2-14

Given spänning på komplex form:

$U = 230 \cdot \sqrt{2} \cdot e^{j \cdot 0} = 230 \cdot \sqrt{2}$

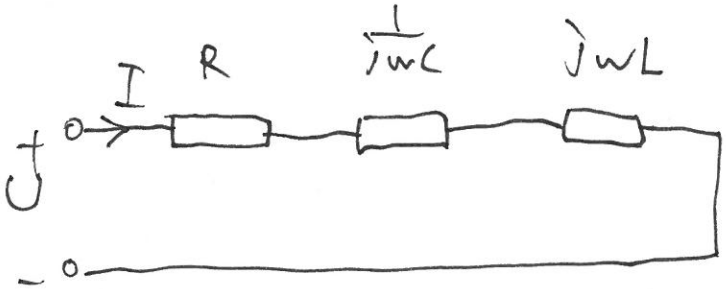
$R = 10^3\ \Omega$

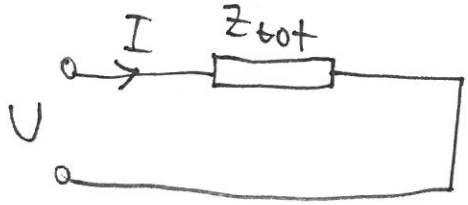
$L = 0.5\ H$

$C = 0.1\ \mu F$

$w = 2\pi \cdot 400$

Komplex schema:





$$Z_{tot} = R + \frac{1}{jwC} + jwL$$

$$= 10^3 + \frac{1}{j \cdot 2\pi \cdot 400 \cdot 0.1 \cdot 10^{-6}} + j \cdot 2\pi \cdot 400 \cdot 0.5$$

$$= 10^3 + \frac{1}{j} \cdot \frac{1}{\pi \cdot 8 \cdot 10^{-5}} + j \cdot \pi \cdot 400$$

$$= 10^3 + j \cdot \left(\pi \cdot 400 - \frac{1}{\pi \cdot 8 \cdot 10^{-5}}\right)$$

$$= 10^3 + j \cdot 2722 = 2900 \cdot e^{-j \cdot 1.219}$$

$$I = \frac{U}{Z_{tot}} = \frac{230 \cdot \sqrt{2}}{2900 \cdot e^{-j \cdot 1.219}} = 0.112 \cdot e^{j \cdot 1.219}$$

$\Rightarrow$

$$i(t) = 0.112 \cdot \sin(2\pi \cdot 400 \cdot t + 1.219)\ A$$

$$\boxed{i(t) = 0.112 \cdot \sin(2\pi \cdot 400 \cdot t + 1.219)\ A}$$