

Inverting Operational Amplifier

Student Group

First Name	Surname	Matrikel Nr.

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Inverting Operational Amplifier

Gain of Op-Amp

Build the following circuit in [figure 1](#) with the power supply and a multimeter.



Fig. 1: Inverting Op-Amp

$U_{DD} = 10\text{ V}$, $U_{SS} = -10\text{ V}$, $R_1 = 10\text{ k}\Omega$

Calculate the necessary value for R_2 , so that the Output U_{OUT} is +5 V. Use the supply voltage of the operational amplifier for U_{IN} .

$U_{IN} =$

$$R_2$$

Investigation of inverting input

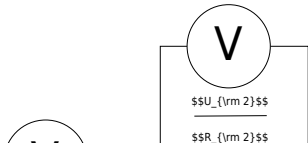


Fig. 2: Inverting Op-Amp: Investigate currents of the inverting input

$$U_{DD} = 10\text{V}, U_{SS} = -10\text{V}, R_1 = 10\text{k}\Omega$$

Use the values from [figure 1](#) for U_{IN} , U_{OUT} , R_2 .

Complete the arrows in the schematic of the circuit.

Determine the the currents I_1 and I_2 indirectly by measuring the voltage.

Calculate the sum of the currents at node N_{12} .

$$U_1$$

$$U_2$$

$I_{\text{1}} \sim =$

$I_{\text{2}} \sim =$

$I_{\text{N12}} \sim =$

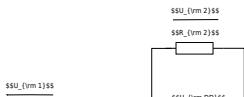


Fig. 3: Inverting Op-Amp: Investigate the virtual GND of the inverting input

$U_{\text{DD}} \sim = 10 \text{ V}, U_{\text{SS}} \sim = -10 \text{ V}, R_{\text{1}} \sim = 10 \text{ k}\Omega$

Use the values from figure 1 for $U_{\text{IN}}, U_{\text{OUT}}, R_{\text{2}}$.

Complete the arrows in the scematic of the circuit.

Take the values for $U_{\text{1}}, U_{\text{2}}, U_{\text{OUT}}$ from figure 2.

Use these values to calculate the sum of the voltages at node N_{12} .

Compare your result by measurement.

$U_{\text{1}} \sim =$

$U_{\text{2}} \sim =$

$U_{\text{OUT}} \sim =$

Calculated $U_{\text{12}} \sim =$

Measured $U_{\text{12}} \sim =$

What are your results?

$\{\rm \dots\}$

$\{\rm \dots\}$

$\{\rm \dots\}$

What will happen if you short-circuit R_2 ?
Try it and explain your results.

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