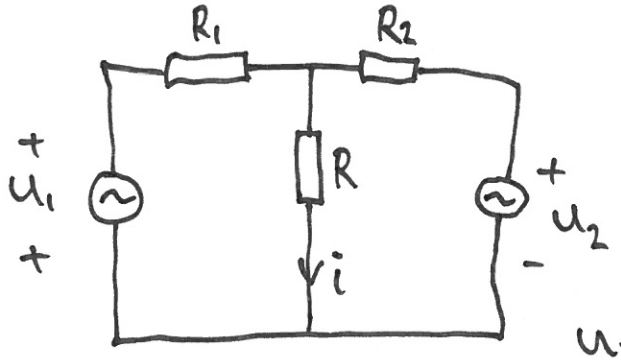
B 1.10)



$u_1(t) = 30\sqrt{2} \cdot \sin(\omega \cdot t)$ V

$R_1 = 1.0$ kΩ

$R_2 = 1.0$ kΩ

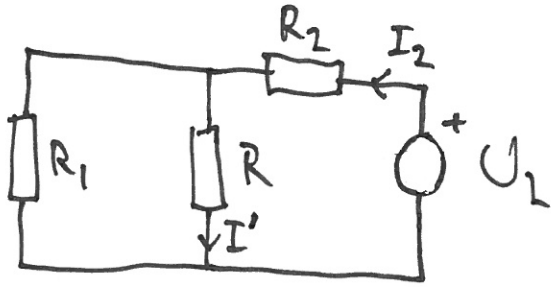
$R = 1.0$ kΩ

$u_2(t) = 60 \cdot \sin(\omega \cdot t + 45°)$ V

Beräkna i med superpositionen:

Nollställ U_1 och beräkna I':

Komplex schema:



$U_2 = 60 \cdot e^{j \cdot \pi/4}$ V

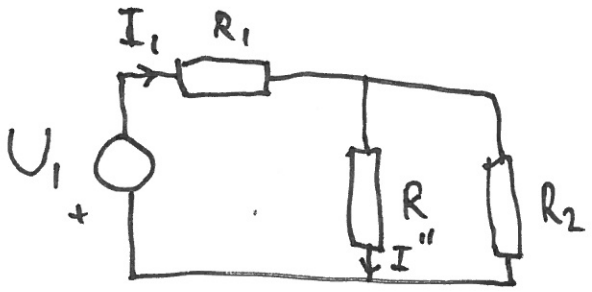
$R_{tot} = R_2 + R_1 // R = 1k + \frac{1k \cdot 1k}{1k + 1k} = 1.5k\ \Omega$

$I_2 = \frac{U_2}{R_{tot}} = \frac{60 \cdot e^{j \cdot \pi/4}}{1.5k} = 40m \cdot e^{j \cdot \pi/4}$ A

Strömdelning:

$I' = \frac{I_2 \cdot R_1}{R_1 + R} = \frac{40m \cdot e^{j\pi/4} \cdot 1k}{2k} = 20m \cdot e^{j\pi/4}$ A

Nollställ u_2 och beräkna i'':



$$U_1 = 30 \cdot \sqrt{2} \cdot e^{j \cdot 0} \text{ V}$$

$$I_1 = -U_1 / (R_1 + R \| R_2) = \frac{-30 \cdot \sqrt{2}}{1{,}5\,k} = -20\sqrt{2} \text{ mA}$$

Strömdelning:

$$I'' = \frac{I_1 \cdot R_2}{R + R_2} = \frac{-20\sqrt{2}\ \text{m}\ 1k}{2k} = -10\sqrt{2} \text{ mA}$$

$$I = I' + I'' = 20\,\text{m} \cdot e^{j\,\pi/4} - 10\sqrt{2}\,\text{m} =$$

$$= 20\text{m}\left(\cos\tfrac{\pi}{4} + j \cdot \sin \pi/4\right) - 10\sqrt{2} \cdot \text{m} =$$

$$= 20\text{m} \cdot \left(\frac{\sqrt{2}}{2} + j \cdot \frac{\sqrt{2}}{2}\right) - 10\sqrt{2} \cdot \text{m} =$$

$$= 10\sqrt{2}\,\text{m} + j \cdot 10\sqrt{2}\,\text{m} - 10\sqrt{2}\,\text{m} = j \cdot 10\sqrt{2}\,\text{m}$$

$$= 10\sqrt{2} \cdot e^{j\,\pi/2} \text{ mA}$$

$$\Rightarrow i(t) = 10\sqrt{2} \cdot \sin(\omega \cdot t + \pi/2) \text{ mA}$$