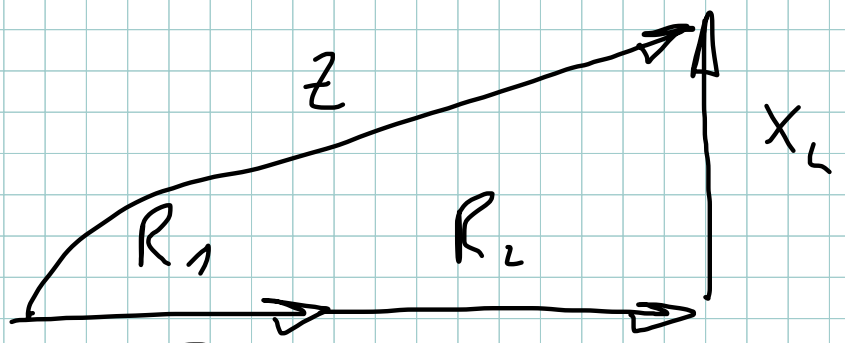
103/13



$U = 230\ V$ $\quad f = 50\ Hz$

$R_1 = 30\ \Omega$

$P_2 = 25\ W$ $\quad U_2 = 100\ V$



$$I = \frac{P_2}{U_2} = \frac{25}{100} = 0{,}25\ A$$

$$R_2 = \frac{U_2}{I} = \frac{100}{0{,}25} = 400\ \Omega$$

$$Z = \frac{U}{I} = \frac{230}{0{,}25} = 920\ \Omega$$

$$R_g = R_1 + R_2 = 30 + 400 = 430\ \Omega$$

$$X_L = \sqrt{Z^2 - R^2} = \sqrt{920^2 - 430^2} = 813{,}3\ \Omega$$

$$L = \frac{X_L}{2\pi f} = \frac{813,3}{2 \cdot \pi \cdot 50} = 2,59\,H$$

$$P = I^2 \cdot R = 0,25^2 \cdot 430 = 26,9\,W$$

$$S = U \cdot I = 230 \cdot 0,25 = 57,5\,VA$$

$$Q = \sqrt{S^2 - P^2} = \sqrt{57,5^2 - 26,9^2} = 50,8\,Var$$

Zeigerdiagramm:

$I = 0,25A \rightarrow 5\,cm$

$U_{R1} = 7,5V \rightarrow 3,75\,mm$

$U_{R2} = 100V \rightarrow 5\,cm$ $\quad 20V \hat{=} 1\,cm$

$U_L = 203V \rightarrow 10\,cm$ $\quad 0,25A \hat{=} 5\,cm$

$U = 230V \rightarrow 11,5\,cm$