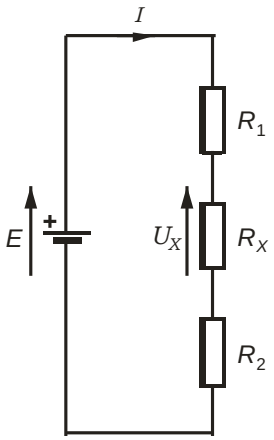
24.10.2005., Zagreb

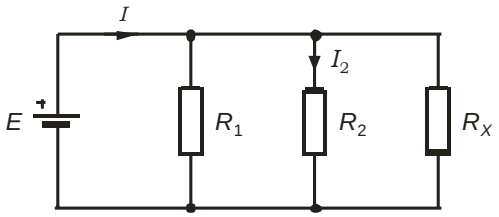
2. domaća zadaća iz Osnova elektrotehnike i elektronike

1. U krugu na slici poznato je: E = 120 V, R_1 = 30 Ω, R_2 = 60 Ω, U_X = 40 V. Izračunajte I, U_1, R_X i U_2.
2. U spoju na slici zadano je: I = 10 A, I_2 = 2 A, R_1 = 20 Ω, R_2 = 40 Ω. Izračunajte E, R_X i I_X.

1.



2.



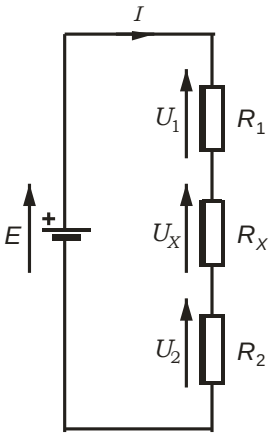
Rješenja

1. $E = U_1 + U_X + U_2 = R_1 \cdot I_1 + U_X + R_2 \cdot I_2$

$I_1 = I_2 = I_X = I$

$E = (R_1 + R_2) \cdot I + U_X$

$$\boxed{I = \frac{E - U_X}{R_1 + R_2} = \frac{80}{90} = 0{,}8\dot{8}\ A}$$



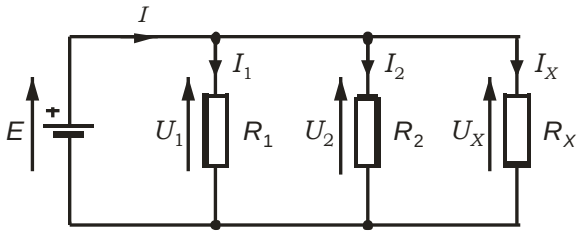
$$\boxed{U_1 = R_1 \cdot I = 26{,}\dot{6}\ V} \qquad \boxed{U_2 = R_2 \cdot I = 53{,}\dot{3}\ V}$$

$$\boxed{R_X = \frac{U_X}{I} = 45\ \Omega}$$

Provjera za napone $U_1 + U_2 = E - U_X$ ... $80 = 80$

Provjera za struju $I = \dfrac{E}{R_1 + R_X + R_2} = \dfrac{120}{135} = 0{,}8\dot{8}\ A$

2.



$I = I_1 + I_2 + I_X$

$U_1 = U_2 = U_X = E$

$U_2 = R_2 \cdot I_2 = 80\ V$

$\boxed{E = 80\ V}$

$I_1 = \dfrac{U_1}{R_1} = 4\ A$

$\boxed{I_X = I - I_1 - I_2 = 4\ A}$

$\boxed{R_X = \dfrac{U_X}{I_X} = 20\ \Omega}$

Provjera

$E = R_{uk} \cdot I$

$R_{uk} = R_1 \| R_2 \| R_X = \dfrac{1}{\dfrac{1}{R_1} + \dfrac{1}{R_2} + \dfrac{1}{R_X}} = 8\ \Omega,$ $\qquad E = 8 \cdot 10 = 80\ V$