# Loop law

## Student Group

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## Mesh set

**In every closed circuit and every mesh of the network, the sum of all voltages is zero!**
Set the voltage on the power supply to $12~\rm V$ and measure this voltage precisely using a multimeter. Set up the measuring circuit shown in figure ##.

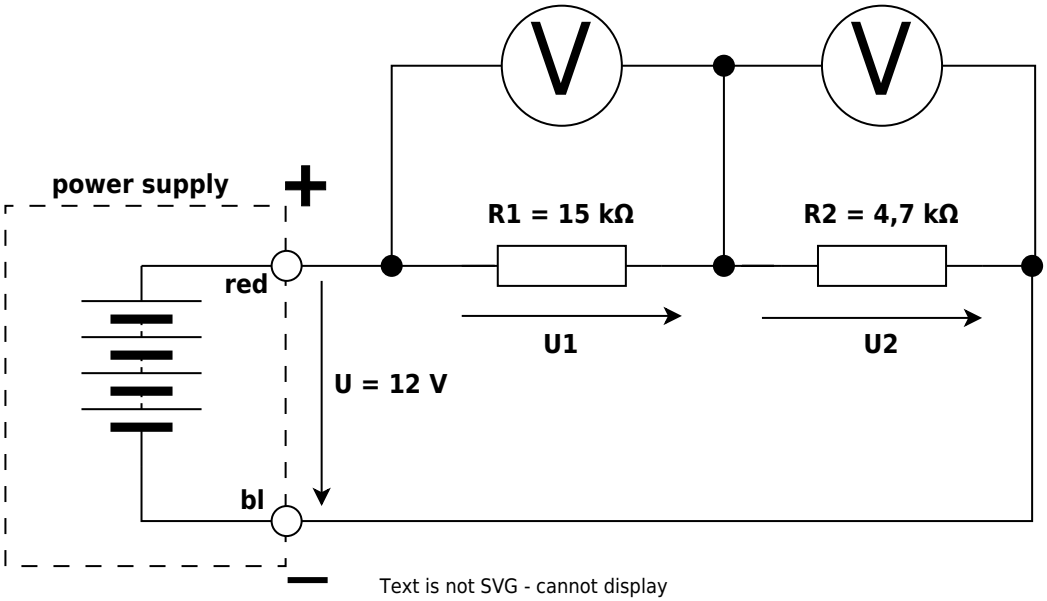


Fig. ##: Mesh-set

Add the voltage arrows and measure $U$, $U_{\rm 1}$ und $U_{\rm 2}$:

| $$U$$ | $$U_{~\rm | $$U_{~\rm... |
|---|---|---|
| | | |

Tab. ##: Mesh set voltage measurement

What is the mesh set here?

Check the formula with the measured values:

The resistors $R_{\rm 1}$ and $R_{\rm 2}$ connected in series form a voltage divider. What is the ratio between the voltages $U_{\rm 1}$ and $R_{\rm 2}$?

$$ \frac{U_1}{U_2} = $$

## Set of nodes

**At each junction point, the sum of all incoming and outgoing currents is equal to zero!**
Set the voltage on the power supply to $12~\rm V$ and measure the voltage accurately with a multimeter. In the first step, set up the measuring circuit shown in figure ##:

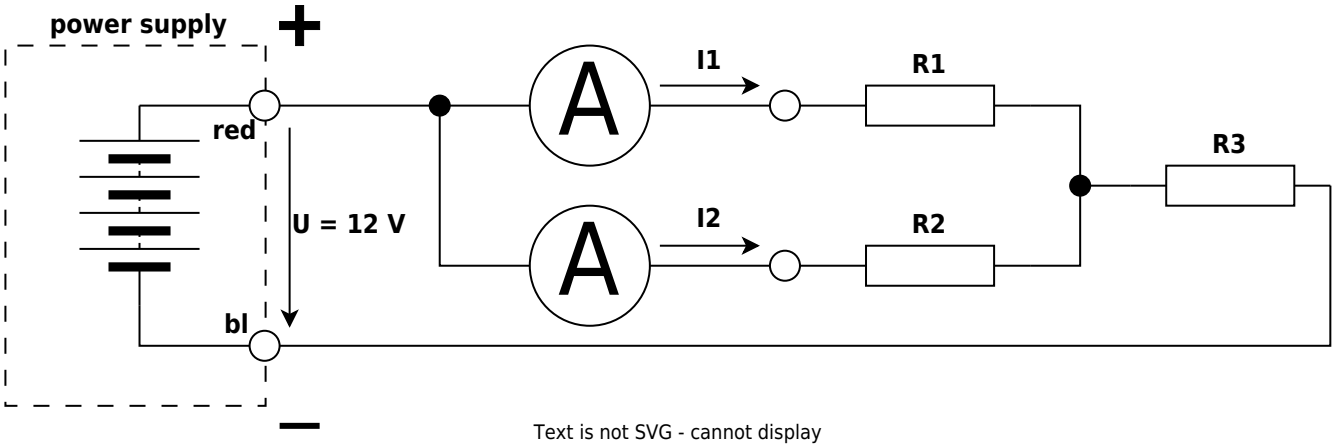


Fig. ##: Node-set circuit 1

Draw the arrows for the directions of currents $I_{\rm 1}$ and $I_{\rm 2}$ in figure ##. The DC current measurement range must be set on both multimeter using the rotary switch. Then measure currents $I_{\rm 1}$ and $I_{\rm 2}$ and enter the measured values in table ##.

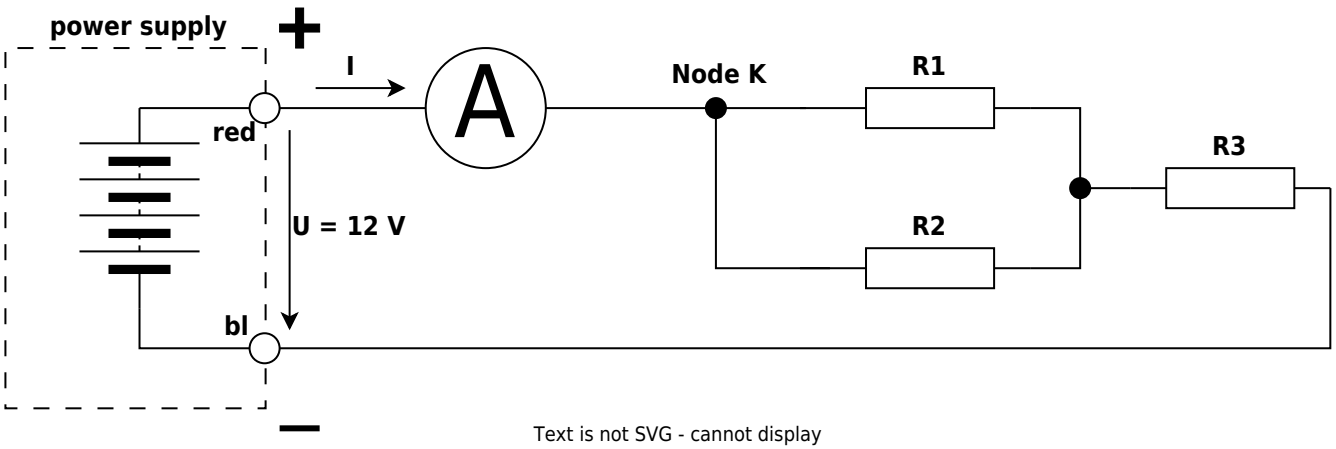


Fig. ##: Node-set circuit 2

What is the relationship between currents $I_{\rm 1}$ and $I_{\rm 2}$?

$$ \frac{I_1}{I_2} = $$

Switch the power supply back on and measure the current $I$. Enter its value in table ##.

| $$I$$ | $$I_{~\rm... | $$I_{~\rm... |
|---|---|---|
| | | |

Tab. ##: Node set current mesurement

Determine the node set for node K and check its validity.

Using the measured values for resistors $R_{\rm 1}$, $R_{\rm 2}$, and $R_{\rm 3}$, calculate the total resistance $R_{\rm KP}$:

Using the calculated value $R_{\rm KP}$, check the measured value of the total current:
$$ I=\frac{U}{R_{KP}} = $$