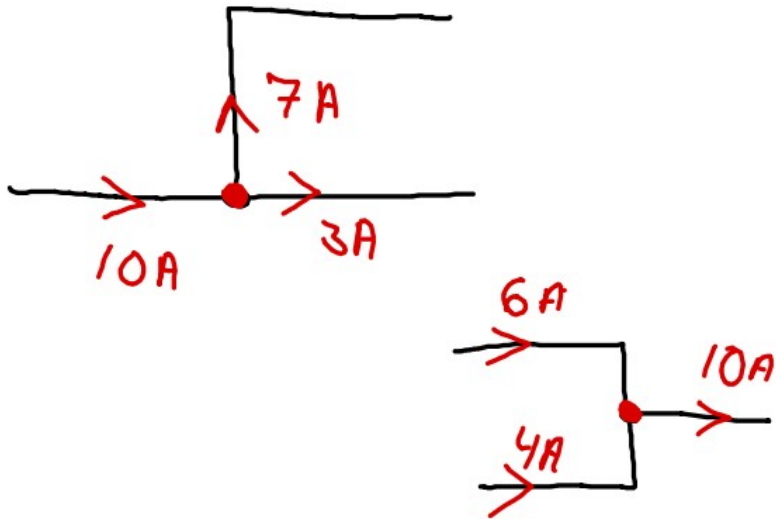


Kirchhoff's Love

Lovene om strømme og spændinger

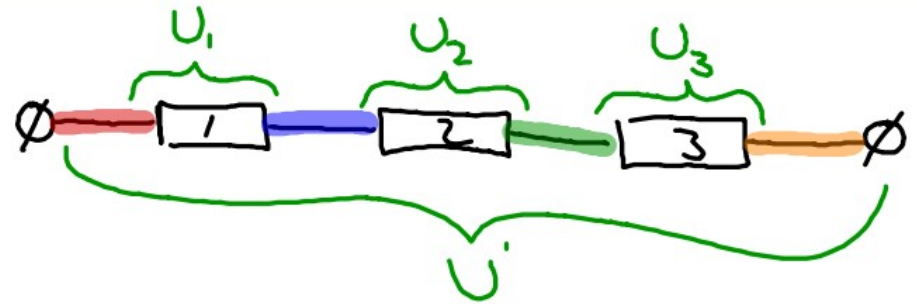
Kirchhoff's 1. Lov

"Summen af strømme som løber til et knudepunkt, er lig summen af strømme der løber fra et knudepunkt"



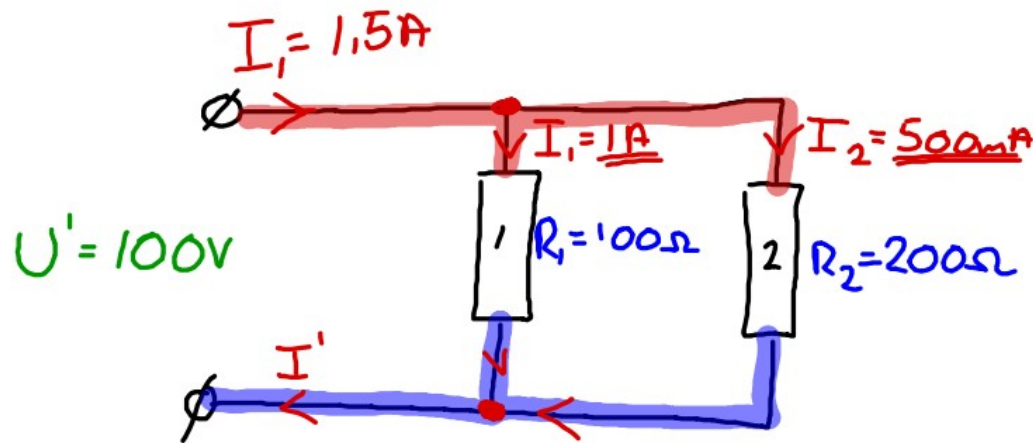
Kirchhoff's 2. Lov

"Summen af spændingsfald, er lig med den påtrygte spænding"



Parallelkreds

Parallelforbundne modstande, Den Recibrokke regnenemetode & Kirchhoff's 1. Lov



$$U' = U_1 = U_2 \quad I' = I_1 + I_2$$

	U	I	R
1	100V	1A	100Ω
2	100V	500mA	200Ω
Top	100V	1.5A	66.67Ω

$$I_1 = \frac{U_1}{R_1} = \frac{100}{100} = \underline{1A}$$

$$I_2 = \frac{U_2}{R_2} = \frac{100}{200} = \underline{500mA}$$

$$I' = I_1 + I_2 = 1 + 0.5 = \underline{1.5A}$$

$$R' = \frac{U'}{I'} = \frac{100}{1.5} = \underline{66.67\Omega}$$

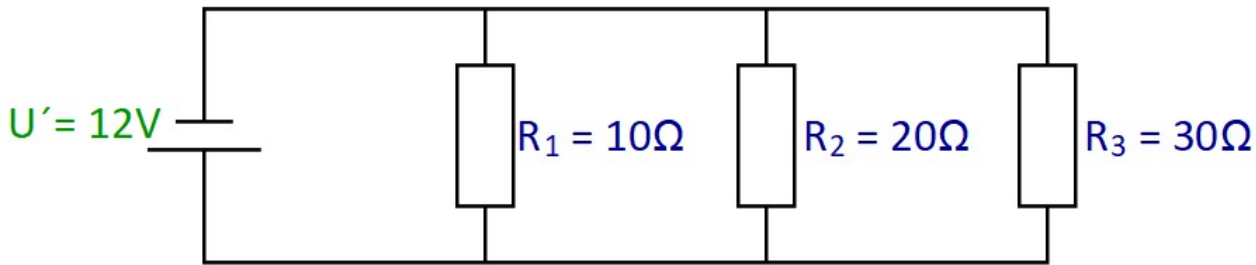
$$R' = \frac{1}{\frac{1}{R_1} + \frac{1}{R_2}} = \frac{1}{\frac{1}{100} + \frac{1}{200}} = \underline{66.67\Omega}$$

$$R' = (R_1^{-1} + R_2^{-1})^{-1} = (100^{-1} + 200^{-1})^{-1} = \underline{66.67\Omega}$$

Tavleopgave

Parallelkreds med 3 modstande

$$U' = U_1 = U_2 = U_3$$



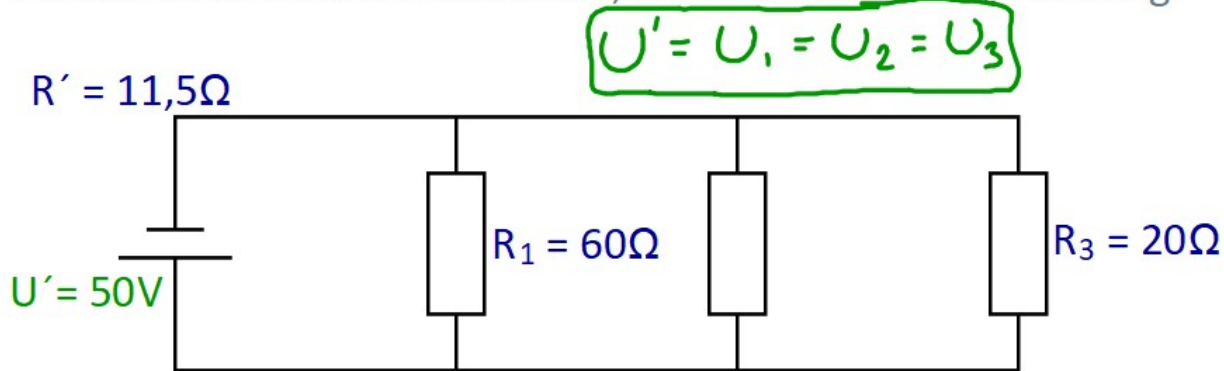
	U	I	R
1			10Ω
2			20Ω
3			30Ω
Tot	12V	2,2A	5,45 Ω

$$\begin{aligned} \textcircled{1} \quad I_1 &= \frac{U_1}{R_1} = \frac{12}{10} = \underline{\underline{1,2A}} \\ \textcircled{2} \quad I_2 &= \frac{U_2}{R_2} = \underline{\underline{600mA}} \\ \textcircled{3} \quad I_3 &= \frac{U_3}{R_3} = \underline{\underline{400mA}} \\ \textcircled{4} \quad I' &= I_1 + I_2 + I_3 = \underline{\underline{2,2A}} \\ \textcircled{5} \quad R' &= (R_1^{-1} + R_2^{-1} + R_3^{-1})^{-1} = \underline{\underline{5,45\Omega}} \end{aligned}$$



Tavleopgave

Parallelkreds med 3 modstande, nu med lidt mere udfordring



	U	I	R
1		833,33 mA	60Ω
2		1,01 A	49,29Ω
3		2,5 A	20Ω
Tot	50V	4,35 A	11,5Ω

$$\textcircled{1} I' = \frac{U'}{R'} = 4,35 A$$

$$\textcircled{4} I_2 = I' - I_1 - I_3 = \underline{\underline{1,01 A}}$$

$$\textcircled{2} I_1 = \frac{U_1}{R_1} = 833,33 \text{ mA}$$

$$\textcircled{5} R_2 = \frac{U_2}{I_2} = \underline{\underline{49,29 \Omega}}$$

$$\textcircled{3} I_3 = \frac{U_3}{R_3} = 2,5 A$$

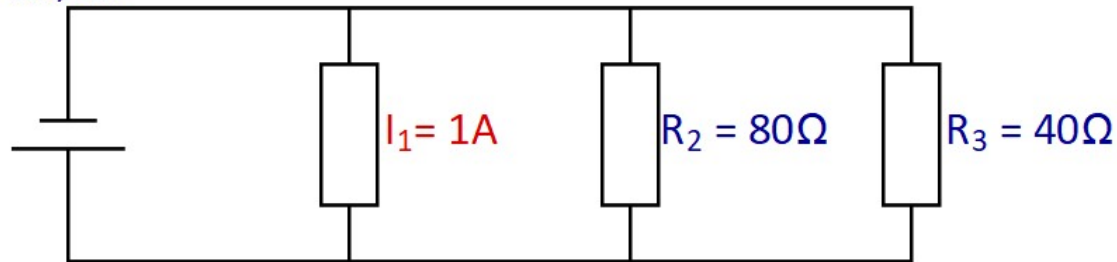
$$\textcircled{k} R' = (R_1^{-1} + R_2^{-1} + R_3^{-1})^{-1} = \underline{\underline{11,5 \Omega}}$$

Shit... Hvad nu?

Recibrok... baglens???

$$U' = U_1 = U_2 = U_3$$

$$R' = 12,9\Omega$$



SERIE

$$R' = R_1 + R_2 + R_3$$

$$R_1 = R' - R_2 - R_3$$

PARALLEL

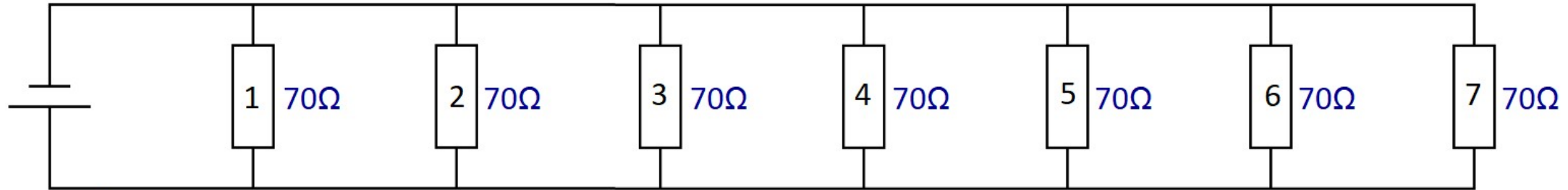
$$R' = (R_1^{-1} + R_2^{-1} + R_3^{-1})^{-1}$$

$$R_1 = (R'^{-1} - R_2^{-1} - R_3^{-1})^{-1}$$

	U	I	R
1	24,99	1 A	24,99 Ω
2		31,235 mA	80 Ω
3		624,7 mA	40 Ω
Tot		1,94 A	12,9 Ω

Cowboytricks og Guld Korn

Ved ens størrelse modstande



ENS MODSTAND $\rightarrow R' = \frac{R_x}{\text{ANTAL}} = \frac{70}{7} = \underline{\underline{10\Omega}}$

$$R' = (R_1^{-1} + R_2^{-1} + R_3^{-1} + R_4^{-1} + R_5^{-1} + R_6^{-1} + R_7^{-1})^{-1} = \underline{\underline{10\Omega}}$$