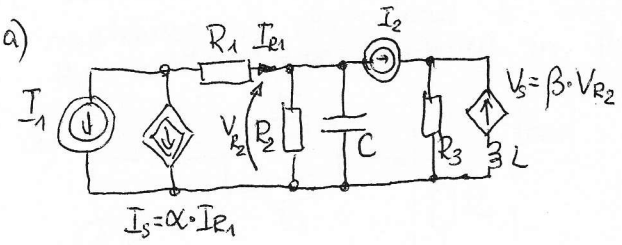
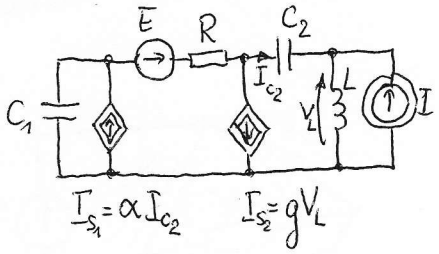
Tutorials No 5 (C&S)

1. Formulate nodal description of the circuit

a)

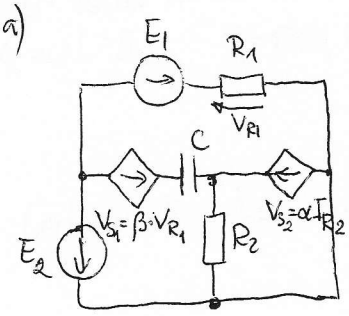


b)

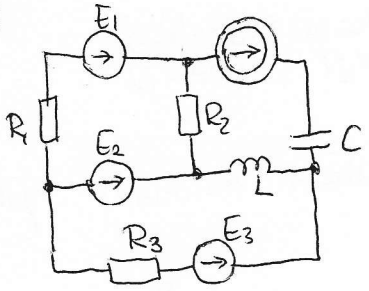


2. Formulate mesh equations for the circuit

a)

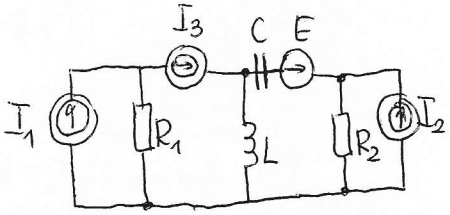


b)



3. Calculate currents in the circuit using nodal equations

a)



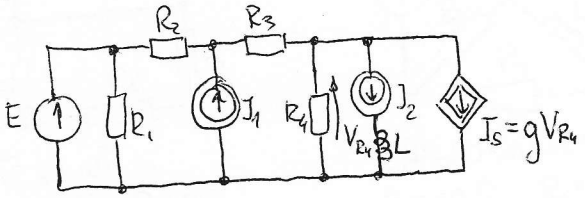
$i_1 = 2\sqrt{2}\sin(\omega t + 90°)$ $\quad R_1 = 10\Omega$

$i_2(t) = 10\sqrt{2}\sin\omega t$ $\quad R_2 = 5\Omega$

$i_3(t) = 4\sin(\omega t + 45°)$ $\quad \omega L = 5\Omega$

$e(t) = 20\sqrt{2}\sin(\omega t - 90°)$ $\quad \frac{1}{\omega C} = 5\Omega$

b)



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

$i_1(t) = 4\sqrt{2}\sin(\omega t + 90°)$

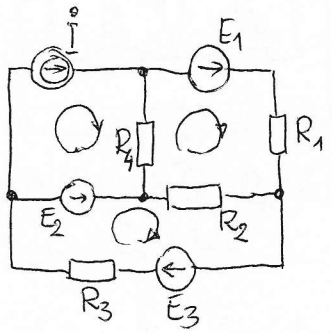
$i_2(t) = 10\sqrt{2}\sin(\omega t - 90°)$

$R_1 = R_2 = R_3 = R_4 = 1\Omega$

$g = 2$

4. Calculate currents in the circuit using mesh equations

a)



$i(t) = 4\sqrt{2}\sin(\omega t)$

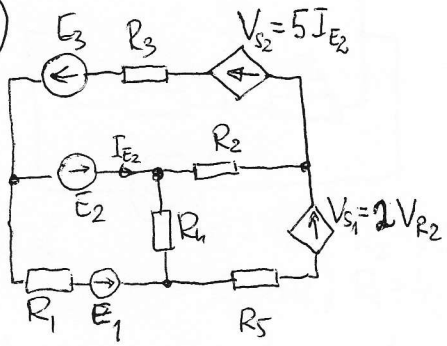
$e_1(t) = 20\sqrt{2}\sin(\omega t + 90°)$

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

$e_3(t) = 20\sin(\omega t + 45°)$

$R_1 = R_2 = R_3 = R_4 = 10\Omega$

b)



$e(t) = E_1 = 20$ $\quad R_1 = R_2 = 10\Omega$

$e_2(t) = E_2 = 10$ $\quad R_3 = R_4 = 5\Omega$

$e_3(t) = E_3 = 40$ $\quad R_5 = 20\Omega$