

# LaTeX4EI Template **Documentation**

## 1. Introduction

## 1.1. Terms of use

This template may be used only for cheat sheets that are published on the LaTeX4EI web page

A lot of effort has been put into this template and therefore all cheat sheets created with this template shall also be available on the LaTeX4EI project web page.

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## 1.2. Purpuse

The purpuse of this document is to give an overview over all functions of the LaTeX4EI template with the goal to help the reader to create beautiful cheat sheets

## 2. Box Environments

For the structuring of the document, the LaTeX4EI template offers different boxes.

## 2.1. Sectionbox

The main structure is defined through the sectionbox environment.

\begin{sectionbox} content of the sectionbox \end{sectionbox}

**2.2. Tablebox**Tables can be set using the *tablebox* or a *tablebox*\* environment. The table entries are embedded within \begin{tablebox\*}{1111} and \end{tablebox\*}

Example for a table with tablebox:

vector 
$$\vec{a} = \begin{pmatrix} 1 \\ 2 \end{pmatrix}$$
 matrix  $\mathbf{M} = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ 

In contrast to that a normal LATEXtable:

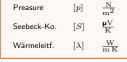
small table with lines two

### 2.3. Symbolbox

A symbolbox can be used to define symbols for different values.

The equation is embedded within \begin{symbolbox} and \end{symbolbox}

Example of a symbolbox (to define symbols)



## 2.4. Cookbox

a so-called cookbox can be used to set beautiful step-by-step instructions.

The items are embedded within \begin{cookbox} and \end{cookbox}.

#### How to create a beautiful cheat sheet

- 1. Read this manual
- 2. Create a heautiful cheat sheet

#### 2.5. Emphbox

really important formulars can be set in a box with a red border.

The equations are embedded within \begin{emphbox} and \end{emphbox}.

$$x_{1/2} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

## 3. Language and Text

3.1. Text The  $\mbox{LMT}_{E}\mbox{X}$  source code of this template is interpreted as unicode. Therefore special characters like the german umlauts (ä.ö.ü) can be used easily.

Also greek characters can be written as math commands ( $\alpha, \beta, \gamma$ ) or as unicode ( $\alpha, \beta, \gamma$ ).

This is also vailed for the math characters:  $\int$ ,  $\partial$ ,  $\mathbb{R}$  or  $\int$ ,  $\partial$ ,  $\mathbb{R}$ .

**3.2. Language**The language can be choosen with the options *english* or *german*.

It is also possible to define a different language for a part of a document: \EngGer{You have chosen the language option english}{Du hast ngerman als Sprachoption gewählt}

However, you can also switch to english in a german cheat sheet using \selectlanguage{english}. This guarantees that words are hyphenated

And back to german with \selectlanguage{ngerman} (use ngerman not german!)

## 4. Images

Images can be included using the \includegraphics command.

Do not use figure environment.

The width should be set as a fraction of \columnwidth.

\begin{center}

\includegraphics[width = 0.5\columnwidth]{Logo}

The includegraphics command searches for images in ./ and ./img. The file extension is added automatically

## 5. Conventions

## Why?

Different formatting is helpful for the understanding of: variables, constants, functions, fixed units, vectors, matrices, sets, complex values, random variables

## 5.1. General conventions for cheat sheets

- · Always the name first and the the symbol afterwards! Example: "The angular velocity  $\omega$ , "The angular velocity \omega"
- Densities are always set in small letters
- Brackets around fractions or bigger equations are set with \left( . \right)

#### 5.2. Tables

Line	B/W	Colored
Line on top	\trule	\ctrule
Linie in the middle	\mrule	\cmrule
Line at bottom	\brule	\cbrule

#### 5.3. Boxes

Different topics are categorized within boxes. The following types of boxes are availible:

sectionbox: for a topic (grey)

tablebox: for colored tables

symbolbox: for units and symbols (orange)

emphbox: for very important equations (red box)

topicbox: for important overviews about the topic

For further information on how to use the different boxes please refer to

section 2.

### 5.4. Vectors and matrices

5.4. Vectors and matrices	
vector symbol	\vec r
vector	\vect{ x \\ y \\ z}
transpose	\vec r^\top
matrix symbol	\ma M
matrix	\mat{ a & b \\ c & d }
tensor	\tensor C

## 5.5. Indicies and superscript

- Depending on what the index refers to it should be set differently:
- $E_{\rm kin}$  (E\_{\ir kin}) if an index refers to a word (e.g. "kinetic"). The command name \ir is an abbriviation for "index roman".
- $\bullet$   $E_x$  (E\_x) if the index refers to a symbol (e.g. the x component of the electromagnetic field).

The same difference also applies for the superscript (^).

## 5.6. Functions

The trigonometric functions are usually set upright. Therefore the commands \exp, \sin, \cos, \sinh, \cosh and \sinc should be used.

Similar we can set:

Differential operators: \grad, \div, \rot and \lpo

Maximum, minium and limes operators: \min, \maxand \lim

Stochastic operators: \E, \Var and \Cov

Transformations are usually set in italic letters: \FT, \LT, \DFT, \ZT and \DTFT

## 5.7. Complex values

Complex variable: \cx z

Complex conjugate: \cxc z

Imaginary: \i or \j or \k (hypercomplex)

## 6. Macros

## 6.1. Own Macros for cheat sheets

Arrows:  $\rightarrow$ ,  $\Rightarrow$ ,  $\uparrow$ ,  $\downarrow$ 

### 6.2. Own Macros in the scientific package

Vectors and Matrices:

Proper delta for differential equaions:

 $G = 6.67 \times 10^{-11} \frac{\text{kg}}{2}$ Functions: SI Units:

Sets:  $\mathbb{NRC}$ Random variable: XYZ

Stochastic: P(X = 3), E(X), Var(X)

Further information about the use of the scientific package can be found in Scientific Package Documentation.pdf