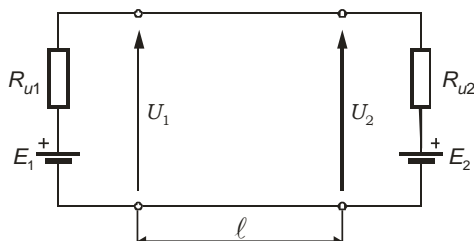
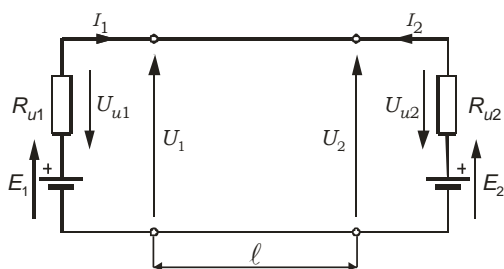


3. domaća zadaća iz Osnova elektrotehnike i elektronike

1. Dva akumulatora spojena su međusobno kao na slici bakrenim vodičima od kojih je svaki dugačak $l = 2,5$ m. Presjek vodiča je $S = 1,5$ mm², a specifični otpor $\rho = 0,0175$ Ω mm²/m. Izračunajte snagu prvog i drugog akumulatora te snagu na vodičima ako je zadano: $E_1 = 14$ V, $R_{u1} = 30$ m Ω , $E_2 = 11,5$ V, $R_{u2} = 150$ m Ω .



Rješenje:



$$U_1 = E_1 - U_{u1} = E_1 - R_{u1} \cdot I_1$$

$$U_2 = E_2 - U_{u2} = E_2 - R_{u2} \cdot I_2$$

$$I_1 = -I_2 = \frac{E_1 - E_2}{R_{u1} + R_{u2} + R_v}$$

$$R_v = \rho \frac{2l}{S} = 58,3 \text{ m}\Omega, \quad I_1 = 10,49 \text{ A}$$

$$U_{u1} = 314,7 \text{ mV}, \quad U_1 = 13,69 \text{ V}, \quad U_{u2} = -1,573 \text{ V}, \quad U_2 = 13,07 \text{ V}.$$

$$P_1 = U_1 \cdot I_1 = 143,6 \text{ W} \quad \text{Izvor } E_1 \text{ predaje energiju, jer je } P_1 > 0.$$

$$P_2 = U_2 \cdot I_2 = -137,1 \text{ W} \quad \text{Izvor } E_2 \text{ prima energiju, jer je } P_2 < 0.$$

Provjera:

$$\text{Načelo ravnoteže snaga: } P_1 + P_2 = P_v, \quad P_{E1} - P_{Ru1} + P_{E2} - P_{Ru2} = P_v$$

$$P_{E1} = E_1 \cdot I_1 = 146,9 \text{ W}, \quad P_{E2} = E_2 \cdot I_2 = -120,6 \text{ W},$$

$$P_{Ru1} = R_{u1} \cdot I_1^2 = 3,301 \text{ W}, \quad P_{Ru2} = R_{u2} \cdot I_2^2 = 16,50 \text{ W}, \quad P_v = R_v \cdot I_1^2 = 6,418 \text{ W}.$$