

HUMBOLDT-UNIVERSITÄT ZU BERLIN



L^AT_EX for Linguists

L^AT_EX 1: Basics

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LOT 2019, Amsterdam

January 15, 2019

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What is LaTeX?

- $\tau\epsilon\chi$ (TeX) was developed between 1977 and 1986 by Donald E. Knuth.
- LaTeX is an interface with helpful macros for the TeX system. It was written by Leslie Lamport (= **Lamport TeX**).
- LaTeX works with **markup tagging conventions** – similar to HTML – to
 - define the structure of the document (e.g. chapters and sections),
 - for typographic marking (e.g. bold and italics),
 - for cross-references (e.g. citations)

WYSIWYG vs. WYGIWYN

- MS Word or Libre Office: **WYSIWYG** (*what-you-see-is-what-you-get*)

This is a headline

This word is **bold** and this one is in *italics*.

- L^AT_EX: **WYGIWYN** or **WYGIWYM** (*what-you-get-is-what-you-need/mean*)

▼ \section{This is a headline}

This word is \textbf{bold} and this one is in \textit{italics}.

Overleaf

- 1 Go to: <https://www.overleaf.com>
Overleaf is an online L^AT_EX editor.
- 2 **Register** with your email address and create a new blank project.
Your project is not completely empty. Overleaf provides already some information. Later, we are going to change this information.
- 3 **Compile** your project: Click on the green button *Recompile*.

You will find the tasks for our course here:

<https://github.com/langsci/latex4linguists/blob/master/1-1.md>

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Document structure 1

A L^AT_EX document consists of (at least) two parts: **preamble** and **body**.

L^AT_EX preamble

part of the document where **global characteristics** of the document are specified.

L^AT_EX body

part of the document where **local characteristics** of the document are specified and where you write your document.

Exercise

- Insert the following lines in your `.tex` file and compile.

```
%%%%%%%%%%
% Compile: XeLaTeX BibTeX XeLaTeX XeLaTeX
%%%%%%%%%
\documentclass{scrartcl}

%%%%%%%%%PACKAGES%%%%%%%%%

%%%%%%%%%COMMANDS%%%%%%%%%

%%%%%%%%%META DATA%%%%%%%%%

%%%%%%%%%END PREAMBLE%%%%%%%%%

%%%%%%%%%BEGIN DOCUMENT%%%%%%%%%

\begin{document}

This is my first \LaTeX file.

\end{document}

%%%%%%%%%END DOCUMENT%%%%%%%%%
```

- Write something after the `\end{document}` command and compile again.

Document class

Global parameters of the layout can be specified in the `documentclass` command.
The most commonly used classes are:

- `book` for books
- `article` for articles, without chapters, only with sections
- `beamer` for presentations, without chapters, only with sections

Document class

Global parameters of the layout can be specified in the `documentclass` command. The most commonly used classes are:

- `book` for books
- `article` for articles, without chapters, only with sections
- `beamer` for presentations, without chapters, only with sections

Variations of these classes (not in American formats) are provided by the KOMA-Script:

- `scrbook` for books
- `scrartcl` for articles, without chapters, only with sections

You can specify **options** in your `documentclass` command.

- **Font size** as default: 10pt, 11pt, 12pt
Default → 10pt
- **Paper format**: letterpaper, a4paper
Default → letterpaper

Specification of paper format in KOMA-Script classes: `paper=a4`, `paper=letter`

Exercise

- Specify the following options for your document `.tex` file and compile.

```

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% Compile: XeLaTeX BibTeX XeLaTeX XeLaTeX
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
\documentclass[10pt, paper=a4, abstracton]{scrartcl}

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%PACKAGES%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%COMMANDS%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%META DATA%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%END PREAMBLE%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%BEGIN DOCUMENT%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

\begin{document}

This is my first \LaTeX\ file.

\end{document}

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%END DOCUMENT%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

```

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Commands

In L^AT_EX, there are normally **3 types of commands**:

- **declarations:** backslash + command name

The scope of the command can be defined by an environment or with curly brackets.

```
\declaration ...  
{\declaration ...} outside of scope
```

```
{\Huge Hello world!} outside of scope
```

Commands

In L^AT_EX, there are normally **3 types of commands**:

- **declarations:** backslash + command name

The scope of the command can be defined by an environment or with curly brackets.

```
\declaration ...  
{\declaration ...} outside of scope
```

```
{\Huge Hello world!} outside of scope
```

- **simple commands:** backslash + command name + optional arguments (square brackets) + obligatory arguments (curly brackets)

```
\name[optional]{obligatory}
```

```
\textit{Text in italics}
```


Commands

In L^AT_EX, there are normally **3 types of commands**:

- **declarations:** backslash + command name

The scope of the command can be defined by an environment or with curly brackets.

```
\declaration ...
{\declaration ...} outside of scope
```

```
{\Huge Hello world!} outside of scope
```

- **simple commands:** backslash + command name + optional arguments (square brackets) + obligatory arguments (curly brackets)

```
\name[optional]{obligatory}
```

```
\textit{Text in italics}
```

- **environments:** begin + end command.

Command applies between begin and end.

```
\begin{environment}[optional]
...
\end{environment}
```

```
\begin{center}
Hello world!
\end{center}
```

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Meta data

Specifying the **meta data** of your document **in the preamble**:

```
\author{first name last name \and first name last name}  
\title{my title}  
\subtitle{my subtitle}  
\date{14th Februar 2019}
```

- Other options for date: `\date{\today}`, `\date{}`
Default → `\date{\today}`

Use the command `\maketitle` after `\begin{document}` to include this information in your output.

Exercise

Specify the meta data in your document with two authors, use the `\maketitle` command, and try different commands for date.

```
\documentclass[10pt, paper=a4, abstracton]{scrartcl}

%%%%%%%%%%%%%%%%%%%%%%%%PACKAGES%%%%%%%%%%%%%%%%%%%%%%%%

%%%%%%%%%%%%%%%%%%%%%%%%COMMANDS%%%%%%%%%%%%%%%%%%%%%%%%

%%%%%%%%%%%%%%%%%%%%%%%%META DATA%%%%%%%%%%%%%%%%%%%%%%%%
\author{Sebastian Nordhoff \and Antonio Machicao y Priemer}
\title{\LaTeX\ for Linguists}
\subtitle{My first \TeX\ document}
\date{\today}

%%%%%%%%%%%%%%%%%%%%%%%%END PREAMBLE%%%%%%%%%%%%%%%%%%%%%%%%

%%%%%%%%%%%%%%%%%%%%%%%%BEGIN DOCUMENT%%%%%%%%%%%%%%%%%%%%%%%%

\begin{document}

\maketitle
```

Headlines

Commands for the structure of your text:

- `\part{title}` (only in book/scrbook and report/scrreprt)
- `\chapter{title}` (only in book/scrbook and report/scrreprt)
- `\section{title}`
- `\subsection{title}`
- `\subsubsection{title}`
- `\paragraph{title}`
- `\subparagraph{title}`

Headlines

Commands for the structure of your text:

- `\part{title}` (only in book/scrbook and report/scrreprt)
- `\chapter{title}` (only in book/scrbook and report/scrreprt)
- `\section{title}`
- `\subsection{title}`
- `\subsubsection{title}`
- `\paragraph{title}`
- `\subparagraph{title}`

These commands can be used with an option, e.g.

`\section[short title]{long title}`

The text in the **option** – when used – appears in the **table of contents** and in the **headers**, otherwise only the text in the **argument** is used.

Cross references 1

To work with cross references, you need two things:

- 1 a label with an ID: `\label{ID}`

The ID must be **unique** for the labelled element in your document.

- 2 a reference: `\ref{ID}`

With the `ref` command, L^AT_EX will take the **number of the element labelled** with the given ID and use it for cross references.

Cross references 1

To work with cross references, you need two things:

- 1 a label with an ID: `\label{ID}`

The ID must be **unique** for the labelled element in your document.

- 2 a reference: `\ref{ID}`

With the `ref` command, L^AT_EX will take the **number of the element labelled** with the given ID and use it for cross references.

The `label` command must **follow** (if possible: immediately) the element it is labelling.

The command `\pageref{ID}` will give you the **page** on which the labelled element appears.

```
\section{Introduction}  
\label{sec:Intro}
```

```
To see how cross referencing works, take a look at Section \ref{sec:Intro}  
which is on page \pageref{sec:Intro}
```


For long works, it is **useful** to have **prefixes**. They help you to find your references faster.

`sec` for sections, subsections, ...

`fig` for figures

`tab` for tables

`it` for numbered items in lists

`eq` for equations

`fn` for footnotes

```
\section{Introduction}
```

```
\label{sec:Intro}
```

To see how cross referencing works, take a look at Section `\ref{sec:Intro}`
which is on page `\pageref{sec:Intro}`

Paragraphs & line breaks

- new **paragraph**: twice `<ENTER>` (↵) key
- **line** break: `\newline` or `\\` cause a line break without ending the paragraph.
- new **page**: `\newpage` or `\clearpage`
- `\noindent` **prevents** the **indentation** after a line break.

Table of contents

To **generate a table of contents** just include the following command in the body of your document at the position where you want the toc to appear.

L^AT_EX generates your toc taking the **information from your structuring commands** (e.g. `\section[short title]{title}`).

```
\tableofcontents
```

```
%%%%%%%%%%%%BEGIN DOCUMENT%%%%%%%%%
```

```
\begin{document}
```

```
\maketitle
```

```
\tableofcontents
```

```
\section[Introduction]{A short introduction}
```

This is a sample text. The only purpose of this text is to show how `\LaTeX` work with `\LaTeX` . It is not necessary that this text has any meaning. It should only show some properties of the system we are using.

```
\subsection{A note on the data}
```

This is a sample text. The only purpose of this text is to show how `\LaTeX` work with `\LaTeX` . It is not necessary that this text has any meaning. It should only show some properties of the system we are using.

```
\end{document}
```

```
%%%%%%%%%%%%END DOCUMENT%%%%%%%%%
```

Footnotes

To generate a footnote, use the following command at the position where the **footnote index** should appear.

```
\footnote{content of the footnote}
```

Example

```
This is a sample text. The only purpose of this text\footnote{A text  
(literary theory) is any object that can be read.} is to show how  
to work with footnotes in \LaTeX .\footnote{\LaTeX\ is a document preparation  
system.}
```

Exercise

Go to

<https://github.com/langsci/latex4linguists/blob/master/1-1.md>
and follow the instructions of the **first four blocks** in your .tex file.

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Characters & spaces

- The following characters can be used without problems:

```
a...z A...Z 0...9  
. , : ; ? ! ' ' " ( ) + - * =
```


Characters & spaces

- The following characters can be used without problems:

```
a...z A...Z 0...9
. , : ; ? ! ' ' " ( ) + - * =
```

- With XeL^AT_EX, you can write **accents** and **umlauts** without further commands. Another option is to use **commands**:

```
\ "A \ "O \ "a \ "o \ 'a \ 'o \ ss{} \ ^u \ ~n
```

```
\ "{A} { \ "O } { \ ss }
```

(1) Ä Ö ä ö á ò ß û ñ
 Ä Ö ß

Characters & spaces

- The following characters can be used without problems:

```
a...z A...Z 0...9
. , : ; ? ! ' ' " ( ) + - * =
```

- With XeL^AT_EX, you can write **accents** and **umlauts** without further commands. Another option is to use **commands**:

```
\ "A \ "O \ "a \ "o \ 'a \ 'o \ ss{} \ ^u \ ~n
\ "{A} {\ "O} {\ ss}
```

(1) Ä Ö ä ö á ò ß û ñ
 Ä Ö ß

- The following characters have a **special meaning** in T_EX.
 You must **escape** their function to use them. (It depends on your compiler
 e.g. XeL^AT_EX vs. PDFL^AT_EX)

```
# $ & _ { } \ < > | ~ ^ [ ] %
```

- escaping with **backslash**

```
\# \$ \% \_ \{ \} \%
```

(2) # \$ & - { } %

- escaping with **backslash**

```
\# \$ \% \_ \{ \} \%
```

(2) # \$ & - { } %

- escaping with **macros** or **math mode**

```
\textbackslash \textasciitilde \textasciicircum  
\textgreater $>$ \textless $<$ \textbar $\text{\textbar}$ $|$\text{\textbar}$
```

(3) \ ~ ^ > > < < | | |

- escaping with **backslash**

`\# \ $ \& _ \{ \} \%`

(2) # \$ & - { } %

- escaping with **macros** or **math mode**

```
\textbackslash \textasciitilde \textasciicircum  
\textgreater $>$ \textless $<$ \textbar $\textbar$ $|\textbar$
```

(3) $\backslash \sim ^\wedge > > < < |||$

- Sometimes **angled brackets** `<>` can be used in Xe \LaTeX without further commands.
- **Square brackets** `[]` can be used in plain text, but they can also mark the **option** of a command (e.g. in `\section[short title]{title}`). In this case use them in math mode `[$ text $]` for the brackets.

More on special characters:

https://en.wikibooks.org/wiki/LaTeX/Special_Characters

Space & line break

L^AT_EX has a special treatment of **spaces** and **line breaks** to avoid typographic errors:

- **no difference** between a **blank** and a **tab**
- **Consecutive blanks** are treated as only one blank.
- A **blank** at the **beginning of a line** is ignored.
- One **line break** (1x `<ENTER>`) is interpreted as a blank.
- One **empty line** (2x `<ENTER>`) is interpreted as the end of a paragraph.
- **More than one empty line** is interpreted as one empty line.

Example

This is a sample text with too many spaces. Here, I use one line break.

This is a sample text. Now, I use one blank line.

This is a sample text. Now, I use 3 blank lines.

This is a sample text.

Example

This is a sample text with too many spaces. Here, I use one line break.

This is a sample text. Now, I use one blank line.

This is a sample text. Now, I use 3 blank lines.

This is a sample text.

This is a sample text with too many spaces. Here, I use one line break. This is a sample text. Now, I use one blank line.

This is a sample text. Now, I use 3 blank lines.

This is a sample text.

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Commenting out

In LaTeX, text following the character **%** in a line will be **ignored**.

- **hiding code/text**, without deleting it;
- **finding errors** in sections;
- **avoiding blanks** and **empty lines** in a long input line;
- **writing comments** without seeing it in the output.

```
This is a sample text. %These are just notes
%Here is a special characters and a command: & \small
```

```
A comment can divide a word:
Rindfleischetikettierungs% 5 morphemes
überwachungsaufgaben% 6 morphemes
übertragungsgesetz.
```

This is a sample text.

A comment can divide a word: Rindfleischetikettierungsüberwachungsaufgaben-
übertragungsgesetz.

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Text formatting

```

\textbf{bold}
\textit{italics}
\textsl{slanted}
\emph{emphasized}
{\it test \textup{upright} test}
\texttt{typewriter}
\textsc{small caps}
ex\textsuperscript{up}
ex\textsubscript{down}

```

bold
italics
slanted
emphasized
test upright test
 typewriter
 SMALL CAPS
 ex^{up}
 ex_{down}

Some of these commands can be also used as **declarations**.

```
{\tiny tiny}  
{\scriptsize scsize}  
{\footnotesize fnsiz}  
{\small small}  
{\normalsize normal}  
{\large large}  
{\Large Large}  
{\LARGE LARG}  
{\huge huge}  
{\Huge Huge}
```

tiny
scsize
fnsiz
small
normal
large
Large
LARG
huge
Huge

The commands for font size can be used as **declarations** or as **environments**.

Exercise

Go to

<https://github.com/langsci/latex4linguists/blob/master/1-1.md>
and follow the instructions of the **fifth block** in your .tex file.

Test further commands!

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Text environments

You will normally need the following text environments:

- quotations,
- lists,
- abstracts,
- ...

Quotations

- In L^AT_EX there are two environments for quotations `quote` and `quotation`.
- Both show a different output dependent on the document class (e.g. `beamer` vs. `article`).

This is a sentence before the `\texttt{quote}` environment.

```
\begin{quote}
```

Furthermore, each actual ‘‘language’’ will incorporate a periphery of borrowings, historical residues, inventions, and so on, which we can hardly expect to -- and indeed would not want to -- incorporate within a principled theory of UG. [\dots]

Viewed against the reality of what a particular person may have inside his head, core grammar is an idealization. \hfill (Chomsky,~1981:~8)

```
\end{quote}
```

This is a sentence after the `\texttt{quote}` environment.

List environments

L^AT_EX has 3 pre-defined and 1 general list environments:

- `itemize`,
- `enumerate`,
- `description`,
- `list`.

List environments

L^AT_EX has 3 pre-defined and 1 general list environments:

- `itemize`,
- `enumerate`,
- `description`,
- `list`.

Every environment begins with the `\begin{ }` and ends with the `\end{ }` command.
Each point on the list begins with `\item`.

```
\begin{itemize}
\item syntax
\item semantics

\begin{itemize}
\item lexical semantics
\item propositional semantics
\end{itemize}

\item morphology
\end{itemize}
```

- syntax
- semantics
 - lexical semantics
 - propositional semantics
- morphology

The description list can be used for terms with their definitions.

```
\begin{description}
\item[Morpheme:] smallest grammatical unit in a language bearing a meaning

\begin{description}
\item[Allomorph:] phonetic variant of a morpheme
\end{description}

\item[Phoneme:] systematic unit of sound (or gesture in the case of sign
languages, see chereme) that distinguish one word from another in a particular
language
\end{description}
```

Morpheme: smallest grammatical unit in a language bearing a meaning

Allomorph: phonetic variant of a morpheme

Phoneme: systematic unit of sound (or gesture in the case of sign languages, see chereme) that distinguish one word from another in a particular language

Combining lists

Lists can be **combined** with and **embedded** in other list types.

```
\begin{description}
\item[Morpheme:] smallest grammatical
unit in a language bearing a meaning

\begin{itemize}
\item minimal unit in morphology
\item subtypes:

\begin{enumerate}
\item roots
\item prefixes
\item suffixes
\item \dots
\end{enumerate}
\end{itemize}
\end{description}
```

Morpheme: smallest grammatical
unit in a language
bearing a meaning

- minimal unit in morphology
- subtypes:
 - ① roots
 - ② prefixes
 - ③ suffixes
 - ④ ...

Customizing lists

Bullet points can be customized with an **optional parameter**.

```
\begin{itemize}
\item standard symbol
\item[+] customized
\item[--] customized
\item[--] customized
\end{itemize}
```

- standard symbol
- + customized
- customized
- customized

```
\begin{enumerate}
\item standard symbol
\item[+] customized
\item[+] customized
\item[--] customized
\item standard symbol
\end{enumerate}
```

- ① standard symbol
- + customized
- + customized
- customized
- ② standard symbol

Abstract

For automatic abstracts, use the option `abstracton` in the `\documentclass` command.

```
\begin{abstract}
```

An abstract is a brief summary of a research article, thesis, or any in-depth analysis of a particular subject and is often used to help the reader quickly ascertain the paper's purpose.\par

When used, an abstract always appears at the beginning of a manuscript, acting as the point-of-entry for any given academic paper.

```
\end{abstract}
```

Abstract

An abstract is a brief summary of a research article, thesis, or any in-depth analysis of a particular subject and is often used to help the reader quickly ascertain the paper's purpose.

When used, an abstract always appears at the beginning of a manuscript, acting as the point-of-entry for any given academic paper.

Exercise

Go to

<https://github.com/langsci/latex4linguists/blob/master/1-1.md>
and follow the instructions of the **blocks 6–8** in your .tex file.

Test further commands!

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Loading Packages

- The functions L^AT_EX offers are restricted. Most **extra features** you will need come with **packages** that you can load in your T_EX document.
- Packages must be loaded in the **preamble** of your document.

```
\usepackage[parameter1, parameter2]{package name}
```

Loading Packages

- The functions L^AT_EX offers are restricted. Most **extra features** you will need come with **packages** that you can load in your T_EX document.
- Packages must be loaded in the **preamble** of your document.

```
\usepackage[parameter1, parameter2]{package name}
```

- Normally, L^AT_EX packages are already **pre-installed** in your T_EX distribution (e.g. MiKTeX).
- Almost every other package (with manual) can be **downloaded** from CTAN – The Comprehensive T_EX Archive Network (<http://www.ctan.org/>)
- With the command `\usepackage` your T_EX distribution loads the package – or **downloads it automatically** if necessary.

These packages can be useful:

- Language package: `babel` `\usepackage[ngerman, english]{babel}`
- Font: `libertine` `\usepackage{libertine}`
- Blind text: `lipsum` or `blindtext` `\usepackage{blindtext}`
- URLs: `url` `\usepackage{url}`
- Links (e.g. for cross references): `hyperref` `\usepackage[bookmarksnumbered, hidelinks]{hyperref}`

Sometimes the **order** in that packages have been installed can affect the compilation (e.g. `gb4e` and `forest`).

Also, not all packages are **compatible** with each other or with your compiler (XeLaTeX vs. PDFLaTeX).

Exercise

Go to
<https://github.com/langsci/latex4linguists/blob/master/1-1.md>
and follow the instructions of the **blocks 9–11** in your `.tex` file.

Test further commands!

Internet sources I

- Graphic: File Extensions – xkcd, A webcomic of romance, sarcasm, math, and language
<https://xkcd.com/1301/>
[Access: 10/04/2017]
- Link: Akzente und Sonderzeichen in L^AT_EX.
https://de.wikibooks.org/wiki/LaTeX/_Akzente_und_Sonderzeichen
[Access: 10/10/2017]
- Link: KOMA-Script.
<https://www.komascript.de/>
[Access: 02/01/2019]
- Link: Overleaf.
<https://www.overleaf.com>
[Access: 02/01/2019]
- Link: L^AT_EX/Special Characters.
https://en.wikibooks.org/wiki/LaTeX/Special_Characters
[Access: 02/01/2019]
- Link: CTAN – The Comprehensive T_EX Archive Network.
<http://www.ctan.org/>
[Access: 02/01/2019]

Internet sources II

- Software: MiKTeX
<https://miktex.org/>
[Access: 10/04/2017]
- Software: TeXstudio
<https://www.texstudio.org/>
[Access: 10/04/2017]

Literature I

- Chomsky, Noam. 1981. *Lectures on Government and Binding*. Dordrecht: Foris Publications.
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