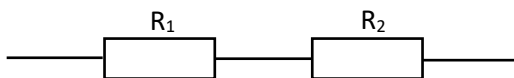


Otpornike u strujne krugove možemo spajati serijski i paralelno.

SERIJSKI SPOJ

$$R_{uk} = R_1 + R_2$$

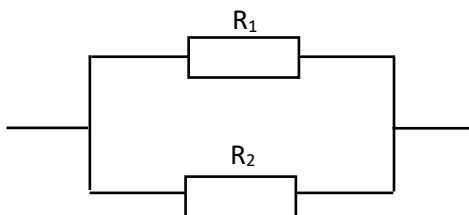


PARALELNI SPOJ

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

odnosno

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



Zadatak 1.

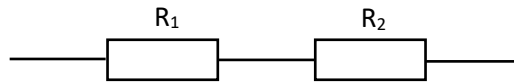
Služeći se tablicom boja otpornika, izračunaj vrijednost otpornika iz tablice

| Oznaka otpornika | Slika otpornika | boje otpornika | Iznos (Ω) |
|------------------|-----------------|--------------------------------------|--------------------|
| R ₁ | | smeđa/crna/smeđa/zlatna | |
| R ₂ | | crvena/ljubičasta/smeđa/srebrna | |
| R ₃ | | narančasta/plava/žuta/crvena/srebrna | |
| R ₄ | | zelena/plava/smeđa/zlatna | |
| R ₅ | | narančasta/bijela/crvena/srebrna | |

Zadatak 2.

Izračunaj i prikaži postupak računanja ukupnog otpora strujnog kruga služeći se vrijednostima otpornika iz zadatka 1.

a)

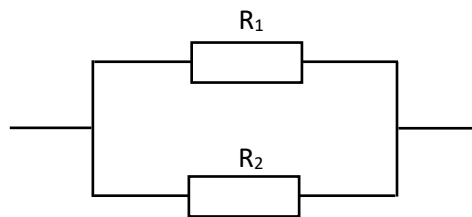


$$R_1 = 100 \Omega$$

$$R_2 = 270 \Omega$$

$$R_{uk} = R_1 + R_2 = 100 \Omega + 270 \Omega = 370 \Omega$$

b)

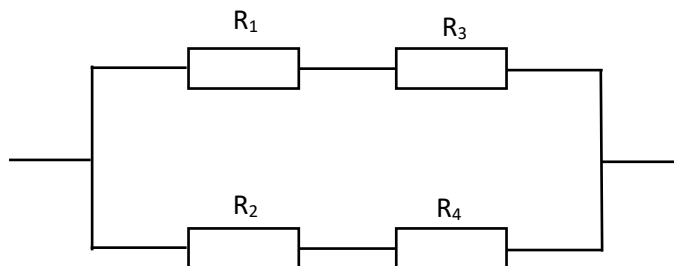


$$R_1 = 100 \Omega$$

$$R_2 = 270 \Omega$$

$$R_{uk} = \frac{R_1 \cdot R_2}{R_1 + R_2} = \frac{100 \cdot 270}{100 + 270} = \frac{27000}{370} = 72,97 \Omega \sim 73 \Omega$$

c)



$$R_1 = 100 \Omega$$

$$R_2 = 270 \Omega$$

$$R_3 = 36400 \Omega$$

$$R_4 = 560 \Omega$$

Prvi način

$$R_{13} = R_1 + R_3 = 100 + 36400 = 36500 \Omega$$

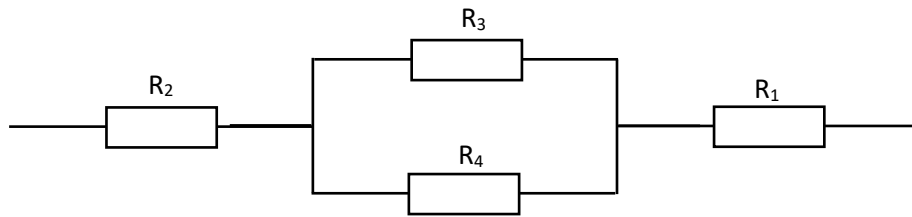
$$R_{24} = R_2 + R_4 = 270 + 560 = 830 \Omega$$

$$R_{uk} = \frac{R_{13} \cdot R_{24}}{R_{13} + R_{24}} = \frac{36500 \cdot 830}{36500 + 830} = \frac{30295000}{37330} = 811,55 \Omega \sim 812 \Omega$$

Drugi način

$$\begin{aligned} R_{uk} &= \frac{(R_1 + R_3) \cdot (R_2 + R_4)}{(R_1 + R_3) + (R_2 + R_4)} = \frac{(100 + 36400) \cdot (270 + 560)}{(100 + 36400) + (270 + 560)} = \frac{36500 \cdot 830}{36500 + 830} = \\ &= \frac{30295000}{37330} = 811,55 \Omega \sim 812 \Omega \end{aligned}$$

d)



$$R_1 = 100 \Omega$$

$$R_2 = 270 \Omega$$

$$R_3 = 36400 \Omega$$

$$R_4 = 560 \Omega$$

Prvi način

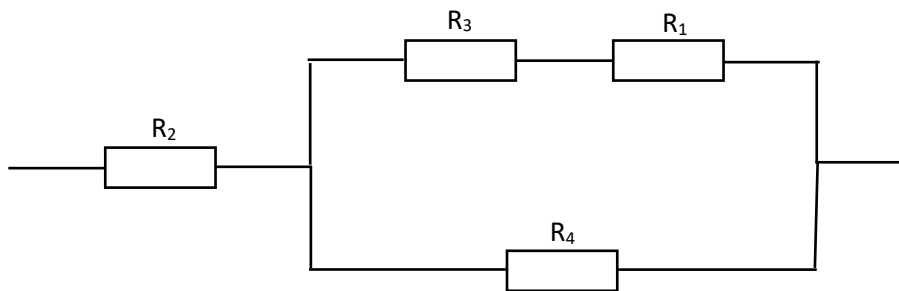
$$R_{34} = \frac{R_3 \cdot R_4}{R_3 + R_4} = \frac{36400 \cdot 560}{36400 + 560} = \frac{20384000}{36960} = 551,52 \Omega \sim 552 \Omega$$

$$R_{uk} = R_2 + R_{34} + R_1 = 270 + 552 + 100 = 922 \Omega$$

Drugi način

$$R_{uk} = R_2 + \frac{R_3 \cdot R_4}{R_3 + R_4} + R_1 = 270 + \frac{36400 \cdot 560}{36400 + 560} + 100 = 270 + 551,52 + 100 = 921,52 \Omega \sim 922 \Omega$$

e)



$$R_1 = 100 \Omega$$

$$R_2 = 270 \Omega$$

$$R_3 = 36400 \Omega$$

$$R_4 = 560 \Omega$$

Prvi način

$$R_{31} = R_3 + R_1 = 36400 + 100 = 36500 \Omega$$

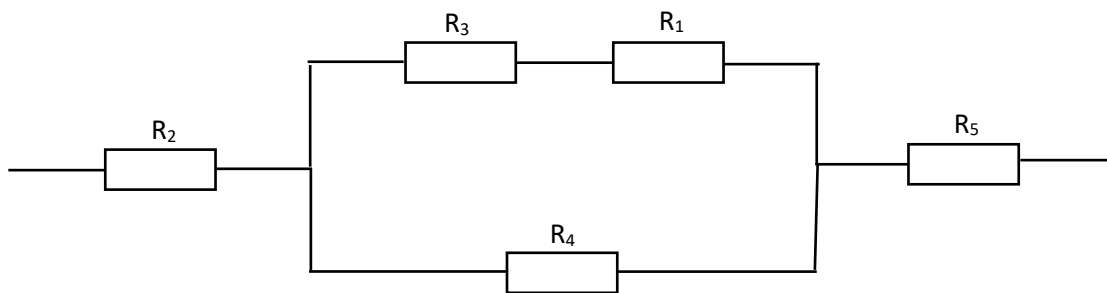
$$R_{314} = \frac{R_{31} \cdot R_4}{R_{31} + R_4} = \frac{36500 \cdot 560}{36500 + 560} = \frac{20440000}{37060} = 551,54 \Omega \sim 552 \Omega$$

$$R_{uk} = R_2 + R_{314} = 270 + 552 = 922 \Omega$$

Drugi način

$$R_{uk} = R_2 + \frac{(R_3 + R_1) \cdot R_4}{(R_3 + R_1) + R_4} = 270 + \frac{36500 \cdot 560}{36500 + 560} = 270 + 551,52 = 921,52 \Omega \sim 922 \Omega$$

Jedan način rješavanja (korak po korak)



Zadani su otpornici iznosa

$$R_1 = 100 \Omega$$

$$R_2 = 270 \Omega$$

$$R_3 = 36400 \Omega$$

$$R_4 = 560 \Omega$$

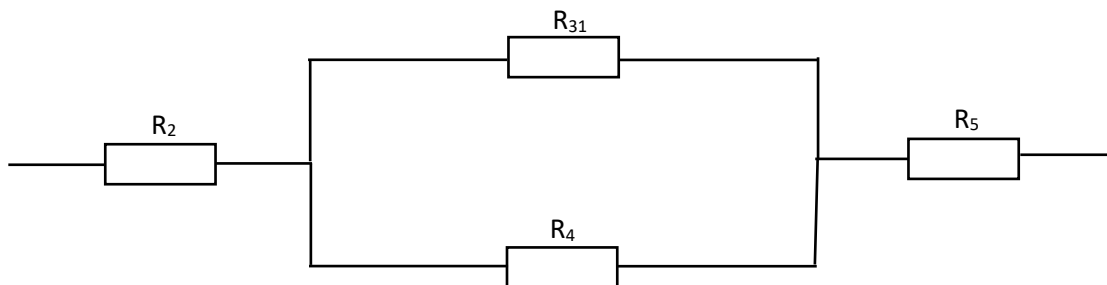
$$R_5 = 3900 \Omega$$

Prvo rješavamo serijski spoj otpornika R_3 i R_1

$$R_1 = 100 \Omega$$

$$R_3 = 36400 \Omega$$

$$R_{31} = R_3 + R_1 = 36400 + 100 = 36500 \Omega$$

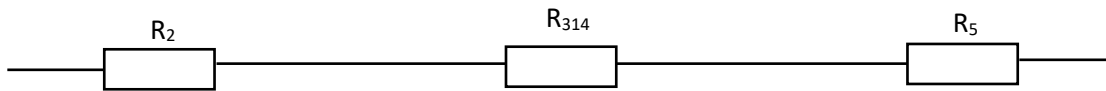


Drugi korak rješavamo paralelni spoj otpornika R_{31} i R_4

$$R_{31} = 36500 \Omega$$

$$R_4 = 560 \Omega$$

$$R_{314} = \frac{R_{31} \cdot R_4}{R_{31} + R_4} = \frac{36500 \cdot 560}{36500 + 560} = \frac{20440000}{37060} = 551,54 \Omega \sim 552 \Omega$$



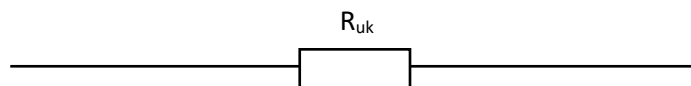
Treći korak rješavamo serijski spoj otpornika R_2 , R_{314} i R_5 .

$$R_2 = 270 \Omega$$

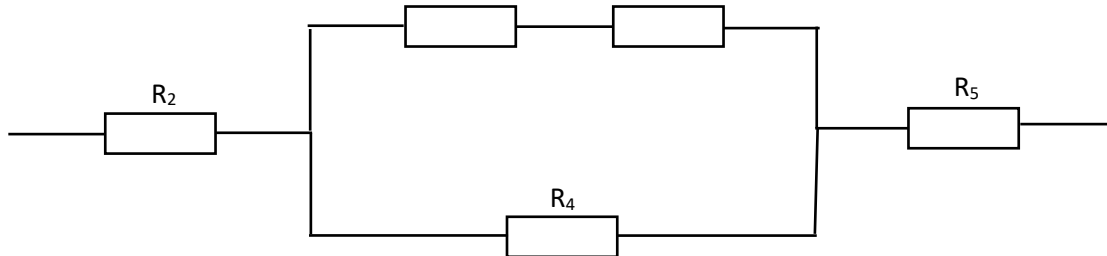
$$R_{314} = 552 \Omega$$

$$R_5 = 3900 \Omega$$

$$R_{uk} = R_2 + R_{314} + R_5 = 270 + 552 + 3900 = 4722 \Omega$$



Drugi način je sve formule ubaciti u jednu formulu R_{uk}



Zadani su otpornici iznosa

$$R_1 = 100 \Omega$$

$$R_2 = 270 \Omega$$

$$R_3 = 36400 \Omega$$

$$R_4 = 560 \Omega$$

$$R_5 = 3900 \Omega$$

$$R_{uk} = R_2 + \frac{(R_3 + R_1) \cdot R_4}{(R_3 + R_1) + R_4} + R_5$$

$$R_{uk} = 270 + \frac{36500 \cdot 560}{36500 + 560} + 3900 = 270 + 551,52 + 3900 = 4721,52 \Omega \sim 4722 \Omega$$

Na koji god se način rješava mora ispasti isti rezultat!