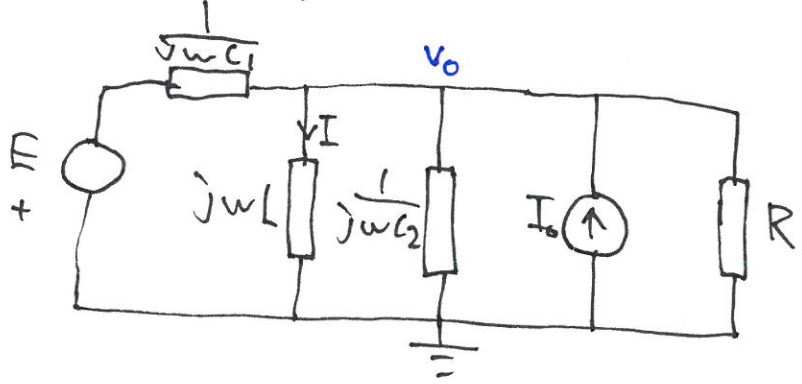
B-13) Komplexschema:



$R = 0.5\,\Omega$
$L = 1\,mH$
$C_1 = C_2 = 1\,mF$

$E = 1$
$I_0 = 2$
$\omega = 10^3$

Komplexa strömmen I beräknas m.h.a nodanalys:

$$\frac{-E-V_0}{\frac{1}{j\omega C_1}} + \frac{0-V_0}{j\omega L} + I_0 + \frac{0-V_0}{\frac{1}{j\omega C_2}} + \frac{0-V_0}{R} = 0 \quad \text{enl. KCL}$$

$$\Rightarrow V_0\left(-j - \frac{1}{j\omega} - j - \frac{1}{R}\right) = -I_0 + E\cdot j$$

($\frac{1}{j\omega} = -j$)

$$\Rightarrow V_0 = \frac{-2+1\cdot j}{-j-\frac{1}{0.5}} = \frac{-2+j}{-2-j} = \frac{(-2+j)(-2+j)}{(-2-j)(-2+j)} = \frac{4+j^2-4j}{4-j^2}$$

$$= \frac{3-4j}{5} = \frac{1}{5}\cdot\underbrace{\sqrt{3^2+(-4)^2}}_{5}\cdot e^{j\cdot\arctan(-4/3)} = e^{j\cdot\arctan(-4/3)}$$

$$I = \frac{V_0}{j\omega L} = \frac{e^{j\cdot\arctan(-4/3)}}{e^{j\cdot\pi/2}} = e^{j(\arctan(-4/3)-\pi/2)}$$

$$\Rightarrow i(t) = \sin\left(10^3\cdot t + \arctan(-4/3) - \pi/2\right)\ A$$

(Fel i facit)

$$\arctan(-4/3) - \pi/2 = 2\arctan(2) - \frac{3\pi}{2} \quad (\neq 4)$$

$$\boxed{i(t) = \sin\left(10^3\cdot t + \arctan(-4/3) - \pi/2\right)\ A}$$