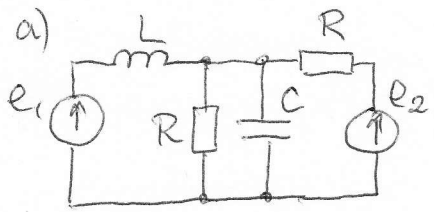
Tutorials No 6 C&S

1. Calculate currents in the circuit using superposition theorem

a)

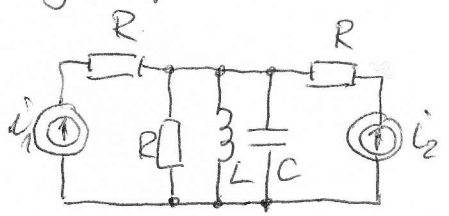


$e_1(t) = 20$

$e_2(t) = 10\sqrt{2}\sin t$

$L = 5H$, $C = 0{,}1F$, $R = 5\Omega$

b)



$i_1(t) = 5$

$i_2(t) = 4\sqrt{2}\sin(t + 90°)$

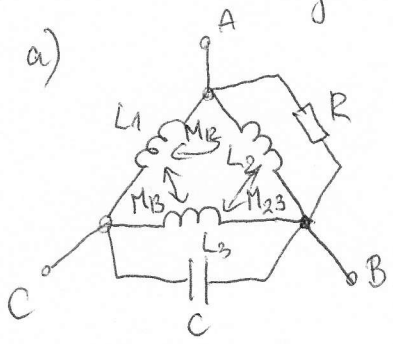
$L = 2H$

$C = 0{,}25F$

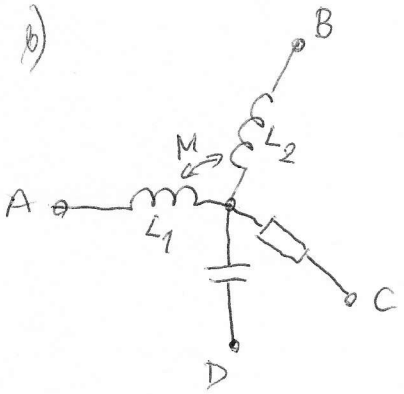
$R = 2\Omega$

2. Eliminate magnetic couplings

a)

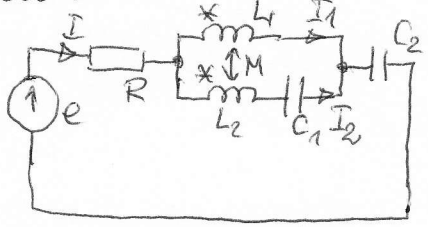


b)



3. Calculate currents & voltages on inductances

a)

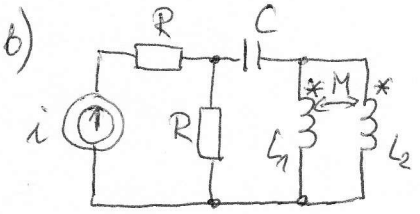


$e(t) = 20\sqrt{2}\sin(\omega t + 90°)$

$\omega L_1 = 20\Omega$, $\omega L_2 = 30\Omega$, $\omega M = 10\Omega$

$R = 20$, $\frac{1}{\omega C_1} = 20\Omega$, $\frac{1}{\omega C_2} = 30\Omega$

b)



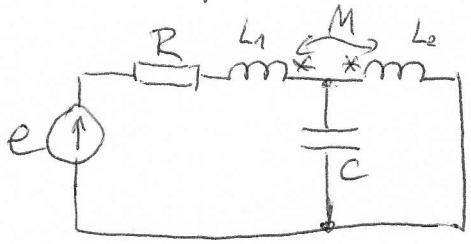
$i(t) = 10\sqrt{2}\sin(t - 90°)$

$R = 1\Omega$, $C = 1F$

$L_1 = 3H$, $L_2 = 2H$, $M = 1H$

4. Calculate powers of elements & balance of powers

a)

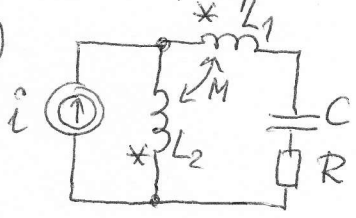


$e(t) = 100\sqrt{2}\sin(\omega t + 90°)$

$\omega L_1 = 50\Omega$, $\omega L_2 = 60\Omega$, $\omega M = 20\Omega$

$R = 80\Omega$, $\frac{1}{\omega C} = 50\Omega$

b)



$i(t) = 10\sin(\omega t + 45°)$

$R = 20\Omega$ $\frac{1}{\omega C} = 10\Omega$

$\omega L_1 = 20\Omega$, $\omega L_2 = 30\Omega$, $\omega M = 10\Omega$