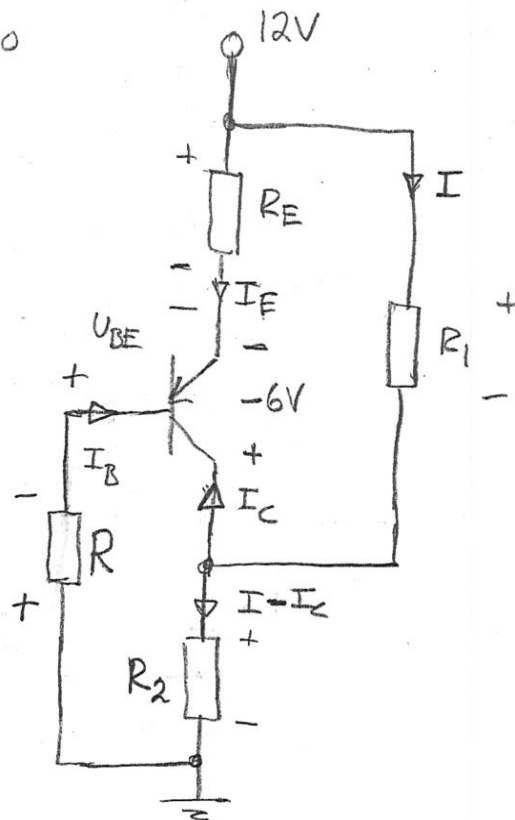


Bestäm R



$$I_C = h_{FE} I_B = 100 I_B$$

$$I_E = -(I_C + I_B) = -101 I_B$$

$$\Rightarrow -0.22 \cdot 101 I_B + 1k(I - 100 I_B) = 6V \quad (1)$$

$$+12V - R_1 \cdot I - R_2(I - I_c) = 0 \Rightarrow I = \frac{12V + R_2 I_c}{R_1 + R_2} \Rightarrow$$

$$-0,2k \cdot 101 \cdot I_B + 1k \cdot \left(4mA + \frac{100}{3} \cdot I_B\right) - 1k \cdot 100 I_B = 6V \Rightarrow$$

$$I_B = \frac{6V - 1k \cdot 4mA}{-0,2k \cdot 101 + 1k \cdot \frac{100}{3} + 1k \cdot 100} = -23,05 \mu A \Rightarrow I_E = -101 \cdot I_B = \underline{\underline{2,328mA}}$$

KVL i baseretten get R:

$$+12V - R_E I_E + V_{BE} + R I_B = 0 \Rightarrow$$

$$R = \frac{-12V + R_E I_E - U_{BE}}{I_B} = \frac{-12V + 0,2k \cdot 2,328mA - (-0,7V)}{-23,05\mu A} =$$

$$= 470 \text{ k}\Omega$$

11. Komplex representation

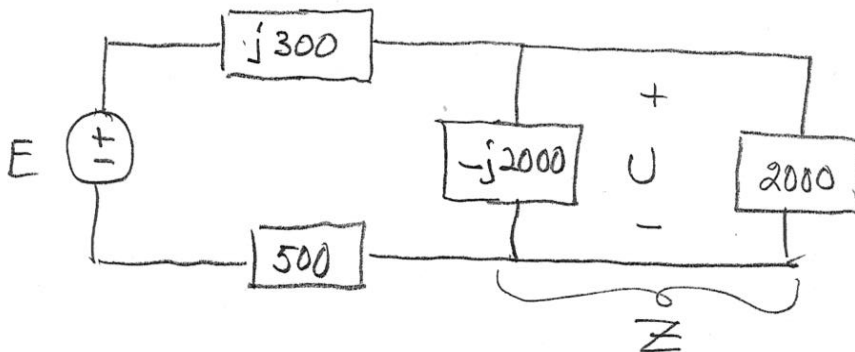
$$M(t) = 10 \sin(\omega t + 30^\circ) \text{ V} \leftrightarrow U = 10 e^{j(\omega t + 30^\circ)}$$

$$a.) \quad \omega = 1000 \text{ rad/s} \quad L \leftrightarrow j\omega L = j1000 \cdot 0,3 = j300$$

$$C \leftrightarrow \frac{1}{j\omega C} = -j \frac{1}{1000 \cdot 500 \cdot 10^{-9}} = -j2000$$

$$R \leftrightarrow 2000$$

$$e(t) = |E| \sin(\omega t + \alpha) \leftrightarrow E = |E| e^{j(\omega t + \alpha)}$$



$$Z = 2000 // (-j2000) = \frac{2000 \cdot (-j2000)}{2000 - j2000} = \frac{-j2000}{1 - j} =$$

$$= 1000 - j1000 = 1000\sqrt{2} e^{-j45^\circ}$$

Spänningsdelning ger

$$U = \frac{Z}{Z + j300 + 500} \cdot E = \frac{1000 - j1000}{1000 - j1000 + j300 + 500} \cdot E =$$

$$= \frac{1000 - j1000}{1500 - j700} \cdot E = \frac{1000\sqrt{2} e^{-j45^\circ}}{1655 e^{-j25^\circ}} \cdot E \Rightarrow$$

$$E = \frac{1655 e^{-j25^\circ}}{1000\sqrt{2} \cdot e^{-j45^\circ}} \cdot 10 e^{j(\omega t + 30^\circ)} = 11,7 e^{j(\omega t + 50^\circ)} \Rightarrow$$

$$\underline{\underline{e(t) = 11,7 \sin(1000t + 50^\circ) \text{ V}}}$$

116.

$$\omega = 2000 \text{ rad/s} \Rightarrow$$

$$L \iff \int \omega L = \int 2000L$$

$$C \leftrightarrow \frac{1}{j\omega C} = -j \frac{1}{2000 \cdot 500 \cdot 10^{-9}} = -j 1000$$

$$Z = -j1000 // 2000 = \frac{-j1000 \cdot 2000}{2000 - j1000} = \frac{-j2000}{2 - j} =$$

$$= 400 - j800 = 400\sqrt{5} e^{-j63.4^\circ} \Rightarrow$$

$$Z_{TOT} = j2000L + 500 + 400 - j800 = 900 + j(2000L - 800)$$

Fasforskytning = $30^\circ \Leftrightarrow$

$$\varphi = \arg Z_{TOT} = \pm 30^\circ \Leftrightarrow \tan \varphi = \pm \frac{1}{\sqrt{3}} \Leftrightarrow$$

$$\frac{2000L - 800}{900} = \pm \frac{1}{\sqrt{3}} \quad \Leftrightarrow \quad 2000L - 800 = \pm \frac{900}{\sqrt{3}}$$

$$\Leftrightarrow 2000L = \frac{1}{\sqrt{3}} \frac{900}{\sqrt{3}} + 800 = \begin{cases} 1319,6 \\ -280,4 \end{cases} \Rightarrow$$

$L = 659,8 \text{ mH}$ (ström 30° efter spänning)

oder $L = 140,2 \text{ mH}$ (-||- fore -||-)