

## Example Project

# How to write in Latex

A helpful guide to get started and to show some common use cases

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Professor: your Professor

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Mira Musterfrau

## Abstract

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**Keywords:** some, informative, keywords

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# 1 Examples

red text and blue text

different subscripts:  $R_t$   $R_t$

using Units:  $R = 200 \text{ m}\Omega + 345.675 \times 10^{-3} \text{ V/m} - 5 \text{ s/m}^2$

some information[**laboranleitung:physik**]

german number: 3,5 english number: 3.5

## 1.1 Using formulas

a numberd formula:

$$0,5 = \frac{1}{3} \quad (1.1)$$

Equation 1.1 is nice, but how about multiple lines:

$$\begin{aligned} x &= x^2 + 3 \\ \Leftrightarrow 0 &= x^2 - x + 3 \end{aligned} \quad (1.2)$$

and how could you align formulas?

$$x_1 = 6 \quad | \text{ mit } x \in \mathbb{N} \quad (1.3)$$

$$x_2 = 33 + \left| \frac{1}{4} \right| \quad | x_1 + 3 \quad (1.4)$$

$$\begin{aligned} &= 33,25 \quad | \text{ don't number everything} \\ x_3 &= 10^{22} \end{aligned} \quad (1.5)$$

## 1.2 using Units

For this the `siunitx` package is used. It provides Macros for all units.

$$200 \text{ kg} \quad (1.6)$$

The space between a number and it's unit should be a protected half-space, which can be created in latex using `\,`. In the classfile `siunits` is set up to use a separate macro for each subunit, even for size-modifiers:

$$200 \text{ mm} \cdot 2 \text{ V} \quad (1.7)$$

`Siunits` also allows for reformatting of numbers as well as units. Use the `\SI` and `\si` macros for that:

$$e = 160.218 \times 10^{-21} \text{ C} \quad (1.8)$$

$$1.000 \text{ }\mu\text{m} \quad (1.9)$$

$$124 \frac{\text{km}}{\text{s}^2} \quad (1.10)$$

$$400.000 \times 10^{-6} \text{ lm} \quad (1.11)$$

### 1.3 using images

Images can just be imported and used in a float environment with a caption and a label to reference it. (see Figure 1.1)

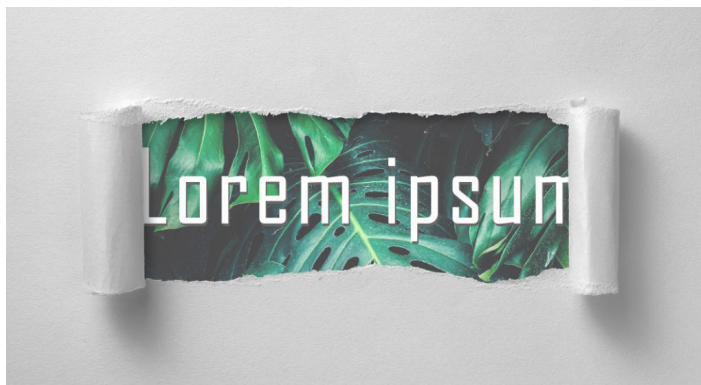


Fig. 1.1: just a random image

You can also display two or more images together, using the subfigure package. You can also resize or crop Images, as seen in Figure 1.2(a) and Figure 1.2(b)

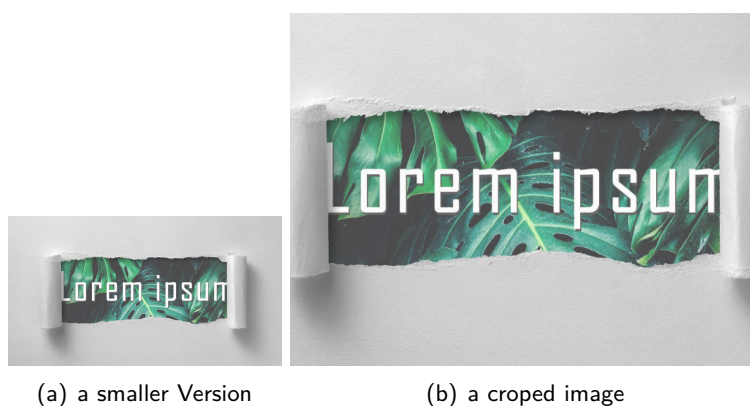


Fig. 1.2: some more images

Plots can be created directly with latex. It is recommended to do this in subfiles and just import the finished PDF pages. This speeds up compilation times by a lot. You should not change the size of precompiled images to keep font sizes consistent.

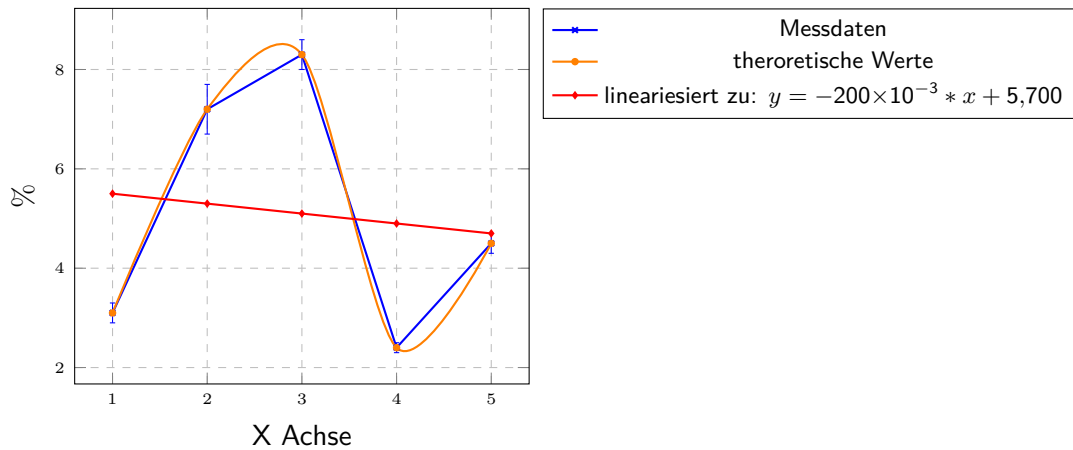


Fig. 1.3: a nice plot

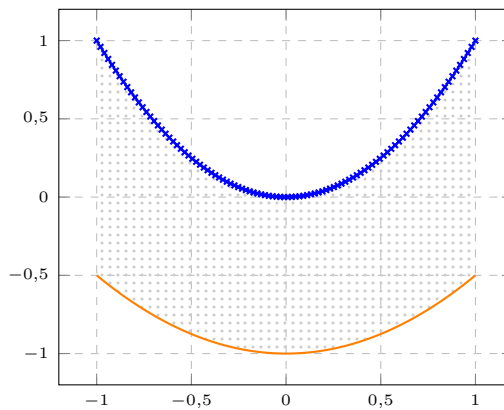


Fig. 1.4: a area plot

Circuit diagrams can also be created using a package called `circuitikz`. It is also recommended to get familiar with Inkscape which has a very good export to latex feature, as you can see in Figure 1.6. If you use Inkscape, there is a list of all electrical symbols here on wikipedia. You can download them as .svg files (not as png!) and just drag&drop them into Inkscape.

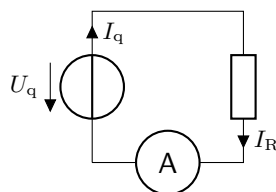


Fig. 1.5: a circuit diagramm

Using Inkscape, you can create SVG-vector graphics and import them easily into Latex.

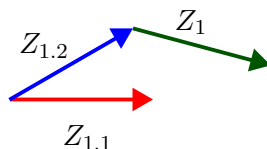


Fig. 1.6: A image created with Inkscape

## 1.4 using tables

Tables are a little bit complicated in LaTeX, but don't worry, here are some examples:

Tab. 1.1: a simple table

A	B
1	2
3	4

As you can see, tables are build using two nested environments. The `table` creates a floate just like a `figure` would. You can then just give it a caption and a lable.

The `tabular` environment creates the actual table. You need to devine the alignment for every column and give delimiters between lines. Each cell is ended by a `&` and a newline is created as always. Using `\hline` creates a vertical line after the row.

Here is a more complex example:

Tab. 1.2: a bigger table

ID	NAME	Price	Currency	Stock
1	Product A	10	EUR	20
2	Stuff	1	USD	200
	A cool Teddy	50	EUR	1

## 1.5 lists and enumerations

This is a nested List:

- hallo
  - temp
    - temp
      - temp



And this is a nice checklist:

- ☐ first
- ☐ urgent
  - ☐ sub item
  - ☐ and another
- ☐ continue

## 1.6 CSV files

import a csv as table:

A	B	C	D
1	0	3,1	0,2
2	0	7,2	0,5
3	0	8,3	0,3
4	0	2,4	0,1
5	0	4,5	0,2

or do it manually to get more control:

Tab. 1.3: a nice list of numbers

first row	second row
number: 1 m	is not 3,1
number: 2 m	is not 7,2
number: 3 m	is not 8,3
number: 4 m	is not 2,4
number: 5 m	is not 4,5

## 1.7 formatting code

use the listings package:

```
#include <stdlib.h>
#include <sdtio.h>

int main(void) {
    printf("Hello World");
    return 0;
}
```

## 2 seperating the document

This was inputed from anothe file!!

It can be usefull to seperate yout document into chapterfiles. This allows to only compile the changed parts of the document or work with multiple people at the same time, but on different chapters.

If you use a more advanced text editor like VS-Code, the editor even compiles the hole document, even when you are editin a subfile.

## 3 attachment

**Messprotokoll oder so** As you can see its also possible to have some pages sideways. Just keep in mind you might need to adapt the margins

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