ASYMMETRISCHE VERSCHLÜSSELUNG

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Einführung in die Asymmetrische Verschlüsselung Januar 2021 – version 1.0

PUBLICATIONS

Some ideas and figures have appeared previously in the following publications:

Put your publications from the thesis here. The packages multibib or bibtopic etc. can be used to handle multiple different bibliographies in your document.

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ACRONYMS

DRY Don't Repeat Yourself

API Application Programming Interface

UML Unified Modeling Language

Teil I

SOME KIND OF MANUAL

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INTRODUCTION

This template for LATEX has two goals:

1. Provide students with an easy-to-use template for their Master's or PhD thesis (though it might also be used by other types of authors for reports, books, etc.).

2. Provide a classic, high-quality typographic style that is inspired by Bringhurst's "The Elements of Typographic Style" [2].

Asymmetrische Verschlüsselung version 1.0

The bundle is configured to run with a *full* MiKT_EX or T_EXLive installation right away and, therefore, it uses only freely available fonts.

People interested only in the nice style and not the whole bundle can now use the style stand-alone via the file classicthesis.sty. This works now also with "plain" LATEX.

As of version 3.0, classicthesis can also be easily used with LyX¹ thanks to Nicholas Mariette and Ivo Pletikosić. The LyX version of this manual will contain more information on the details.

This should enable anyone with a basic knowledge of LaTeX 2ε or LyX to produce beautiful documents without too much effort. In the end, this is my overall goal: more beautiful documents, especially theses, as I am tired of seeing so many ugly ones.

The whole template and the used style is released under the GNU General Public License.

If you like the style then I would appreciate a postcard:

André Miede Detmolder Straße 32 31737 Rinteln Germany

The postcards I received so far are available at:

http://postcards.miede.de

So far, many theses, some books, and several other publications have been typeset successfully with it. If you are interested in some typographic details behind it, enjoy Robert Bringhurst's wonderful book.

A well-balanced line width improves the legibility of the text. That's what typography is all about, right?

¹ http://www.lyx.org

IMPORTANT NOTE: Some things of this style might look unusual at first glance, many people feel so in the beginning. However, all things are intentionally designed to be as they are, especially these:

- No bold fonts are used. Italics or spaced small caps do the job quite well.
- The size of the text body is intentionally shaped like it is. It supports both legibility and allows a reasonable amount of information to be on a page. And, no: the lines are not too short.
- The tables intentionally do not use vertical or double rules. See the documentation for the booktabs package for a nice discussion of this topic.²
- And last but not least, to provide the reader with a way easier access to page numbers in the table of contents, the page numbers are right behind the titles. Yes, they are *not* neatly aligned at the right side and they are *not* connected with dots that help the eye to bridge a distance that is not necessary. If you are still not convinced: is your reader interested in the page number or does she want to sum the numbers up?

Therefore, please do not break the beauty of the style by changing these things unless you really know what you are doing! Please.

YET ANOTHER IMPORTANT NOTE: Since classicthesis' first release in 2006, many things have changed in the LATEX world. Trying to keep up-to-date, classicthesis grew and evolved into many directions, trying to stay (some kind of) stable and be compatible with its port to LyX. However, there are still many remains from older times in the code, many dirty workarounds here and there, and several other things I am absolutely not proud of (for example my unwise combination of KOMA and titlesec etc.).

Currently, I am looking into how to completely re-design and re-implement classicthesis making it easier to maintain and to use. As a general idea, classicthesis.sty should be developed and distributed separately from the template bundle itself. Excellent spin-offs such as arsclassica could also be integrated (with permission by their authors) as format configurations. Also, current trends of microtype, fontspec, etc. should be included as well. As I am not really into deep LATEX programming,

An outlook into the future of classicthesis.

² To be found online at

I will reach out to the LATEX community for their expertise and help.

1.1 ORGANIZATION

A very important factor for successful thesis writing is the organization of the material. This template suggests a structure as the following:

• Chapters/ is where all the "real" content goes in separate files such as Chapter01.tex etc.

- You can use these margins for summaries of the text body...
- FrontBackMatter/ is where all the stuff goes that surrounds the "real" content, such as the acknowledgments, dedication, etc.
- gfx/ is where you put all the graphics you use in the thesis. Maybe they should be organized into subfolders depending on the chapter they are used in, if you have a lot of graphics.
- Bibliography.bib: the BibT_EX database to organize all the references you might want to cite.
- classicthesis.sty: the style definition to get this awesome look and feel. Bonus: works with both LATEX and PDFLATEX...and LyX.
- ClassicThesis.tcp a TEXnicCenter project file. Great tool and it's free!
- ClassicThesis.tex: the main file of your thesis where all the content gets bundled together.
- classicthesis-config.tex: a central place to load all nifty packages that are used. In there, you can also activate backrefs in order to have information in the bibliography about where a source was cited in the text (i.e., the page number).

Make your changes and adjustments here. This means that you specify here the options you want to load classicthesis.sty with. You also adjust the title of your thesis, your name, and all similar information here. Refer to Abschnitt 1.3 for more information.

This had to change as of version 3.0 in order to enable an easy transition from the "basic" style to LyX.

In total, this should get you started in no time.

1.2 STYLE OPTIONS

There are a couple of options for classicthesis.sty that allow for a bit of freedom concerning the layout:

• General:

 drafting: prints the date and time at the bottom of each page, so you always know which version you are dealing with. Might come in handy not to give your Prof. that old draft. ... or your supervisor might use the margins for some comments of her own while reading.

Parts and Chapters:

- parts: if you use Part divisions for your document, you should choose this option. (Cannot be used together with nochapters.)
- nochapters: allows to use the look-and-feel with classes that do not use chapters, e.g., for articles. Automatically turns off a couple of other options: eulerchapternumbers, linedheaders, listsseparated, and parts.
- linedheaders: changes the look of the chapter headings a bit by adding a horizontal line above the chapter title. The chapter number will also be moved to the top of the page, above the chapter title.

• Typography:

- eulerchapternumbers: use figures from Hermann Zapf's Euler math font for the chapter numbers. By default, old style figures from the Palatino font are used.
- beramono: loads Bera Mono as typewriter font. (Default setting is using the standard CM typewriter font.)
- eulermath: loads the awesome Euler fonts for math.
 (Palatino is used as default font.)
- pdfspacing: makes use of pdftex' letter spacing capabilities via the microtype package.³ This fixes some serious issues regarding math formulæ etc. (e. g., "ß") in headers.
- minionprospacing: uses the internal textssc command of the MinionPro package for letter spacing.
 This automatically enables the minionpro option and overrides the pdfspacing option.

• Table of Contents:

 tocaligned: aligns the whole table of contents on the left side. Some people like that, some don't.

³ Use microtype's DVIoutput option to generate DVI with pdftex.

- dottedtoc: sets pagenumbers flushed right in the table of contents.
- manychapters: if you need more than nine chapters for your document, you might not be happy with the spacing between the chapter number and the chapter title in the Table of Contents. This option allows for additional space in this context. However, it does not look as "perfect" if you use \parts for structuring your document.

• Floats:

- listings: loads the listings package (if not already done) and configures the List of Listings accordingly.
- floatperchapter: activates numbering per chapter for all floats such as figures, tables, and listings (if used).
- subfig(ure): is passed to the tocloft package to enable compatibility with the subfig(ure) package. Use this option if you want use classicthesis with the subfig package.

The best way to figure these options out is to try the different possibilities and see, what you and your supervisor like best.

In order to make things easier in general, classicthesis-config.tex contains some useful commands that might help you.

1.3 CUSTOMIZATION

This section will give you some hints about how to adapt classicthesis to your needs.

The file classicthesis.sty contains the core functionality of the style and in most cases will be left intact, whereas the file classicthesis-config.tex is used for some common user customizations.

The first customization you are about to make is to alter the document title, author name, and other thesis details. In order to do this, replace the data in the following lines of classicthesis-configuations in

\newcommand{\myTitle}{A Classic Thesis Style\xspace}
\newcommand{\mySubtitle}{An Homage to ...\xspace}

Further customization can be made in classicthesis-config.tex by choosing the options to classicthesis.sty (see Abschnitt 1.2) in a line that looks like this:

```
\PassOptionsToPackage{eulerchapternumbers,listings,drafting,
    pdfspacing, subfig,beramono,eulermath,parts}{
    classicthesis}
```

Many other customizations in classicthesis-config.tex are possible, but you should be careful making changes there, since some changes could cause errors.

Finally, changes can be made in the file classicthesis.sty, although this is mostly not designed for user customization. The main change that might be made here is the text-block size, for example, to get longer lines of text.

Modifications in classicthesis.sty

```
1.4 ISSUES
```

This section will list some information about problems using classicthesis in general or using it with other packages.

Beta versions of classicthesis can be found at Bitbucket:

```
https://bitbucket.org/amiede/classicthesis/
```

There, you can also post serious bugs and problems you encounter.

Compatibility with the glossaries Package

If you want to use the glossaries package, take care of loading it with the following options:

\usepackage[style=long,nolist]{glossaries}

Thanks to Sven Staehs for this information.

Compatibility with the (Spanish) babel Package

Spanish languages need an extra option in order to work with this template:

```
\usepackage[spanish,es-lcroman]{babel}
```

Thanks to an unknown person for this information (via the issue reporting).

FURTHER INFORMATION FOR USING classicthesis WITH SPANISH (IN ADDITION TO THE ABOVE) In the file ClassicThesis.tex activate the language:

```
\selectlanguage{spanish}
```

If there are issues changing \tablename, e.g., using this:

```
\renewcommand{\tablename}{Tabla}
```

This can be solved by passing es-tabla parameter to babel:

```
\PassOptionsToPackage{es-tabla,spanish,es-lcroman,
   english}{babel}
\usepackage{babel}
```

But it is also necessary to set spanish in the \documentclass. Thanks to Alvaro Jaramillo Duque for this information.

Compatibility with the pdfsync Package

Using the pdfsync package leads to linebreaking problems with the graffito command. Thanks to Henrik Schumacher for this information.

1.5 FUTURE WORK

So far, this is a quite stable version that served a couple of people well during their thesis time. However, some things are still not as they should be. Proper documentation in the standard format is still missing. In the long run, the style should probably be published separately, with the template bundle being only an application of the style. Alas, there is no time for that at the moment...it could be a nice task for a small group of LATEXnicians.

Please do not send me email with questions concerning LATEX or the template, as I do not have time for an answer. But if you have comments, suggestions, or improvements for the style or the template in general, do not hesitate to write them on that postcard of yours.

1.6 BEYOND A THESIS

The layout of classicthesis.sty can be easily used without the framework of this template. A few examples where it was used to typeset an article, a book or a curriculum vitae can be found in the folder Examples. The examples have been tested with latex and pdflatex and are easy to compile. To encourage you even more, PDFs built from the sources can be found in the same folder.

1.7 LICENSE

GNU GENERAL PUBLIC LICENSE: This program is free software; you can redistribute it and/or modify it under the terms of the GNU General Public License as published by the Free Software Foundation; either version 2 of the License, or (at your option) any later version.

This program is distributed in the hope that it will be useful, but without any warranty; without even the implied warranty

of *merchantability* or *fitness for a particular purpose*. See the GNU General Public License for more details.

Teil II

THE SHOWCASE

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2.1 A NEW SECTION

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Examples: *Italics*, ALL CAPS, SMALL CAPS, LOW SMALL CAPS¹. Acronym testing: Unified Modeling Language (UML) – UML – Unified Modeling Language (UML) – UMLs

2.1.1 *Test for a Subsection*

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Note: The content of this chapter is just some dummy text.

¹ Footnote example.

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2.2 ANOTHER SECTION IN THIS CHAPTER

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This statement requires citation Cormen u. a. [3].

2.2.1 Personas Initialmente

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² De web nostre historia angloromanic.

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Another statement requiring citation Sommerville [5] but this time with text after the citation.

2.2.2 Figure Citations

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fastidii ea ius	germano	demonstratea
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Tabelle 1: Autem timeam deleniti usu id. Knuth

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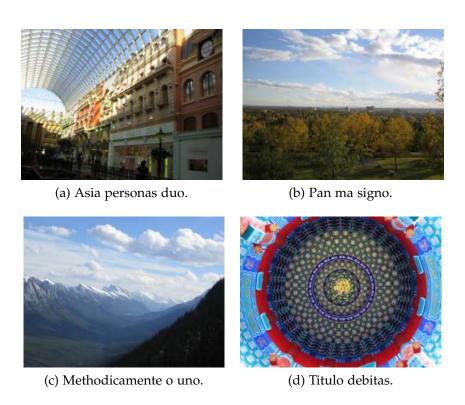


Abbildung 1: Tu duo titulo debitas latente.

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3.1 SOME FORMULAS

Due to the statistical nature of ionisation energy loss, large fluctuations can occur in the amount of energy deposited by a particle traversing an absorber element¹. Continuous processes such as multiple scattering and energy loss play a relevant role in the longitudinal and lateral development of electromagnetic and hadronic showers, and in the case of sampling calorimeters the measured resolution can be significantly affected by such fluctuations in their active layers. The description of ionisation fluctuations is characterised by the significance parameter κ , which is proportional to the ratio of mean energy loss to the maximum allowed energy transfer in a single collision with an atomic electron:

$$\kappa = \frac{\xi}{E_{max}} \tag{1}$$

 E_{max} is the maximum transferable energy in a single collision with an atomic electron.

$$E_{max} = \frac{2m_e \beta^2 \gamma^2}{1 + 2\gamma m_e / m_x + (m_e / m_x)^2} ,$$

where $\gamma = E/m_x$, E is energy and m_x the mass of the incident particle, $\beta^2 = 1 - 1/\gamma^2$ and m_e is the electron mass. ξ comes from the Rutherford scattering cross section and is defined as:

$$\xi = \frac{2\pi z^2 e^4 N_{Av} Z \rho \delta x}{m_e \beta^2 c^2 A} = 153.4 \frac{z^2}{\beta^2} \frac{Z}{A} \rho \delta x \quad \text{keV},$$

where

You might get unexpected results using math in chapter or section heads. Consider the pdfspacing option.

¹ Examples taken from Walter Schmidt's great gallery: http://home.vrweb.de/~was/mathfonts.html

z charge of the incident particle

N_{Av} Avogadro's number

Z atomic number of the material

A atomic weight of the material

ρ density

 δx thickness of the material

 κ measures the contribution of the collisions with energy transfer close to E_{max} . For a given absorber, κ tends towards large values if δx is large and/or if β is small. Likewise, κ tends towards zero if δx is small and/or if β approaches 1.

The value of κ distinguishes two regimes which occur in the description of ionisation fluctuations:

 A large number of collisions involving the loss of all or most of the incident particle energy during the traversal of an absorber.

As the total energy transfer is composed of a multitude of small energy losses, we can apply the central limit theorem and describe the fluctuations by a Gaussian distribution. This case is applicable to non-relativistic particles and is described by the inequality $\kappa > 10$ (i. e., when the mean energy loss in the absorber is greater than the maximum energy transfer in a single collision).

2. Particles traversing thin counters and incident electrons under any conditions.

The relevant inequalities and distributions are $0.01 < \kappa < 10$, Vavilov distribution, and $\kappa < 0.01$, Landau distribution.

3.2 VARIOUS MATHEMATICAL EXAMPLES

If n > 2, the identity

$$t[u_1,...,u_n] = t[t[u_1,...,u_{n_1}],t[u_2,...,u_n]]$$

defines $t[u_1,...,u_n]$ recursively, and it can be shown that the alternative definition

$$t[u_1, ..., u_n] = t[t[u_1, u_2], ..., t[u_{n-1}, u_n]]$$

gives the same result.

Teil III APPENDIX



APPENDIX TEST

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A.1 APPENDIX SECTION TEST

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Tabelle 2: Autem usu id.

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A.2 ANOTHER APPENDIX SECTION TEST

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There is also a useless Pascal listing below: Listing 1.

Listing 1: A floating example (listings manual)

```
for i:=maxint downto 0 do
begin
3 { do nothing }
end;
```

LITERATUR

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DECLARATION	
Put your declaration here.	
Stuttgart, Januar 2021	
	Markus Brunsch

COLOPHON

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