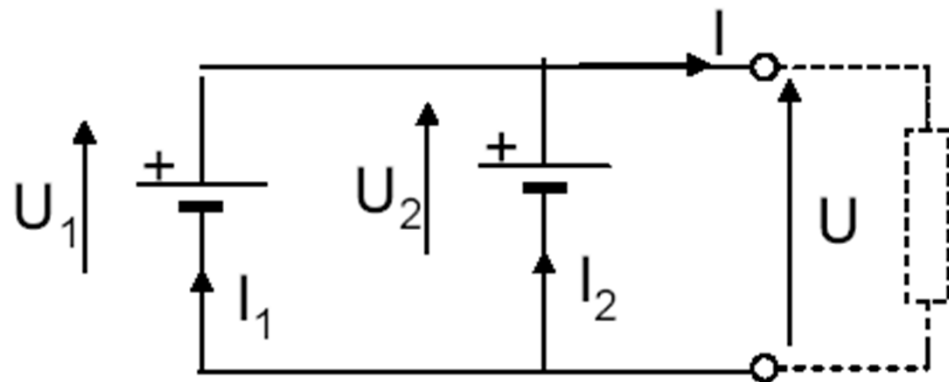


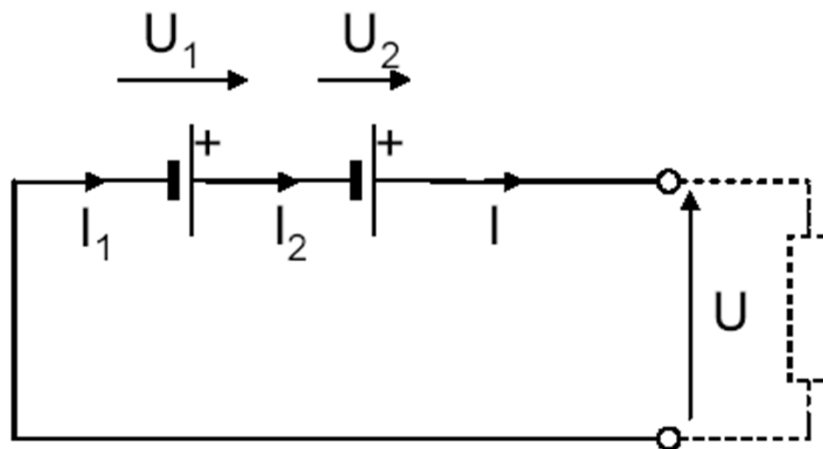
# SPAJANJE OTPORNIKA

## PARALELNI SPOJ IZVORA



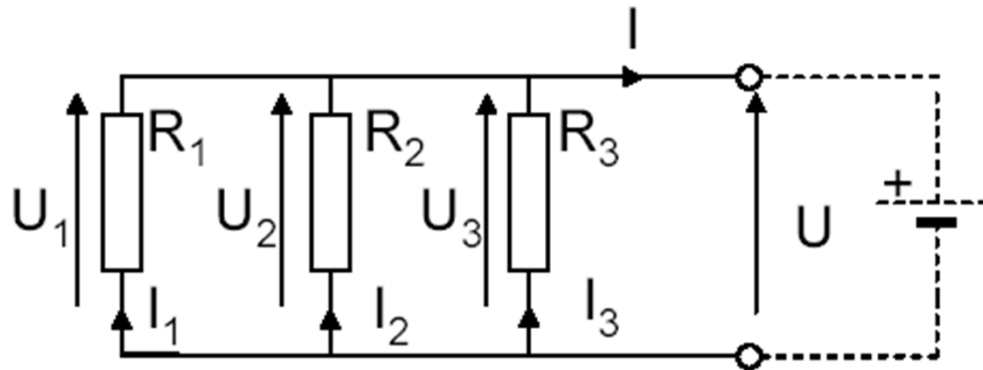
- $U = U_1 = U_2$
- $I = I_1 + I_2$

## SERIJSKI SPOJ IZVORA



- $U = U_1 + U_2$
- $I = I_1 = I_2$

# PARALELNI SPOJ OTPORA (TROŠILA)



$$R_1 \neq R_2 \neq R_3$$

$$I_1 \neq I_2 \neq I_3$$

$$I = I_1 + I_2 + I_3$$

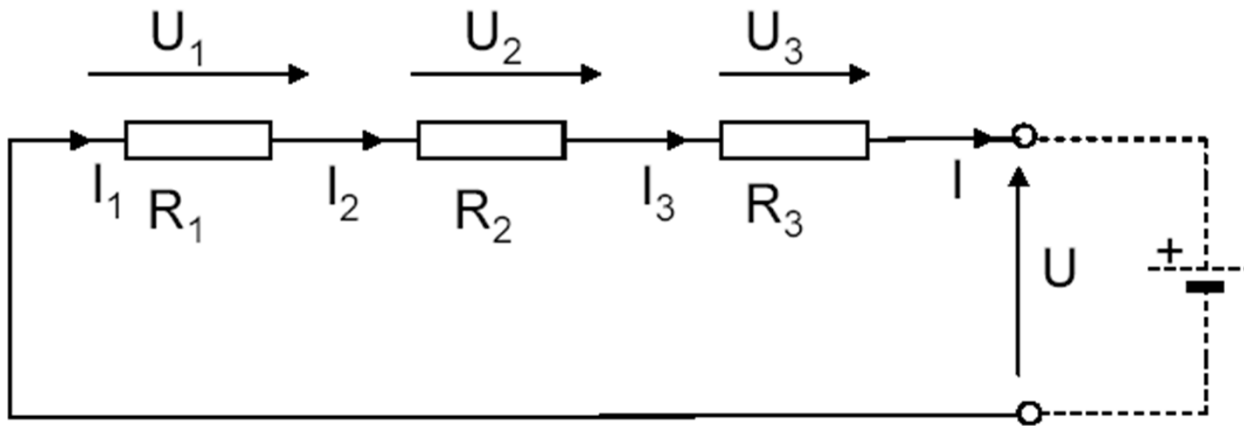
$$U_1 = U_2 = U_3 = U$$

$$\frac{1}{R_{uk}} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$$

$$R_{uk} = \frac{R_1 * R_2}{R_1 + R_2}$$

Specijalni slučaj kada su samo dva otpora u paralelnom spoju

# SERIJSKI SPOJ OTPORA



$$R_1 \neq R_2 \neq R_3$$

$$R_{UK} = R_1 + R_2 + R_3$$

$$U_1 \neq U_2 \neq U_3$$

$$I_1 = I_2 = I_3 = I$$

$$U = U_1 + U_2 + U_3$$

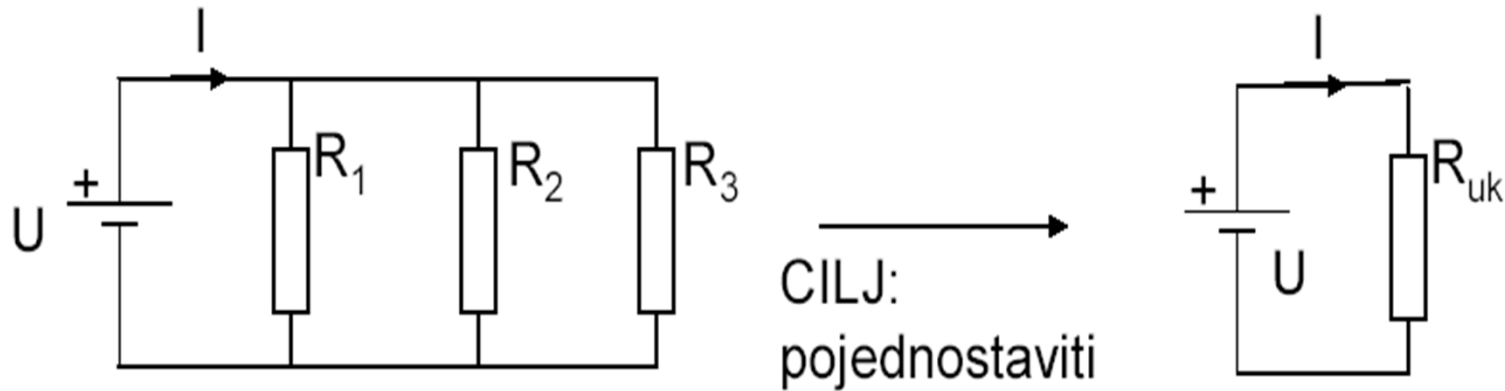
## PRIMJERI:

1. Izračunaj struju koju daje idealni izvor od 12 (V), za:

a) Paralelan spoj

b) Serijski spoj tri žarulje od po 1 ( $\Omega$ ).

## a) Paralelni spoj

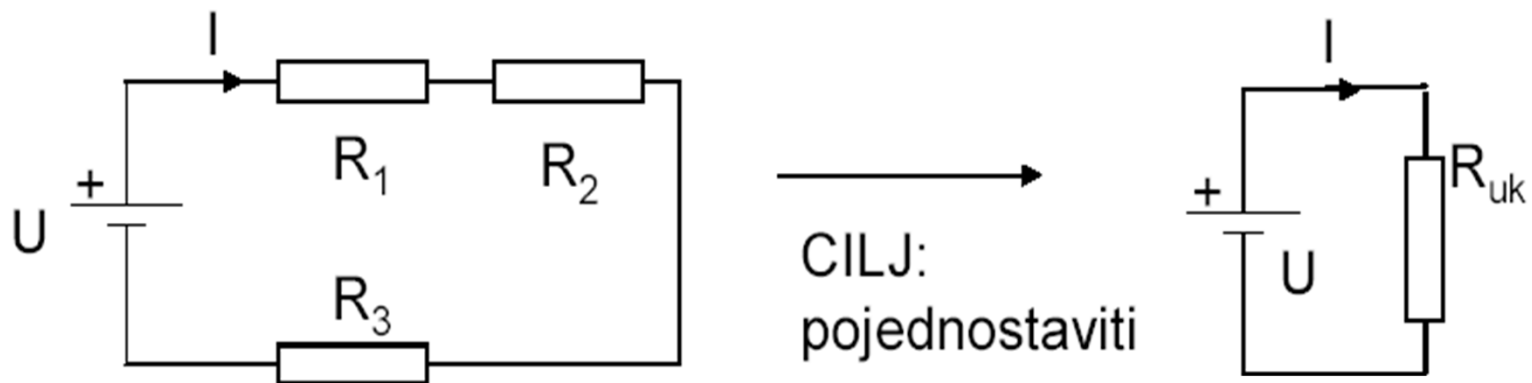


$$\frac{1}{R_{uk}} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} = \frac{1}{1} + \frac{1}{1} + \frac{1}{1} = \frac{3}{1}$$

$$R_{uk} = \frac{1}{3} \Omega$$

$$I = \frac{U}{R_{uk}} = \frac{12}{0,333} = 36 A$$

## b) Serijski spoj

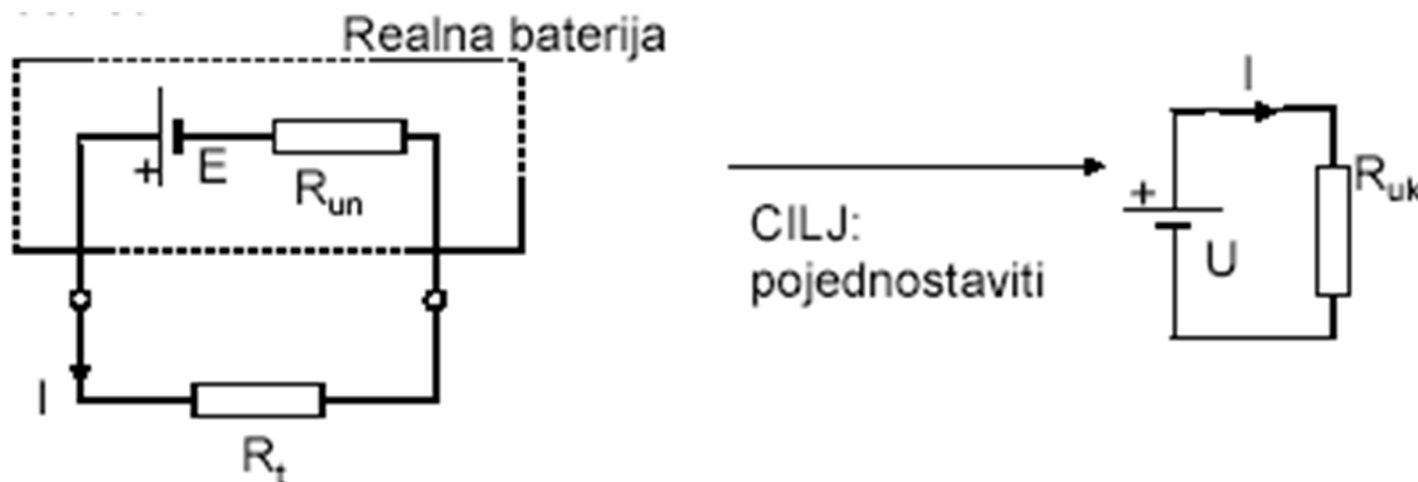


$$R_{uk} = R_1 + R_2 + R_3 = 1 + 1 + 1 = 3\Omega$$

$$I = \frac{U}{R_{uk}} = \frac{12}{3} = 4A$$

Primijetite da u paralelnom spoju sva trošila koriste veću struju i veći napon nego u serijskom spoju

2. Odredite struju u strujnom krugu koji se sastoji od realne baterije ( $E=10\text{ V}$ ,  $R_{un}=1\Omega$ ) i vanjskog trošila od  $9\Omega$ .



$E$ ..elektromotorna sila (idealan izvor unutar baterije)

$R_{un}$ ..unutrašnji otpor baterije (korekcija dealne baterije)

$$R_{uk} = R_{un} + R_t$$

$$I = \frac{U}{R_{uk}} = \frac{U}{R_{un} + R_t} = \frac{10}{9+1} = 1A$$



3) Elektromotorna sila baterije je 5,3V. Na stezaljkama baterije nalazi se napon od 5V  
 Pri jakosti struje od 0,5A. Koliki je unutarnji otpor i otpor trošila ?

$$E=5,3V$$

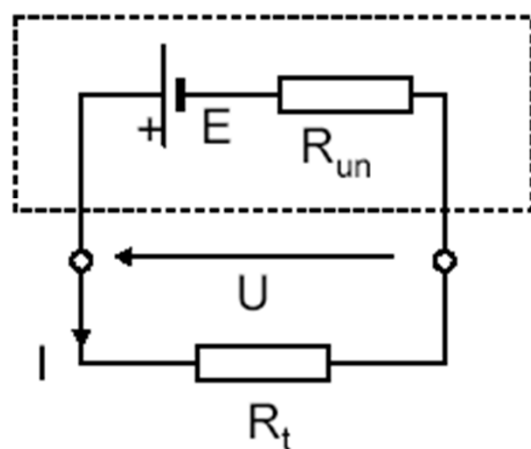
$$U=5V$$

$$I=0,5A$$

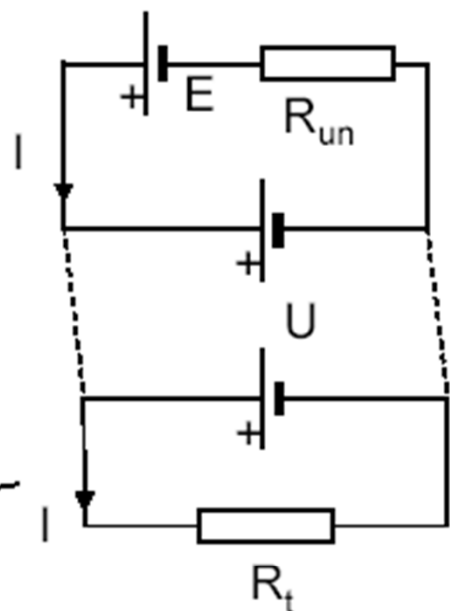

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$$R_t=?$$

$$R_{un}=?$$

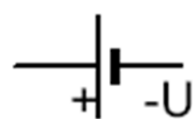


CILJ:  
pojednostaviti

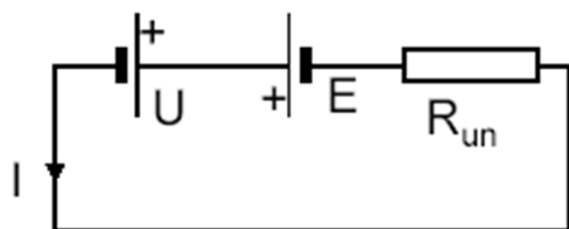


Iz donje sheme

$$R_t = \frac{U}{I} = \frac{5}{0,5} = 10\Omega$$



Uvrštavanjem u gornju shemu:



$$R_{un} = \frac{E - U}{I} = \frac{5,3 - 5}{0,5} = 0,6\Omega$$

4) Unutrašnji otpor izvora je  $2\Omega$ . Ako na izvor spojimo trošilo od  $12\Omega$  poteći će struja od  $0,5A$ . Kolika je elektromotorna sila izvora ? Koliko je napon na stezaljkama ?

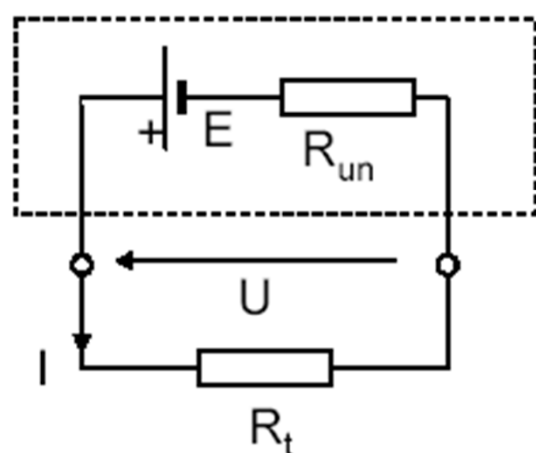
$$R_t = 12\Omega$$

$$R_{un} = 2\Omega$$

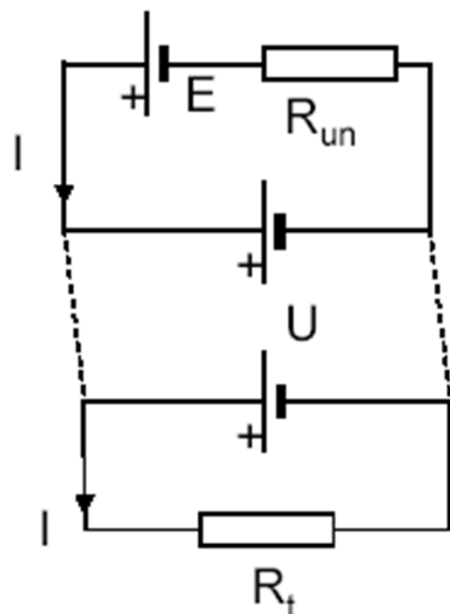
$$I = 0,5A$$

$$E = ?$$

$$U = ?$$



CILJ:  
pojednostaviti



Iz donje sheme:

$$U = I * R_t = 0,5 * 12 = 6V$$

Uvrštavanjem u gornju shemu, koristeći  $-U$  prema prethodnom zadatku

$$R_{un} = \frac{E - U}{I} \Rightarrow E - U = R_{un} * I$$

$$E = (R_{un} * I) + U = (2 * 0,5) + 6 = 7V$$