IMTEK
DEPARTMENT OF
MICROSYSTEMS ENGINEERING

universität freiburg

Electronics Laboratory

Winter semester 2025

Lab 4 – Op Amps

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Score and comments (only for tutors, please leave blank)

Please fill out this cover sheet and submit it with your lab report.

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Electronics Laboratory
WS 25/26
Prof. Dr. Hans Zappe

Lab 4 - MOSFETs

11. Januar 2025

4.2 Non-inverting amplifier

4.2.1 Simulation

Introduction

In this section, we simulated a non-inverting amplifier circuit shown in Figure 5.

Circuit Diagrams:

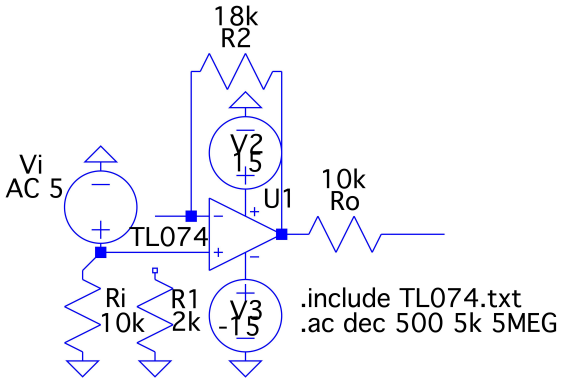

Figure 1: LTSpice *non-inverting amplifier* circuit diagram[1]

Plots:

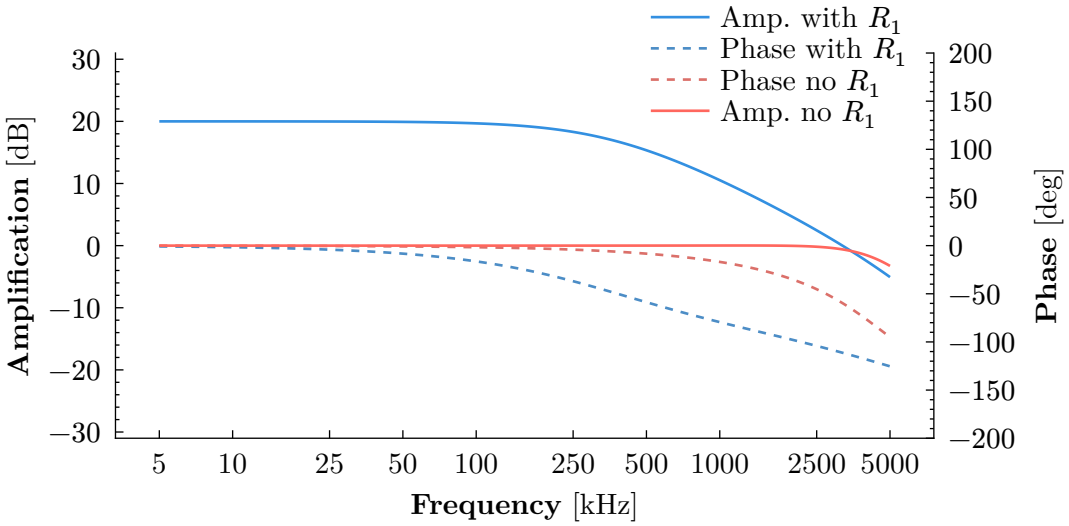

Figure 2: Simulated phase and amplification of the non-inverting amplifier for a frequency of 5kHz-5MHz on a logarithmic scale. $R_1 = 2\ \text{k}\Omega$

[1]We changed `AC 5` to `AC 1` (so)

Text Questions:

Conclusion:

4.2.2. Measurement

Introduction

Circuit Diagrams:

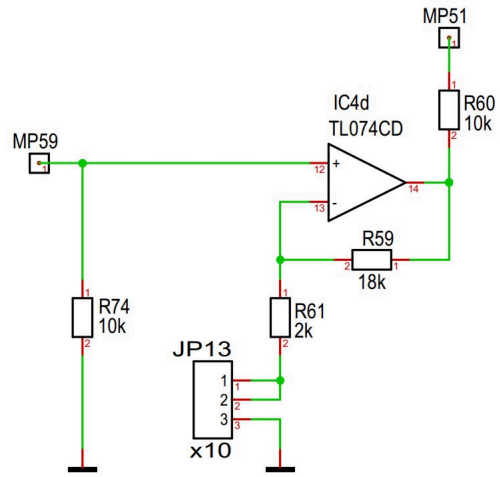

Figure 3: Schematic of the *non-inverting amplifier* circuit

Plots:

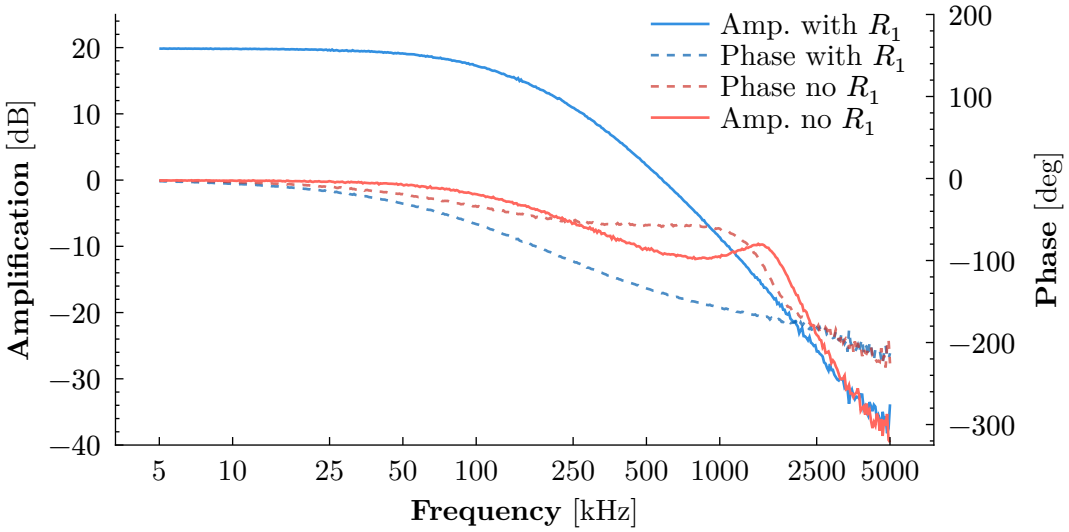

Figure 4: Simulated phase and amplification of the non-inverting amplifier for a frequency of 5kHz-5MHz on a logarithmic scale. R_1= 2 kΩ

Text Questions:

Conclusion

4.3 Voltage-to-current converter

4.3.1 Simulation

Introduction

Circuit Diagrams:

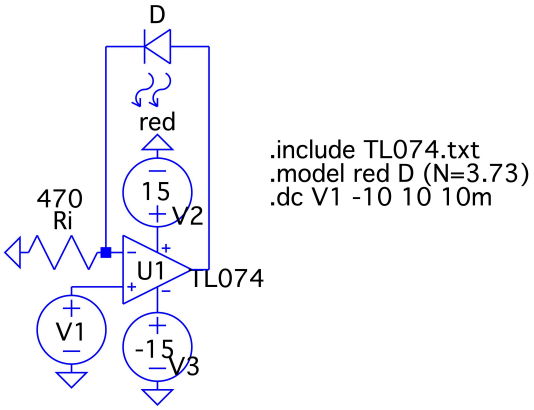

Figure 5: LTSpice *voltage-to-current converter* circuit diagram

Plots:

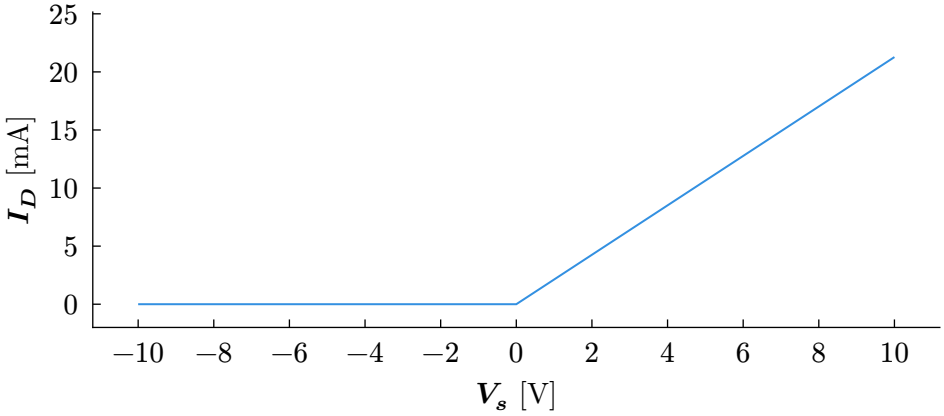

Figure 6: Simulated voltage-to-current converter

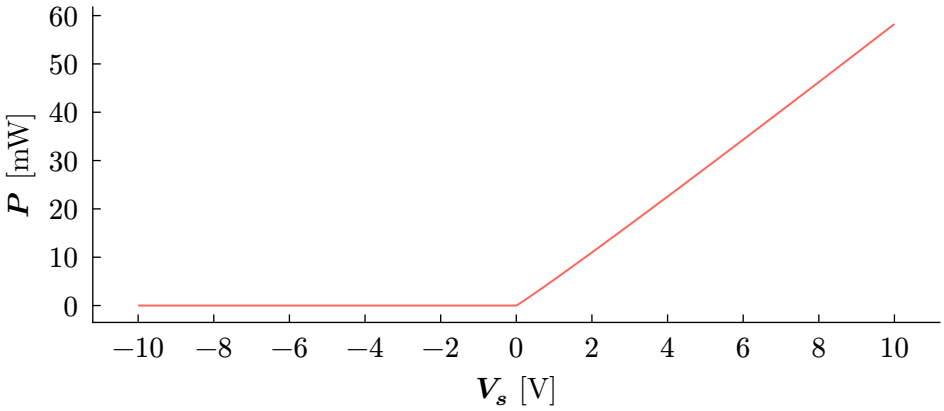

Figure 7: Simulated voltage-to-current converter

Text Questions:

Conclusion:

4.3.2. Measurement

Introduction

Circuit Diagrams:

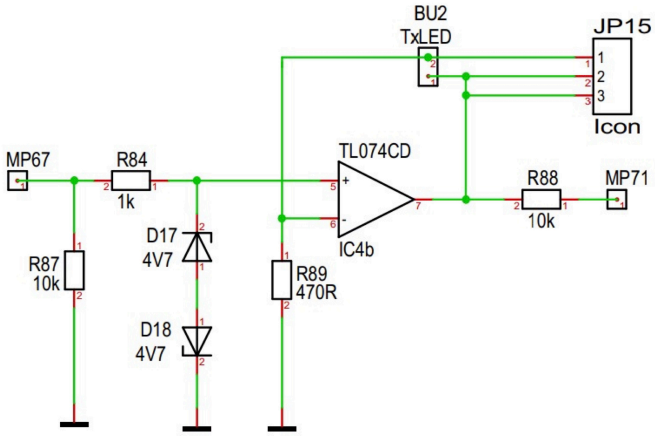

Figure 8: Schematic of the *voltage-to-current converter* circuit

Plots:

Text Questions:
we took the voltage after the LED and divided by 470 Ω. Perfection.

Conclusion

4.4 Transimpedance Amplifier

4.4.1 Simulation

Introduction

Circuit Diagrams:

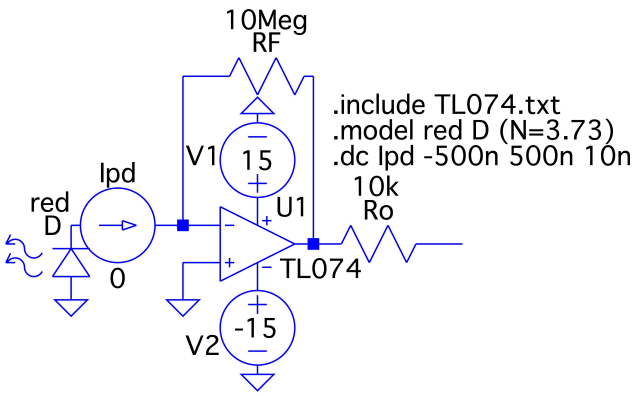

Figure 9: LTSpice *transimpedance amplifier* circuit diagram

Plots:

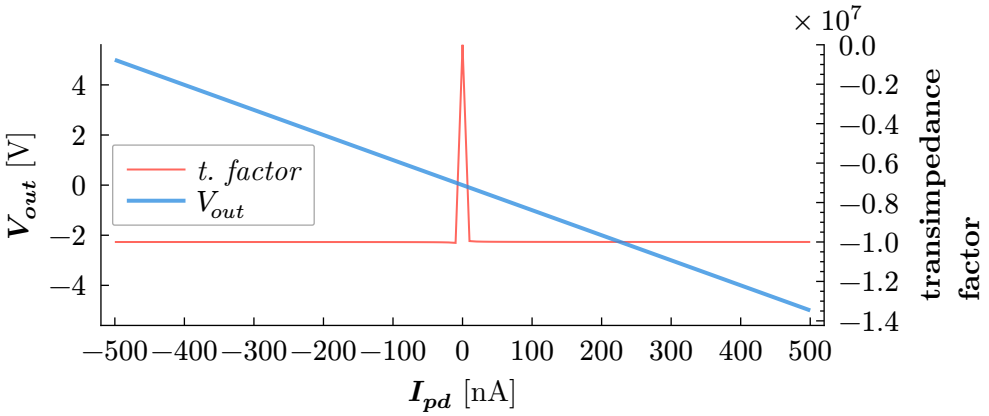

Figure 10: Simulated transimpedance amplifier

Text Questions:

Conclusion:

4.4.2. Measurement

Introduction

Circuit Diagrams:

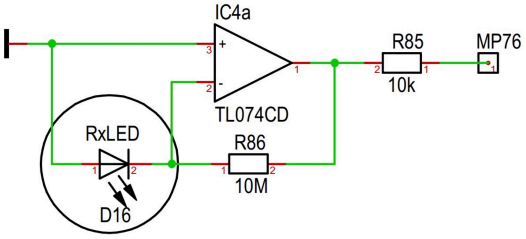

Figure 11: Schematic of the *transimpedance amplifier* circuit

Plots:

Text Questions:

(c) to estimate the current over D16, we use the relation U= -R*I where R is R88 as it is inside the feedback loop of the amplifier circuit. This leads to $I = -\frac{U}{R}$

Conclusion