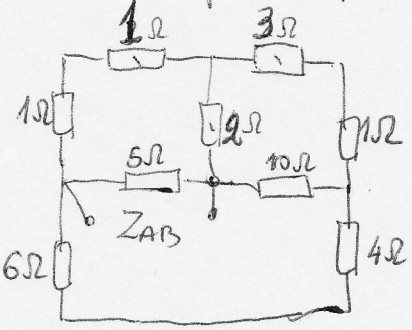
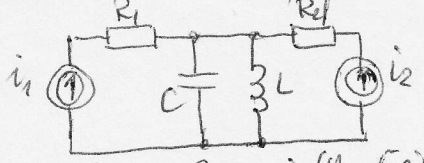
Zadania do kolokwium I (przykładowe)

1. Calculate input impedance Z_{AB}



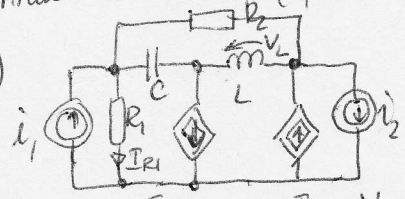
2. Calculate currents, powers & balance of powers in the circuit



$i_1(t) = 2\sqrt{2}\sin\omega t$, $i_2(t) = 5\sin(\omega t + 45°)$
$R_1 = 2\Omega$, $R_2 = 3\Omega$, $X_L = \omega L = 10\Omega$, $X_C = \frac{1}{\omega C} = 5\Omega$

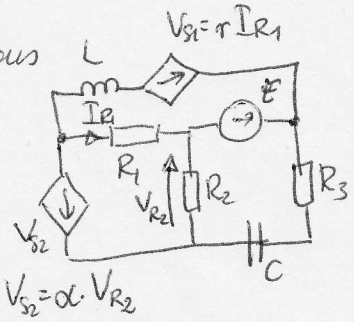
3. Formulate nodal (a) & mesh (b) equations

a)



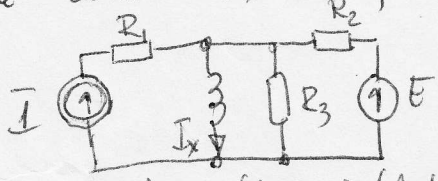
$I_{S1} = \alpha I_{R_1}$ $I_{S2} = gV_L$

b)



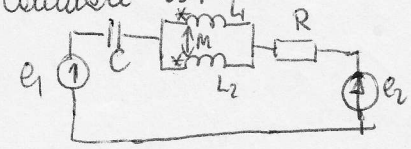
$V_{S2} = \alpha \cdot V_{R_2}$

4. Calculate current I_x using Thevenin theorem



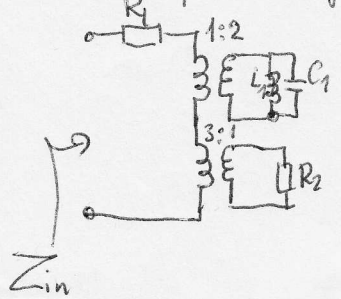
$i(t) = 10\sqrt{2}\sin\omega t$, $e(t) = 30\sin(\omega t - 45°)$
$R_1 = 2\Omega$, $R_2 = 10\Omega$, $R_3 = 5\Omega$, $\omega L = 4\Omega$

5. Calculate currents & voltages of the coupled inductors



$e_1 = 20\sqrt{2}\sin(\omega t + 90°)$, $e_2 = 30\sqrt{2}\sin(\omega t - 90°)$
$R = 5\Omega$, $\omega L_1 = 20\Omega$, $\omega L_2 = 30\Omega$, $\omega M = 10\Omega$, $\frac{1}{\omega C} = 10\Omega$

6. Calculate input impedance of the circuit



$R_1 = 10\Omega$
$R_2 = 3\Omega$
$\omega L_1 = 20\Omega$
$\frac{1}{\omega C_1} = 40\Omega$