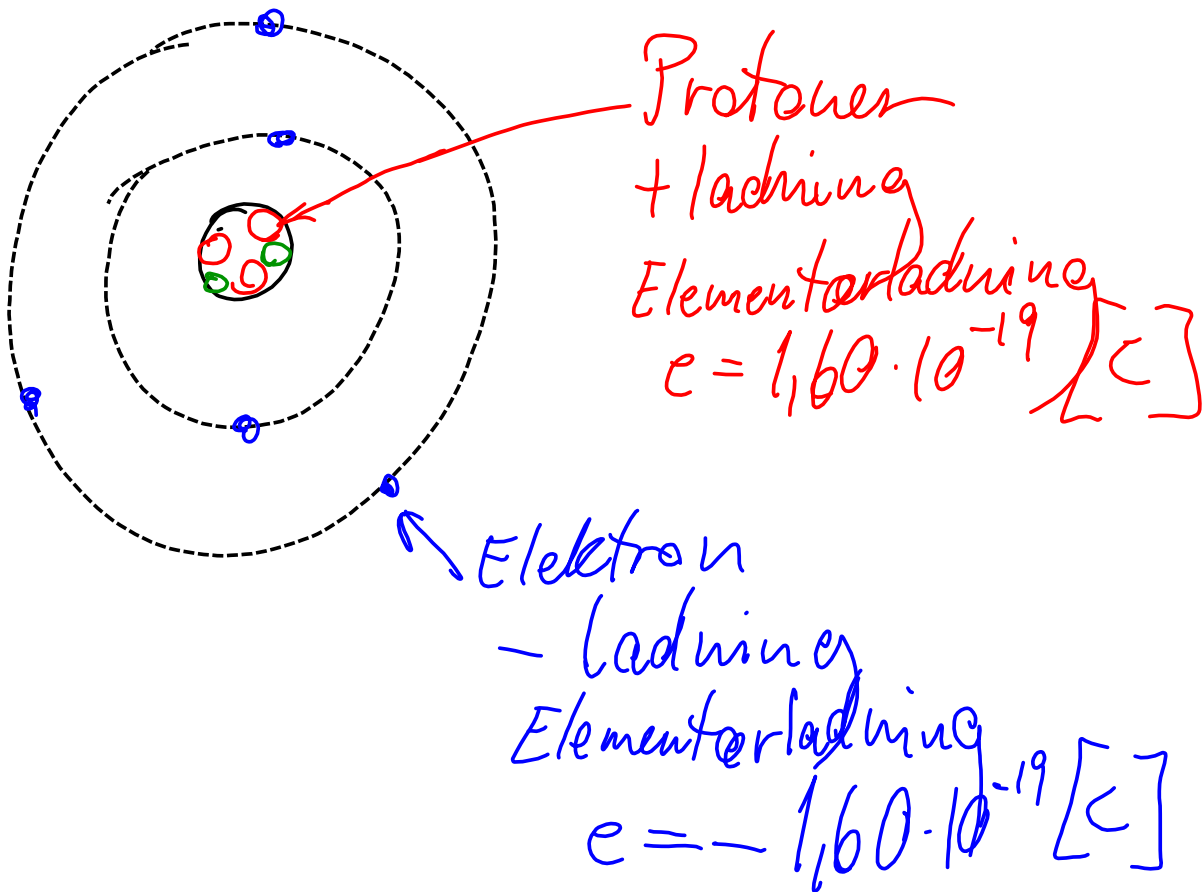


# Kap 11 Elelisitet

## Ladning

+ : Underskudd av elektrone

- : Overskudd - " -

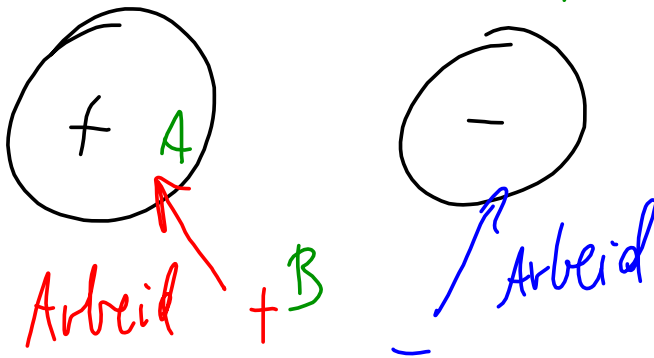


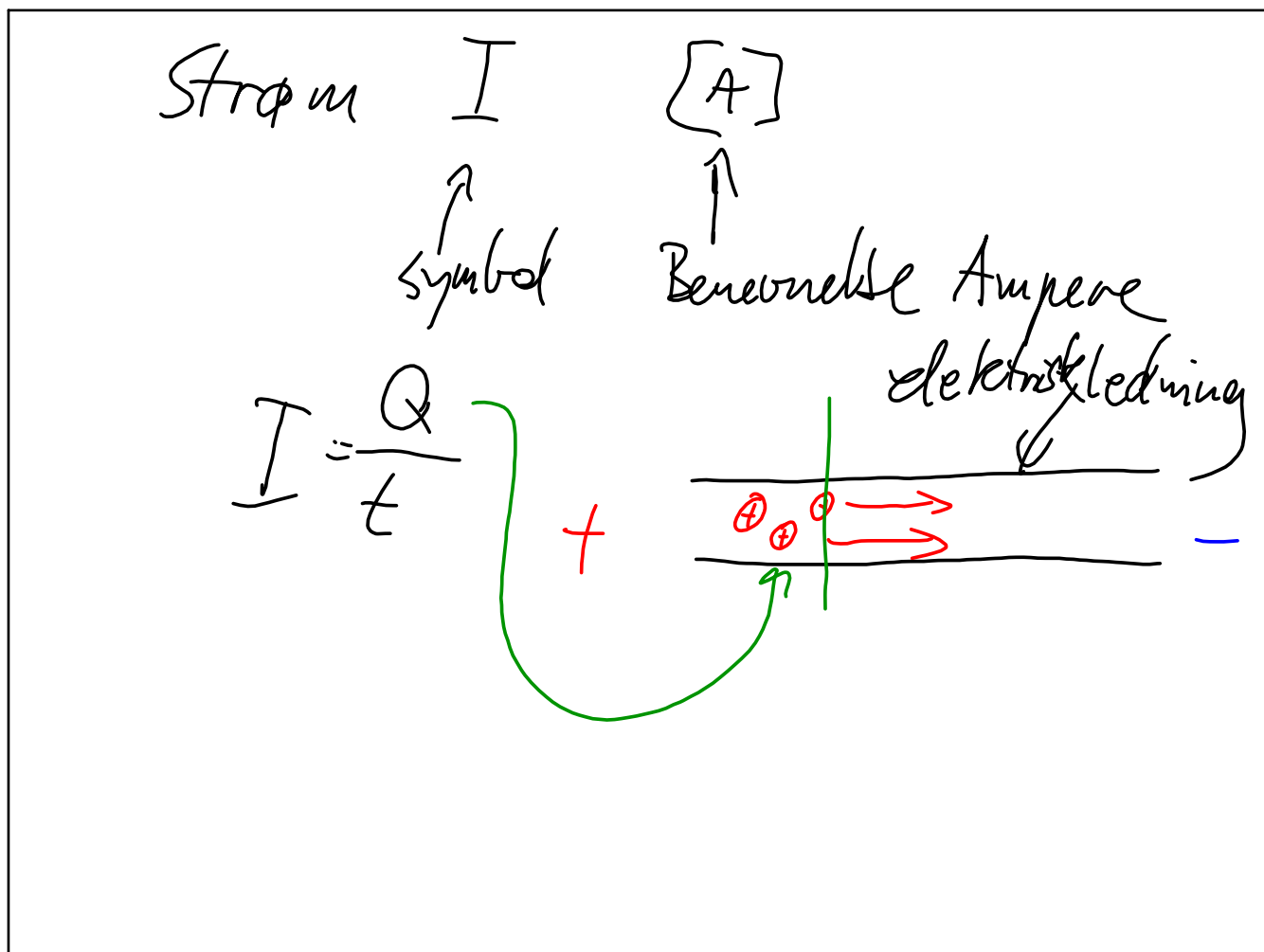
Like ladninger frastøter hverandre  
Ulike - " - tiltrekker hverandre

Spennings:  $U$  [V]  
 ↑ Symbol ↑ Benevnelse Volt

$$U = \frac{W_{AB}}{q}$$

← Arbeit  
 ↑ Ladning

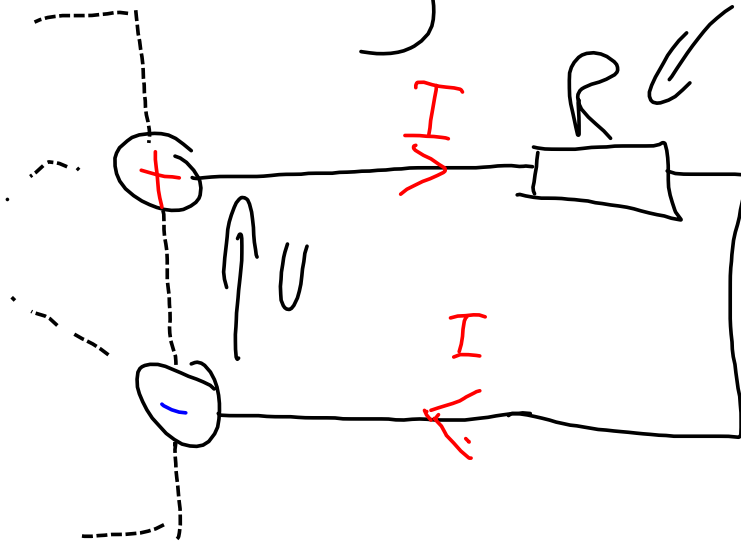




Spenningskilde

Likspenning

Motstand



$R$  [ $\Omega$ ]  
 $\uparrow$   
 Symbol  
 $\uparrow$   
 Benavnelse  
 $\Omega$ : ohm

$$U = R \cdot I \quad \text{Ohms lov}$$

$$\text{Eks: } U = 10,0 \text{ [V]}$$

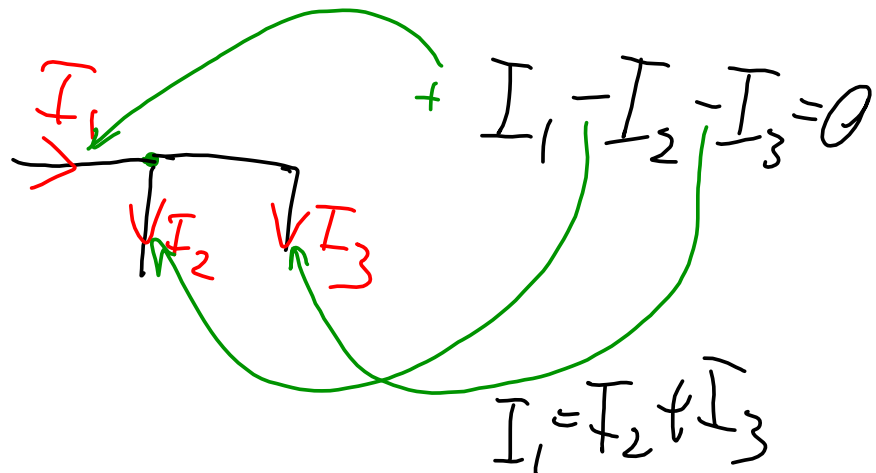
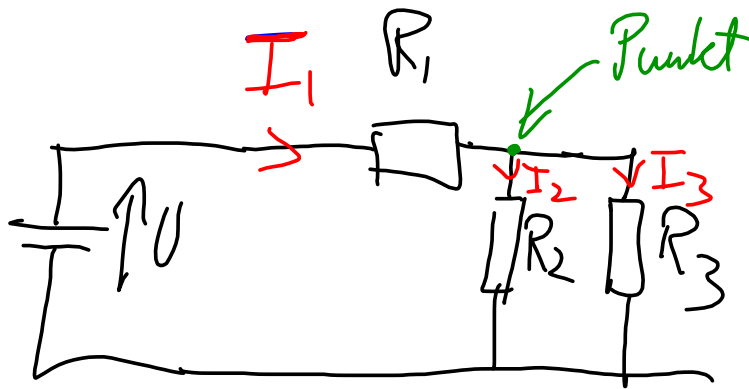
$$R = 200 \text{ [\Omega]}$$

$$I = \frac{U}{R} = \frac{10,0 \text{ [V]}}{200 \text{ [\Omega]}} = 0,05 \text{ [A]} \\ = 50 \text{ [mA]}$$

# Kircheff's 1. lov

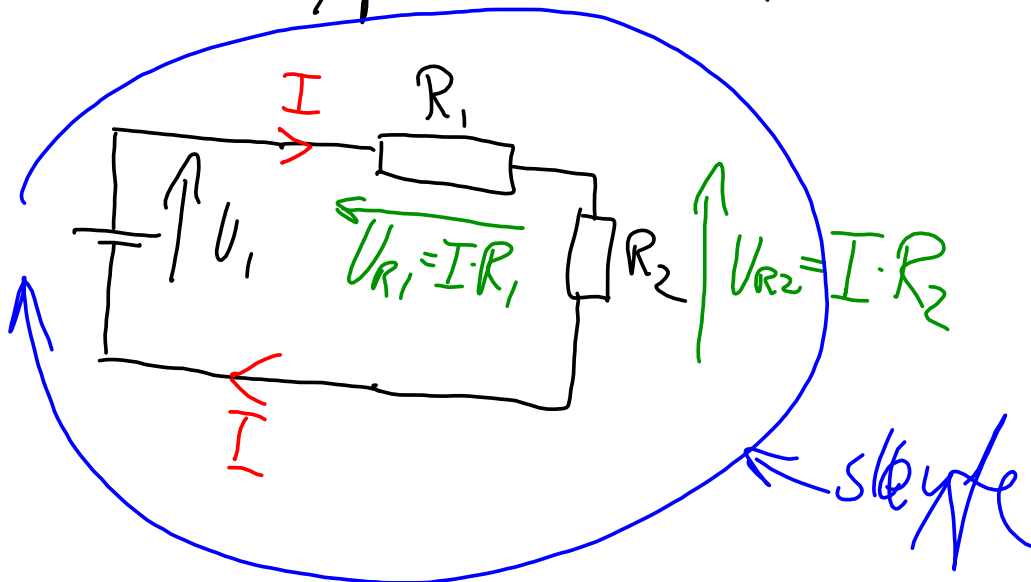
## Strømloven

⇒ Summen av alle strømmer inn til et punkt er lik null



# Kirchoff's 2. lov Spenningsloven

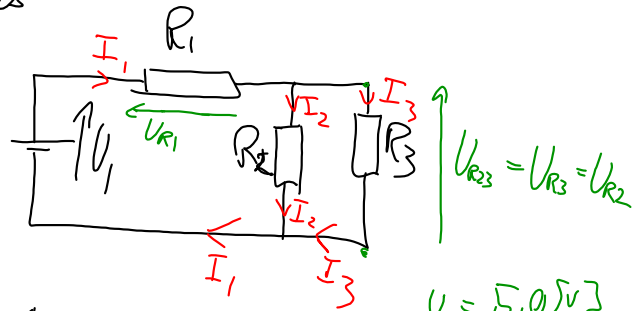
Summen av alle spenninger i  
en sløyfe er like null



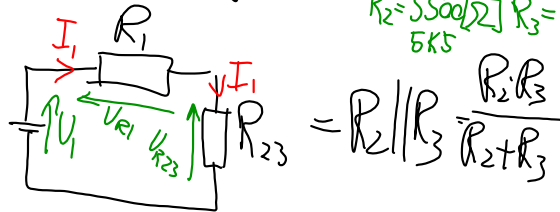
$$U_1 - U_{R1} - U_{R2} = 0$$

$$U_1 = U_{R1} + U_{R2}$$

Elek



Ekvivalentskjema



$U_1 = 5,0 [V]$   
 $R_1 = 2000 [\Omega] = 2,0 [k\Omega]$   
 $R_2 = 5500 [\Omega] = 5,5 [k\Omega]$   
 $R_3 = 1500 [\Omega] = 1,5 [k\Omega]$

$$R_{23} = R_2 \parallel R_3 = \frac{R_2 R_3}{R_2 + R_3}$$

$$= \frac{5500 \cdot 1500 [\Omega]}{(5500 + 1500) [\Omega]} = 1178 [\Omega]$$

$$\frac{U_1}{R_1 + R_{23}} \cdot R_{23} = U_{R23}$$

$$I_1 = \frac{U_1}{R_1 + R_{23}} = \frac{5,0 [V]}{(2000 + 1178) [\Omega]} = \frac{5,0 [V]}{3178 [\Omega]} = 1,573 [mA]$$

$$U_{R23} = I_1 \cdot R_{23} = 1,573 \cdot 10^{-3} [A] \cdot 1178 [\Omega] = 1,85 [V]$$



$$I_2 = \frac{U_{R23}}{R_2} = \frac{1,85 [V]}{5500 [\Omega]} = 0,00033 [A] = 0,33 [mA]$$

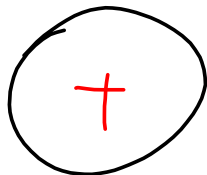
$$I_3 = \frac{U_{R23}}{R_3} = \frac{1,85 [V]}{1500 [\Omega]} = 0,00123 [A] = 1,23 [mA]$$

Kontroll

$$I_1 = I_2 + I_3$$

$$1,573 = 0,33 + 1,23 = 1,56$$

11.03  
 a)  $N = 5,0 \cdot 10^{10}$  : vndersteidd på elektroner



$$Q = N \cdot e = 5,0 \cdot 10^{10} \cdot 1,60 \cdot 10^{-19} \text{ [C]}$$

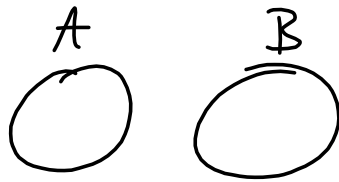
$$= 8,0 \cdot 10^{10-19} \text{ [C]} = 8,0 \cdot 10^{-9} \text{ [C]} = 8,0 \text{ [nC]}$$

b)  $Q = 1 \text{ [C]}$

$$N = \frac{Q}{e} = \frac{1,0 \text{ [C]}}{1,60 \cdot 10^{-19} \text{ [C]}} = 0,625 \cdot 10^{19} = \underline{\underline{6,25 \cdot 10^{18}}}$$



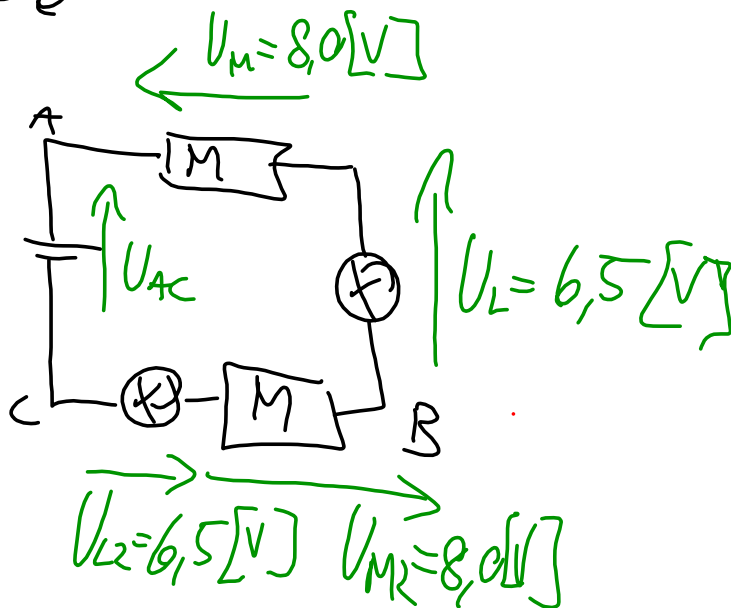
11.04



$$U = 6,0 \text{ [V]}$$

$$U = \frac{W_{AB}}{q} \Rightarrow W_{AB} = U \cdot q = 6,0 \text{ [V]} \cdot 20 \text{ [C]} = 120 \text{ [J]}$$

11.06



$$\begin{aligned} U_{AC} &= U_M + U_L + U_{M2} + U_{L2} \\ &= 8,0 \text{ [V]} + 6,5 \text{ [V]} + 8,0 \text{ [V]} + 6,5 \text{ [V]} \\ &= 29,0 \text{ [V]} \end{aligned}$$

$$U_{AB} = U_M + U_L = 8,0 + 6,5 = 14,5 \text{ [V]}$$

$$U_{BC} = 14,5 \text{ [V]}$$