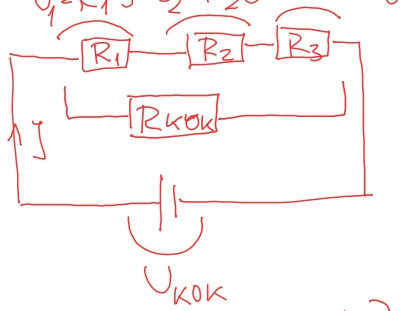
Vastuksen kytkennät

Sarjaankytkentä:

$U_1 = R_1 J \quad U_2 = R_2 J \quad U_3 = R_3 J$



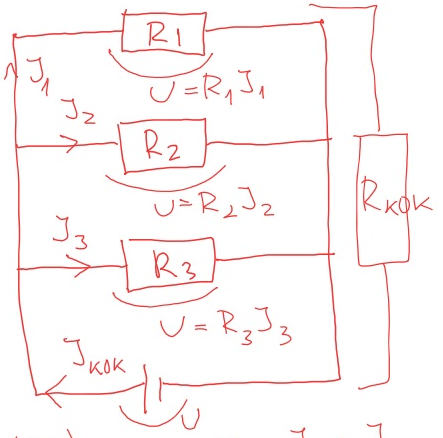
(kII) $U_{KOK} = U_1 + U_2 + U_3$

$U_{KOK} = R_{KOK} J$

$R_{KOK} J = R_1 J + R_2 J + R_3 J \quad | : J$

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

Rinnankytkentä:

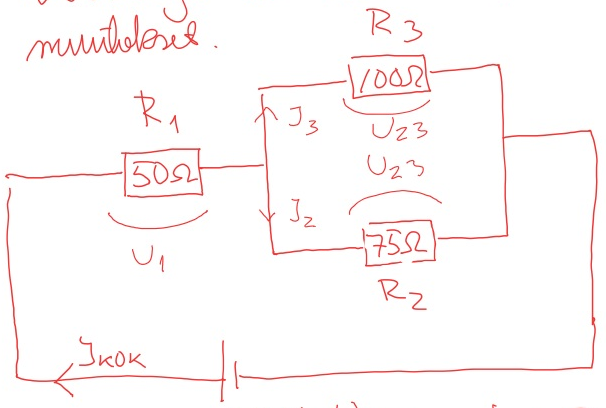


(kI) $J_{KOK} = J_1 + J_2 + J_3$

$$\frac{U}{R_{KOK}} = \frac{U}{R_1} + \frac{U}{R_2} + \frac{U}{R_3} \quad \| : U$$

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

Esim. Laske vastuksen läpi kulkevat virrat ja vastuksissa tapahtuvat potentiaali-muutokset.



Piirin kokonaisresistanssi

$R_{kok} = R_1 + R_{23}$

$\frac{1}{R_{23}} = \frac{1}{R_2} + \frac{1}{R_3} \Leftrightarrow \frac{1}{R_{23}} = \frac{1}{75} + \frac{1}{100} \Leftrightarrow R_{23} = \frac{1}{\frac{1}{75} + \frac{1}{100}} = 42{,}85\Omega$

$R_{kok} = 50\Omega + 42{,}85\Omega = 92{,}85\Omega$

$J_{kok} = \frac{U_{kok}}{R_{kok}} = \frac{9{,}0\,V}{92{,}85\Omega} = 0{,}0969\,A \approx 97\,mA$

(KII) $U_{kok} = U_1 + U_{23}$

$= R_1 J_{kok} + R_{23} J_{kok}$

$U_1 = 50\Omega \cdot 0{,}0969\,A = 4{,}846\,V \approx 4{,}8\,V$

$U_{23} = 42{,}85\Omega \cdot 0{,}0969\,A = 4{,}153\,V \approx 4{,}2\,V$

$J_2 = \frac{U_{23}}{R_2} = \frac{4{,}153\,V}{75\Omega} = 0{,}05538\,A \approx 55\,mA$

$J_3 = \frac{U_{23}}{R_3} = \frac{4{,}153\,V}{100\Omega} = 0{,}04153\,A \approx 42\,mA$