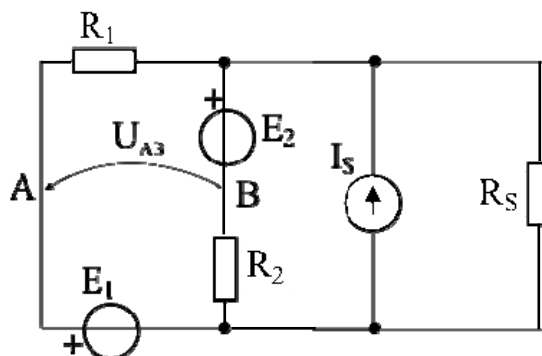


Pripremni zadaci iz Osnova elektrotehnike
grupa A

1. U kolu na slici odrediti:

- a) jačine struja u svim granama,
- b) snage svih generatora,
- c) napon između tačaka A i B, U_{AB} .

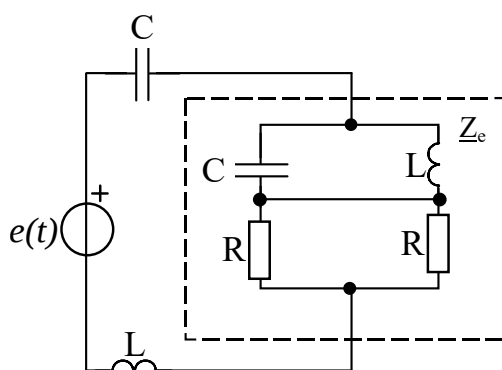
Brojni podaci: $E_1=16V$, $E_2=52V$, $R_1=40\Omega$, $R_2=20\Omega$, $R_S=10\Omega$, $I_S=0,5A$.



2. U kolu na slici odrediti:

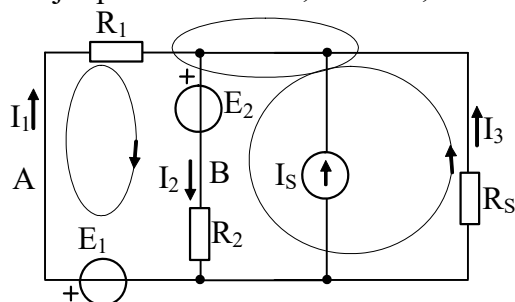
- a) ekvivalentnu impedansu $\underline{Z}_e$,
- b) trenutnu vrednost jačine struje kroz generator elektromotorne sile $e(t)$, $i(t)$,
- c) kompleksnu snagu generatora elektromotorne sile $e(t)$.

Poznato je: $e(t) = 50\sqrt{2} \cos(1000 \cdot t + 2\pi)$ A, $R=40\Omega$, $L=40mH$, $C=50\mu F$.



Pripremni zadaci iz Osnova elektrotehnike
grupa A, rešenje

1. Brojni podaci: $E_1=16V$, $E_2=52V$, $R_1=40\Omega$, $R_2=20\Omega$, $R_S=10\Omega$, $I_S=0,5$.



a) 1: $-I_S - I_1 + I_2 - I_3 = 0$
 I: $E_2 + I_2 R_2 + I_3 R_S = 0$
 II: $E_2 + I_2 R_2 - E_1 + I_1 R_1 = 0$

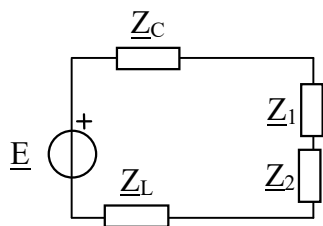
$I_1 = -0,1A,$
 $I_2 = -1,6A$
 $I_3 = -2A$

b) $P_{E1} = E_1 I_1 = -1,6W$
 $P_{E2} = -E_2 I_2 = 83,2W$

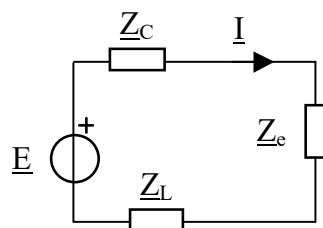
$P_S = U_S I_S = -I_3 R_S \cdot I_S$
 $= 10W$

c) $U_{AB} = R_1 I_1 + E_2 = 48V$

2. Poznato je: $e(t) = 50\sqrt{2} \cos(1000t + 2\pi) V$, $R=40\Omega$, $L=40mH$, $C=50\mu F$.



$Z_L = j40\Omega$, $Z_R = 40\Omega$, $Z_C = -j20\Omega$
 $\underline{E} = 50 e^{j360} A = 50V$



$Z_1 = Z_C \parallel Z_L = (0 - j40)\Omega$
 $Z_2 = Z_R \parallel Z_R = (20 + j0)\Omega$
 $Z_e = Z_1 + Z_2 = (20 - j40)\Omega$

$\underline{I} = \underline{E} / (\underline{Z}_C + \underline{Z}_e + \underline{Z}_L) = 50 / (20 - j20)$
 $= (1,25 + j1,25)A$

$i(t) = 2,5\cos(1000t + 45^\circ)V$

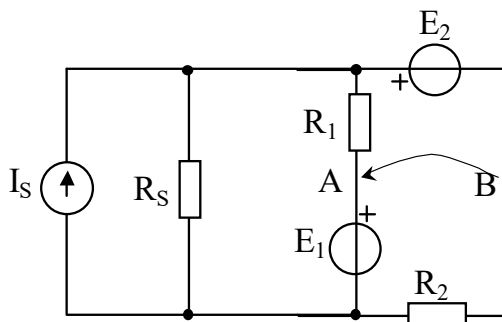
$\underline{S}_E = \underline{E} \underline{I}^* = (62,5 - j62,5)VA$

**Pripremni zadaci iz Osnova elektrotehnike
grupa B**

1. U kolu na slici odrediti:

- a) jačine struja u svim granama,
- b) snage svih generatora u kolu,
- c) napon između tačaka A i B.

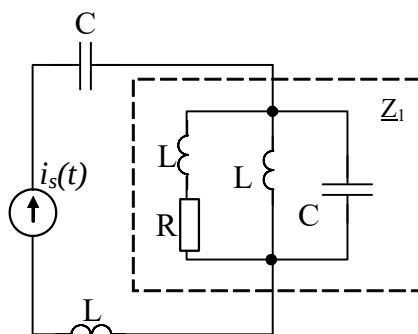
Brojni podaci: $E_1=16\text{V}$, $E_2=52\text{V}$, $R_1=40\Omega$, $R_2=20\Omega$, $I_S=0,5\text{A}$, $R_S=10\Omega$.



2. U kolu na slici odrediti:

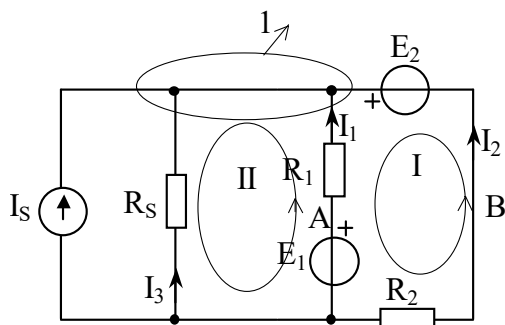
- a) ekvivalentnu impedansu $\underline{Z}_1$,
- b) trenutnu vrednost napona $u_1(t)$, na impedansi $\underline{Z}_1$,
- c) kompleksnu snagu koja se razvije na impedansi $\underline{Z}_1$.

Poznato je: $i_s(t) = 0,5\sqrt{2} \cos(1000t - \pi/2) \text{ A}$, $R=40\Omega$, $L=20\text{mH}$, $C=100\mu\text{F}$.



Pripremni zadaci iz Osnova elektrotehnike
grupa B, rešenje

1. Brojni podaci: $E_1=16V$, $E_2=52V$, $R_1=40\Omega$, $R_2=20\Omega$, $I_S=0,5A$, $R_S=10\Omega$.



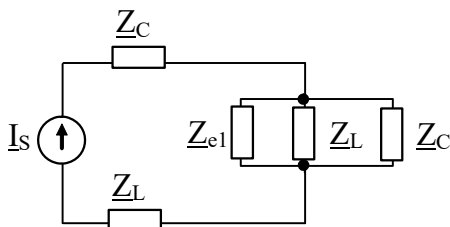
a) 1: $+I_S + I_1 + I_2 + I_3 = 0$
 I: $-E_2 - I_1 R_1 + E_1 + I_2 R_2 = 0$
 II: $I_1 R_1 - E_1 - I_3 R_S = 0$

$I_1 = -0,1A$,
 $I_2 = 1,6A$
 $I_3 = -2A$

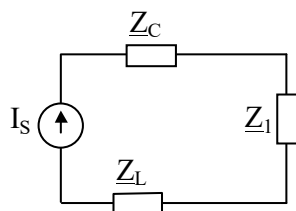
b) $P_{E1} = E_1 I_1 = -1,6W$
 $P_{E2} = E_2 I_2 = 83,2W$
 $P_{I_S} = U_S I_S = -I_3 R_S I_S = 10W$

c) $U_{AB} = E_1 + R_2 I_2 = 48V$

2. Poznato je: $i_s(t) = 0,5\sqrt{2} \cos(1000t - \pi/2) A$, $R=40\Omega$, $L=20mH$, $C=100\mu F$.



$Z_L = j20\Omega$, $Z_R = 40\Omega$, $Z_C = -j10\Omega$
 $\underline{I}_S = 0,5 e^{-j90} A = -j0,5A$



$Z_{e1} = Z_R + Z_L = (40 + j20)\Omega$
 $Z_1 = Z_{e1} \parallel Z_L \parallel Z_C = (10 - j20)\Omega$

$\underline{U}_1 = \underline{Z}_1 \underline{I}_S = (-10 - j5)V = 11,18 e^{-j153} V$
 $u_1(t) = 15,81 \cos(1000t - 153^\circ) V$

$\underline{S}_{Z_1} = \underline{U}_1 \underline{I}_S^* = \underline{Z}_1 |\underline{I}_S|^2 = (10 - j20) \cdot 0,5^2 = (2,5 - j5) VA$