

Elektrisitet

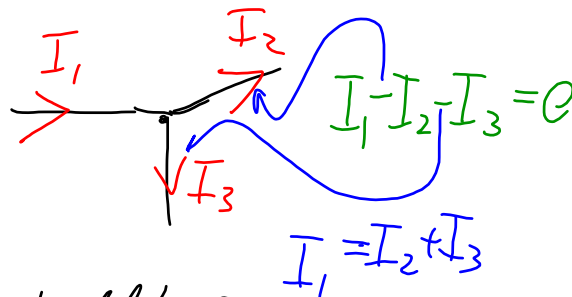
Ladning Q [C]

Strøm $I = \frac{Q}{t}$

Spennning $U = \frac{W_{\text{AB}}}{Q}$

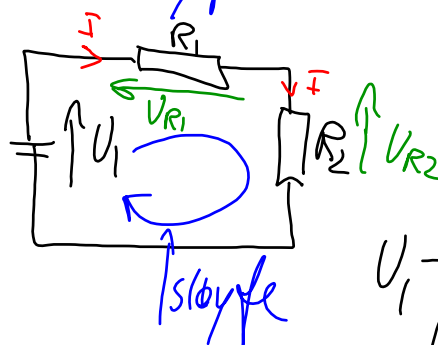
Kircheff 1. lov
(strømloven)

- Summen av alle strømmer inn til et punkt er lik null
- Summen av alle strømmer inn til et punkt er lik summen av alle strømmer ut av punktet



Kircheff's 2. lov
(spenningsloven)

Summen av alle spenninger i en sløyfe er lik null

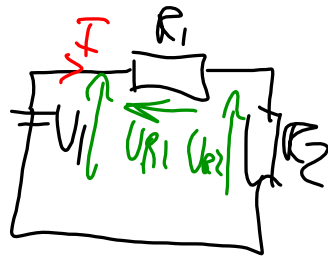


$$U_1 - U_{R1} - U_{R2} = 0$$

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

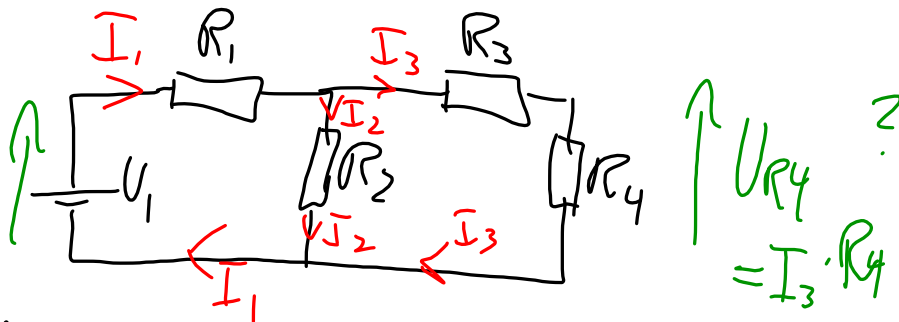
Ohm's lov

$$U = R \cdot I$$



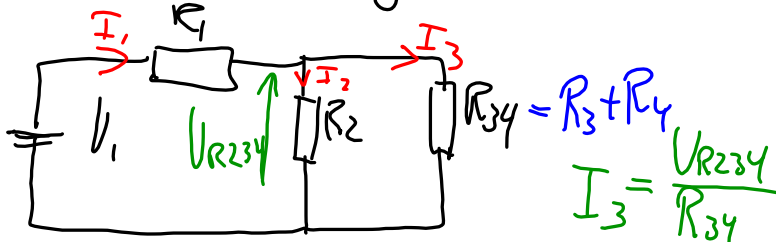
$$U_{R1} = I \cdot R_1$$

$$U_{R2} = I \cdot R_2$$



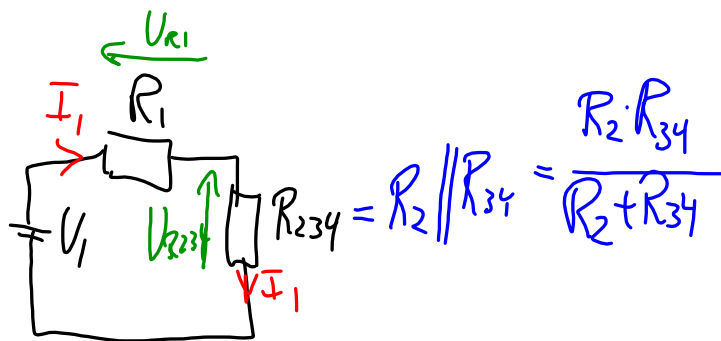
$$U_{R4} = I_3 \cdot R_4$$

Lag en ekvivalent skjema



$$R_{34} = R_3 + R_4$$

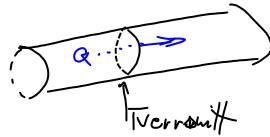
$$I_3 = \frac{U_{R234}}{R_{34}}$$



$$U_{R234} = I_1 \cdot R_{234} = \frac{U_1}{R_1 + R_{234}} \cdot R_{234}$$

$$I_1 = \frac{U_1}{R_1 + R_{234}}$$

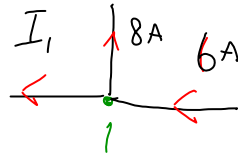
11.08



$$Q = 34 \text{ [C]} \quad I = \frac{Q}{t} = \frac{34 \text{ [C]}}{17 \text{ [s]}} = 2 \text{ [A]}$$

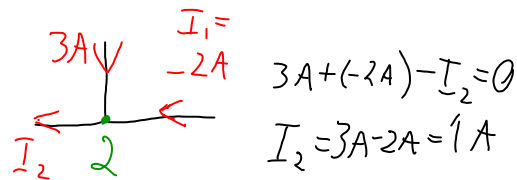
$$t = 17 \text{ [s]}$$

11.13



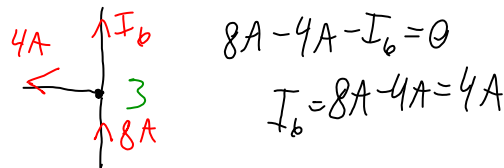
$$6A - 8A - I_1 = 0$$

$$I_1 = 6A - 8A = -2A$$



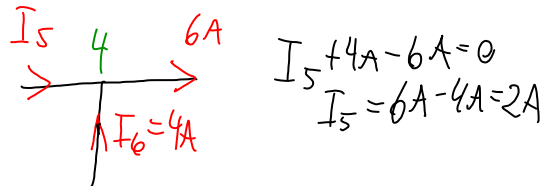
$$3A + (-2A) - I_2 = 0$$

$$I_2 = 3A - 2A = 1A$$



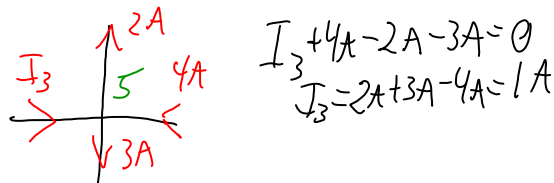
$$8A - 4A - I_6 = 0$$

$$I_6 = 8A - 4A = 4A$$



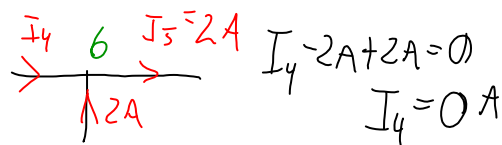
$$I_5 + 4A - 6A = 0$$

$$I_5 = 6A - 4A = 2A$$



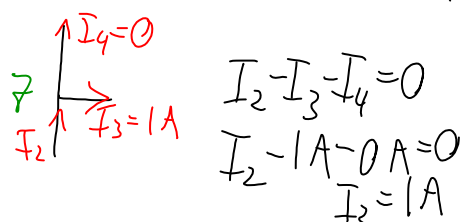
$$I_3 + 4A - 2A - 3A = 0$$

$$I_3 = 2A + 3A - 4A = 1A$$



$$I_4 - 2A + 2A = 0$$

$$I_4 = 0A$$



$$I_2 - I_3 - I_4 = 0$$

$$I_2 - 1A - 0A = 0$$

$$I_2 = 1A$$

11.15

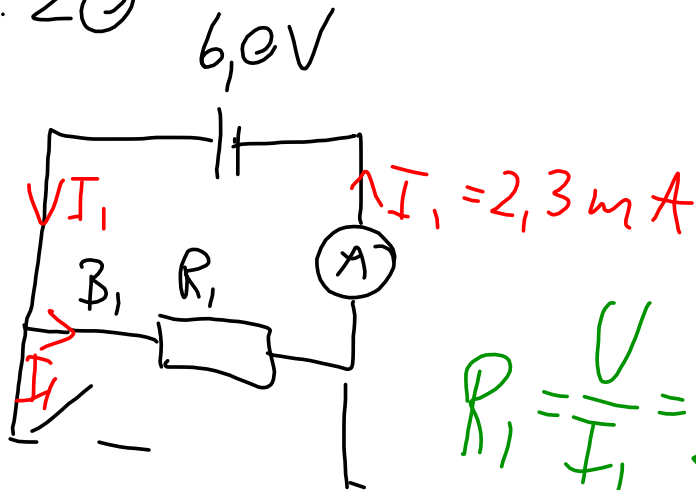
U	10	0,30	0,62
I	10	0,096	0,056 = 0,06
R	1	3,12	5,4

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

$$R = \frac{0,30}{0,096} = 3,12$$

$$I = \frac{U}{R} = \frac{0,62}{5,4}$$

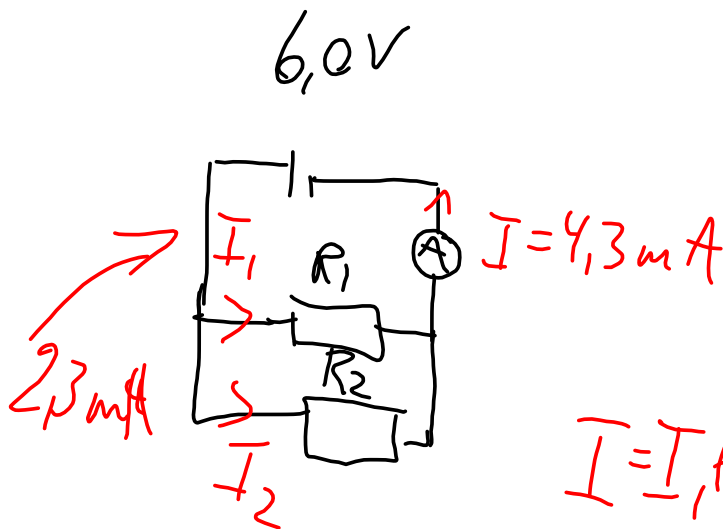
11.20



$$R_1 = \frac{U}{I_1} = \frac{6,0 \text{ V}}{2,3 \text{ mA}}$$

$$= 2,6 \cdot 10^3 \Omega = 2,6 \text{ k}\Omega$$

$$\frac{1}{10^{-3}} = 10^3$$



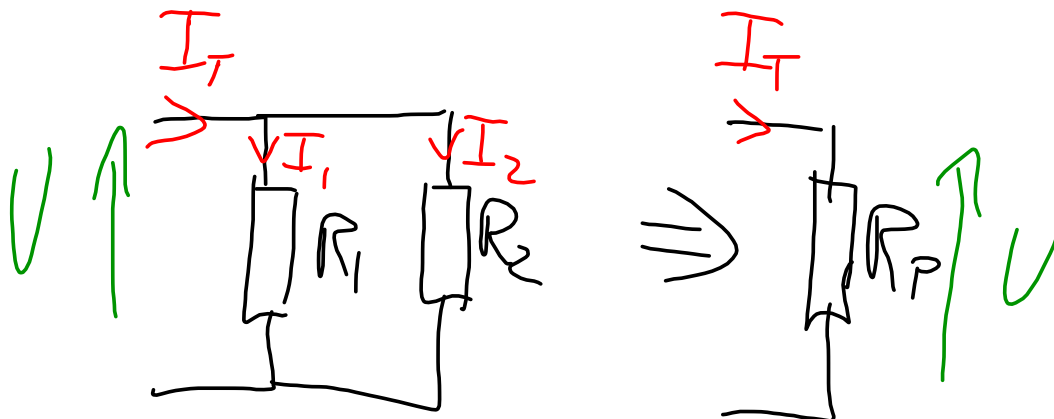
$$I = I_1 + I_2$$

$$4,3 \text{ mA} = 2,3 \text{ mA} + I_2$$

$$I_2 = (4,3 - 2,3) \text{ mA} = 2,0 \text{ mA}$$

$$R_2 = \frac{U}{I_2} = \frac{6,0 \text{ V}}{2,0 \text{ mA}} = 3,0 \text{ k}\Omega$$

11.21



$$I_T = I_1 + I_2$$

$$I_T = \frac{U}{R_P}$$

$$I_1 = \frac{U}{R_1} \quad I_2 = \frac{U}{R_2}$$

$$\frac{U}{R_P} = \frac{U}{R_1} + \frac{U}{R_2}$$

/ : U

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