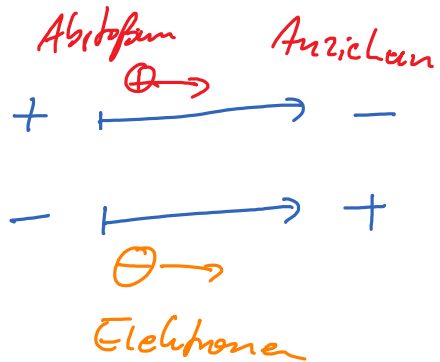


Spannung & Strom

technische Stromrichtung

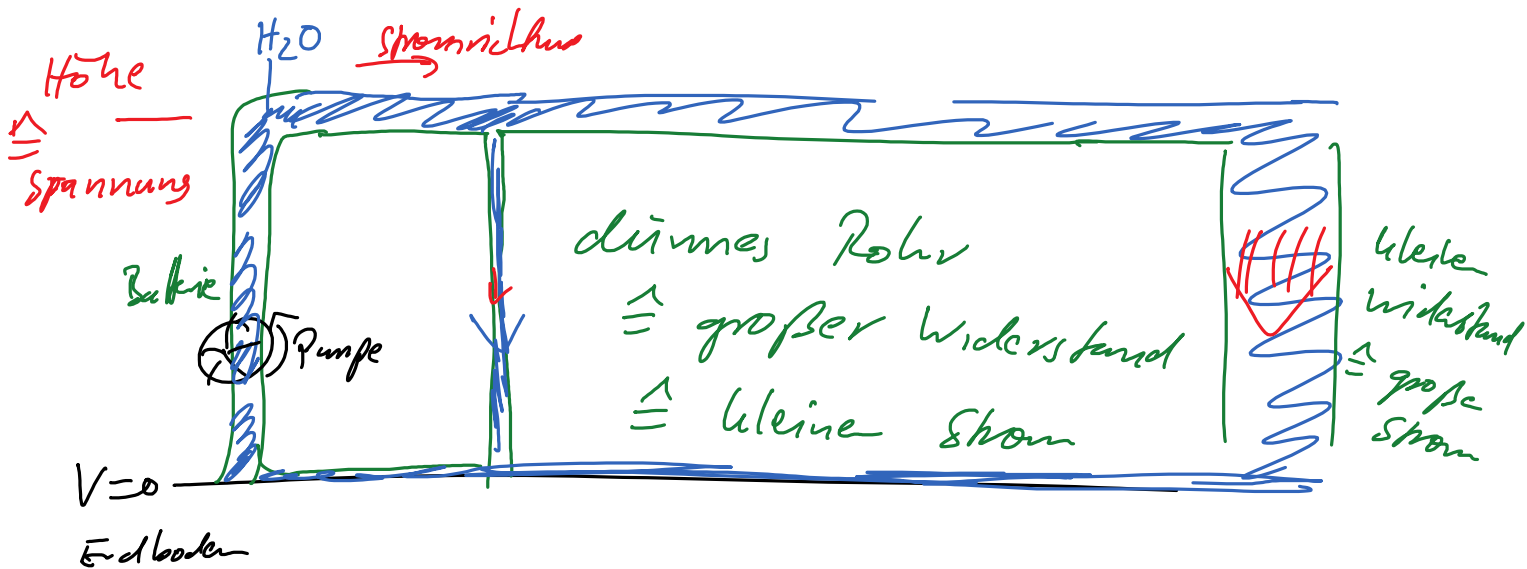
physikalische Stromrichtung



Spannung & Strom

Potentialunterschied
im Elektrischen Feld

⇒ vgl. Schwerkraft d. Erde
≙ "Höhe"



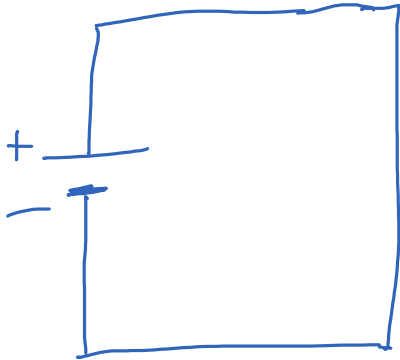
Ohmsches Gesetz:

$$R = \frac{U}{I}$$

$$I = \frac{U}{R} \leftarrow$$

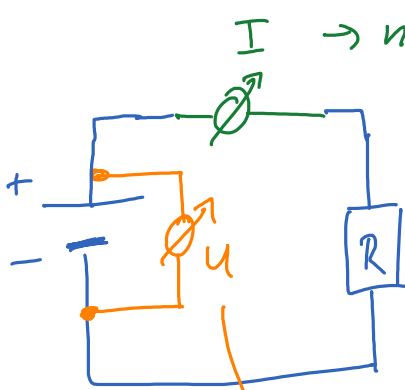
$$U = R \cdot I$$

Der Stromkreis



$$I = \frac{U}{R \approx 0}$$

Kurzschluss $I \rightarrow \infty$ weil
 $R \approx 0$

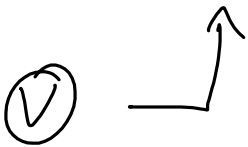


$I \rightarrow$ niederohmig

alt:



hochohmig (sonst Kurzschluss)



50V	120 mA
100V	240 mA
150V	360 mA

$$R = \frac{U}{I} = \frac{50V}{0.12A}$$

$$R = \text{const}$$

Ohm'scher Widerstand $R = \frac{U}{I} = \text{konst.}$

Konstantan - Draht

$\hookrightarrow R =$ "unabhängig" von d. Temperatur

① Konstantan & Kupfer-Drähte

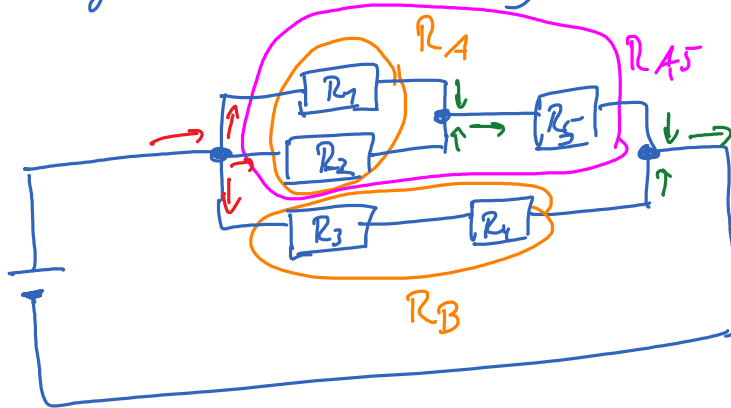
dünn, dick, in Serie, parallel

① Glühbirne

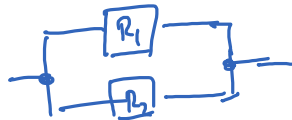
U	I	R
5V	80 mA	94 Ω
10V	106 mA	
15	122 mA	
20V	137 mA	
30V	160 mA	

Maschen- & Knotenregel

Knotenregel $\hat{=}$ Erhaltung der Ladung



①



$$\frac{1}{R_A} = \frac{1}{R_1} + \frac{1}{R_2}$$

②



$$R_B = R_3 + R_4$$

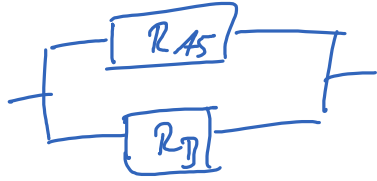
③



$$R_{45} = R_4 + R_5$$

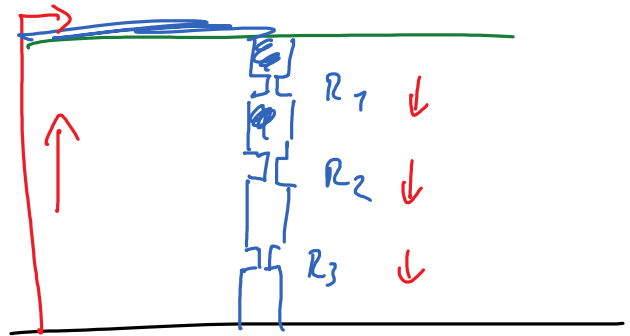
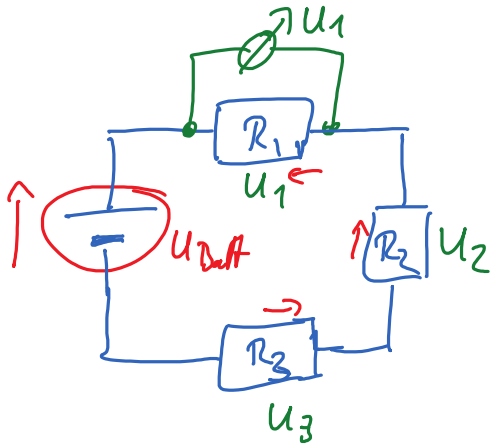
= oberer Arm

④

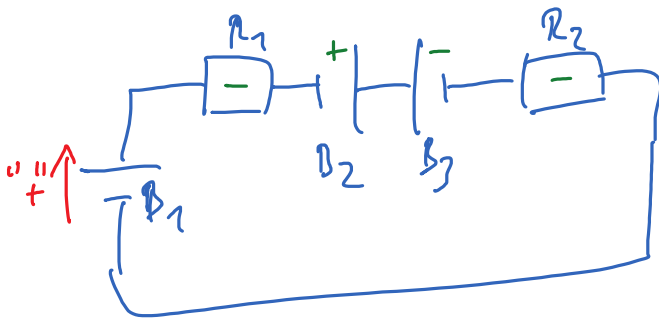


$$\frac{1}{R_{ges}} = \frac{1}{R_{45}} + \frac{1}{R_6}$$

Maschenregel $\hat{=}$ Energieerhaltung



$$U_{Batt} - U_1 - U_2 - U_3 = 0$$



$$U_{B1} - U_{R1} + U_{B2} - U_{B3} - U_{R2} = 0$$

Magnetfelder

$$\vec{F}_{Lorenz} = \vec{v} \times \vec{B}$$

↑
I

rechte Hand: techn. Strom -
richtung $+ \rightarrow -$
oder Protonenstrahl

linke Hand: e^- Bewegung

Hall-Sonde



Ablenkung der
Strom durch \vec{B}
macht Spannung
 \perp zu Strom und
 \perp zu \vec{B}