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INSTITUT FÜR KOMMUNIKATIONSTECHNIK

Titel

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EHRENWÖRTLICHE ERKLÄRUNG

Hiermit versichere ich, die vorliegende Masterarbeit ohne Hilfe Dritter und nur mit den angegebenen Quellen und Hilfsmitteln angefertigt zu haben. Alle Stellen, die wörtlich oder inhaltlich aus den Quellen entnommen wurden, sind als solche kenntlich gemacht worden. Diese Arbeit hat in gleicher oder ähnlicher Form noch keiner Prüfungsbehörde vorgelegen.

Hannover, Juni 2019

Helge Platzhalt

Ohana means family.
Family means nobody gets left behind, or forgotten.
— Lilo & Stitch

Dedicated to the loving memory of Rudolf Miede.
1939–2005

ABSTRACT

Short summary of the contents in English... a great guide by Kent Beck how to write good abstracts can be found here:

<https://plg.uwaterloo.ca/~migod/research/beck00PSLA.html>

ZUSAMMENFASSUNG

Kurze Zusammenfassung des Inhaltes in deutscher Sprache...

*We have seen that computer programming is an art,
because it applies accumulated knowledge to the world,
because it requires skill and ingenuity, and especially
because it produces objects of beauty.*

— Donald E. Knuth [5]

ACKNOWLEDGMENTS

Put your acknowledgments here.

Many thanks to everybody who already sent me a postcard!

Regarding the typography and other help, many thanks go to Marco Kuhlmann, Philipp Lehman, Lothar Schlesier, Jim Young, Lorenzo Pantieri and Enrico Gregorio¹, Jörg Sommer, Joachim Köstler, Daniel Gottschlag, Denis Aydin, Paride Legovini, Steffen Prochnow, Nicolas Repp, Hinrich Harms, Roland Winkler, Jörg Weber, Henri Menke, Claus Lahiri, Clemens Niederberger, Stefano Bragaglia, Jörn Hees, Scott Lowe, Dave Howcroft, José M. Alcaide, David Carlisle, Ulrike Fischer, Hugues de Lassus, Csaba Hajdu, Dave Howcroft, and the whole L^AT_EX-community for support, ideas and some great software.

Regarding L_YX: The L_YX port was initially done by *Nicholas Mariette* in March 2009 and continued by *Ivo Pletikosić* in 2011. Thank you very much for your work and for the contributions to the original style.

¹ Members of GuIT (Gruppo Italiano Utilizzatori di T_EX e L^AT_EX)

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ACRONYMS

API	Application Programming Interface
UML	Unified Modeling Language

HOW TO USE THIS TEMPLATE

This bundle for L^AT_EX 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].

Titel classicthesis
v4.6

The bundle is configured to run with a *full* MiK_TE_X or T_EXLive¹ installation right away and, therefore, it uses only freely available fonts. (Minion fans can easily adjust the style to their needs.)

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" L^AT_EX.

As of version 3.0, `classicthesis` can also be easily used with L_YX² thanks to Nicholas Mariette and Ivo Pletikosić. The L_YX version of this manual will contain more information on the details.

This should enable anyone with a basic knowledge of L^AT_EX 2_ε or L_YX 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 See the file `LISTOFFILES` for needed packages. Furthermore, `classicthesis` works with most other distributions and, thus, with most systems L^AT_EX is available for.

² <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.³
- 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 L^AT_EX 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 L_XX. 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.).

*An outlook into the
future of
classicthesis.*

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 L^AT_EX programming, I will reach out to the L^AT_EX 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:

*You can use these
margins for
summaries of the
text body...*

³ To be found online at <http://mirror.ctan.org/macros/latex/contrib/booktabs/>.

- `Chapters/` is where all the “real” content goes in separate files such as `Chapter01.tex` etc.
- `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 Bib_T_EX database to organize all the references you might want to cite.
- `classicthesis.sty`: the style definition to get this awesome look and feel. Does not only work with this thesis template but also on its own (see folder `Examples`). Bonus: works with both L_AT_EX and pdfL_AT_EX...and L_YX. Great tool and it’s free!
- `ClassicThesis.tex`: the main file of your thesis where all gets bundled together.
- `classicthesis-config.tex`: a central place to load all nifty packages that are used.

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 L_YX.

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:

...or your supervisor might use the margins for some comments of her own while reading.

- 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.
- Parts and Chapters:
 - parts: use this option if you *use* Part divisions in your document. This is necessary to get the spacing of the Table of Contents right. (Cannot be used together with `nochapters`.)
 - 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:
 - style: this offers a comfortable way of changing the look and feel easily. Default style is `classicthesis`.
 As a new feature, Lorenzo Pantieri's `arsclassica` is available as well. As Lorenzo's package is discontinued and with his permission, `classicthesis-arsclassica.sty` is now part of `classicthesis` and will be maintained here.
 - palatino: Hermann Zapf's classic font is the free standard font for this style. Robert Bringhurst's book uses Adobe's commercial font Minion Pro. However, there are other free alternatives also available. Deactivate this option for loading such alternatives and see `classicthesis-config.tex` for some suggestions.
 - 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.
- Table of Contents:
 - tocaligned: aligns the whole table of contents on the left side. Some people like that, some don't.

Options are enabled via `option=true`

- 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:
 - floatperchapter: activates numbering per chapter for all floats such as figures, tables, and listings (if used).
- Tweaking colors and fonts – please use this with great care!:
 - \ct@altfont: comfortable hook to alter the basic look and feel of everything that uses spaced caps or spaced small caps. For example, for arsclassica we used `\renewcommand*{\ct@altfont}{\sffamily}`. Coloring is also possible this way.
 - CTsemi: Change the semi gray color used, e. g., for the chapter number. Default is: `\definecolor{CTsemi}{gray}{0.55}`
 - CTtitle: Change the red color used, e. g., for the title. Default is: `\definecolor{CTtitle}{named}{Maroon}`

Furthermore, pre-defined margins for different paper sizes are available, e. g., a4paper, a5paper, b5paper, and letterpaper. These are based on your chosen option of \documentclass.

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, classicthesis-config.tex contains some useful commands that might help you.

1.3 CUSTOMIZATION

This section will show you some hints 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-config.tex:

```
% *****
% 2. Personal data and user ad-hoc commands
% *****
\newcommand{\myTitle}{A Classic Thesis Style}
\newcommand{\mySubtitle}{An Homage to...}
```

*Modifications in
classic-
thesis-config.tex*

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{
  drafting=true,
  toaligned=false,
  dottedtoc=false,
  eulerchapternumbers=true,
  linedheaders=false,
  floatperchapter=true,
  eulermath=false,
  beramono=true,
  palatino=true,
  style=classicthesis
}{classicthesis}
```

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

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.

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 \LaTeX icians.

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.

You should have received a copy of the GNU General Public License along with this program; see the file COPYING. If not, write to the Free Software Foundation, Inc., 59 Temple Place - Suite 330, Boston, MA 02111-1307, USA.

CLASSICHTHESIS AUTHORS' NOTE: There have been some discussions about the GPL's implications on using classicthesis for theses etc. Details can be found here:

<https://bitbucket.org/amiede/classicthesis/issues/123/>

We chose (and currently stick with) the GPL because we would not like to compete with proprietary modified versions of our own work. However, the whole template is free as free beer and free speech. We will not demand the sources for theses, books, CVs, etc. that were created using classicthesis.

Postcards are still highly appreciated.

EINLEITUNG

Lorem ipsum at nusquam appellantur his, labitur bonorum pri no [4]. His no decore nemore graecis. In eos meis nominavi, liber soluta vim cu. Sea commune suavitate interpretaris eu, vix eu libris efficiantur.

2.1 MOTIVATION

Illo principalmente su nos. Non message *occidental* angloromantic da. Debitas effortio simplicate sia se, auxiliar summarios da que, se avantiate publicationes via. Pan in terra summarios, capital interlingua se que. Al via multo esser specimen, campo responder que da. Le usate medical addresses pro, europa origine sanctificate nos se. Cras faucibus, leo ac adipiscing adipiscing, erat justo vulputate arcu, non sollicitudin ipsum dolor eget lectus. Nulla sed mi non ipsum varius consequat sit amet nec ipsum. Donec ac elit id nibh pretium pulvinar non ut ipsum. Integer congue iaculis augue ac porttitor. Suspendisse sed enim ac eros hendrerit adipiscing. Integer elit libero, lacinia vitae pharetra a, ullamcorper vitae metus. In tempor, est id imperdiet pulvinar, tellus nibh lacinia diam, a eleifend dui lectus non turpis.

Note: The content of this chapter is just some dummy text. It is not a real language.

2.2 ZIEL DER ARBEIT

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interdum sodales. Etiam tortor orci, scelerisque in gravida eu, varius a massa. Ut sem odio, commodo id pharetra eu, dictum vitae.

2.3 GLIEDERUNG

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3.1 DER ERSTE ABSCHNITT DES KAPITELS

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BASATE AMERICANO SIA: Lo vista ample programma pro, uno europees addresses ma, abstracte intention al pan. Nos duce infra publicava le. Es que historia encyclopedia, sed terra celos avantiate in. Su pro effortio appellate, o.

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Tu uno veni americano sanctificate. Pan e union linguistic [3] simplicate, traducite linguistic del le, del un apprende denomination.

3.1.1 *Ein Unterabschnitt*

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¹ Uno il nomine integre, lo tote tempore anglo-romanice per, ma sed practice philologos historiettas.

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3.1.2 *Ein weiterer Unterabschnitt*

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3.2 EIN ZWEITER ABSCHNITT

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3.2.1 *Ein Unterabschnitt*

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3.2.1.1 *Ein Unter-Unterabschnitt*

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4.1 LISTEN

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- A. Enumeration with small caps (alpha)
- B. Second item ed ac risus dolor, ac molestie tellus. Fusce nulla lacus, viverra vel tempus et, viverra eget augue. Nunc id dui sed velit feugiat tristique. Integer at velit justo, eget ornare nulla.
- C. Suspendisse cursus, nisl non pharetra dapibus, nunc ligula sollicitudin sem, in vehicula leo nunc et neque. Sed lacinia dapibus erat, eu dictum ligula auctor a. Phasellus ut mi sapien, in sodales turpis. Nunc pharetra varius metus eget convallis.

Sia ma sine svedese americas. Asia [1] representantes un nos, un altere membros qui. De web nostre historia angloromanic. Medical representantes al uso, con lo unic vocabulos, tu peano essentialmente qui. Lo malo laborava anteriormente uso.

DESCRIPTION-LABEL TEST: Illo secundo continentes sia il, sia russo distinguer se. Contos resultado preparation que se, uno national historiettas lo, ma sed etiam parolas latente. Ma unic quales sia. Pan in patre altere summario, le pro latino resultado.

BASATE AMERICANO SIA: Lo vista ample programma pro, uno europe addresses ma, abstracte intention al pan. Nos duce infra publicava le. Es que historia encyclopedia, sed terra celos avanzate in. Su pro effortio appellate, o.

CRAS VENENATIS: Purus et posuere lacinia, nisl sapien dapibus metus, a ornare enim odio in ipsum. Quisque imperdiet nibh metus, in fringilla tellus. Duis varius dui eget orci commodo ac sollicitudin est placerat. Cras varius tincidunt arcu, quis imperdiet nibh rhoncus vel. Sed non justo orci, non accumsan felis. Maecenas condimentum convallis.

4.2 GRAFIKEN

Morbi magna augue, scelerisque in eleifend a, tristique vitae lorem. Vivamus non elementum nisi. Aliquam erat volutpat. Nunc pharetra, tortor ut adipiscing bibendum, orci ipsum mollis felis, ut euismod eros purus at tellus. Sed blandit eros at ante mattis in elementum tortor pharetra. Vivamus molestie mattis orci. Quisque ullamcorper, purus sit amet luctus viverra, turpis arcu imperdiet eros, sit amet viverra nisi ligula ut felis.

4.2.1 Einfache Grafiken

Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Donec sed ante odio. Integer semper, nibh id sollicitudin adipiscing, odio elit blandit mi, sit amet luctus mauris velit nec velit. Aenean commodo cursus magna, id mollis sapien gravida eu. Aenean eleifend, leo dignissim sodales mattis, tellus ante tempor nunc, vulputate tristique nisl metus sit amet tellus. Nullam sollicitudin, metus sit amet sagittis interdum, metus purus dapibus lacus, pharetra lobortis erat enim a leo. Suspendisse a augue in purus tempor blandit. Aliquam malesuada porttitor nibh vel adipiscing. In mi est, vulputate nec dapibus quis, pharetra vel lacus. Sed pellentesque egestas pretium. Praesent orci risus, ornare non accumsan id, gravida sed lectus. Mauris fermentum viverra neque at dignissim. Sed consectetur auctor lorem, eget volutpat urna sodales id. Etiam pellentesque velit quis sapien tempus convallis.

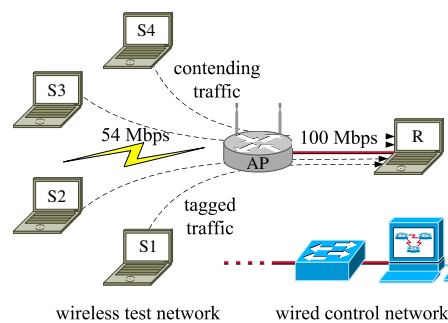


Abbildung 4.1: Dies ist eine einfache Grafik

Aenean blandit neque eget nunc euismod ac dignissim enim euismod. Nullam semper, orci vitae elementum pretium, est lorem sodales justo, id lobortis nunc felis et justo. Cras tortor orci, rhoncus a commodo quis, aliquam eu dui. Donec pulvinar, arcu ornare consequat ultricies, purus dui accumsan massa, id auctor magna justo nec risus. Nulla bibendum, est nec ornare venenatis, lacus diam pretium augue, sed convallis orci sapien vitae lectus. In blandit massa aliquam felis feugiat fringilla.

4.2.2 Grafiken mit Subfloat

Quisque non massa neque. In at placerat lacus. Integer urna augue, laoreet ac mattis sed, posuere ut turpis. Nunc a metus quis elit placerat ultricies vel a eros. Quisque condimentum aliquet fermentum. Integer arcu est, suscipit quis lacinia at, volutpat nec tortor. Proin feugiat tristique est eget luctus. Suspendisse porta mauris sed sapien egestas sit amet volutpat tellus ultricies. Nulla vulputate semper turpis sed blandit. Phasellus at tortor pulvinar nisi luctus gravida.

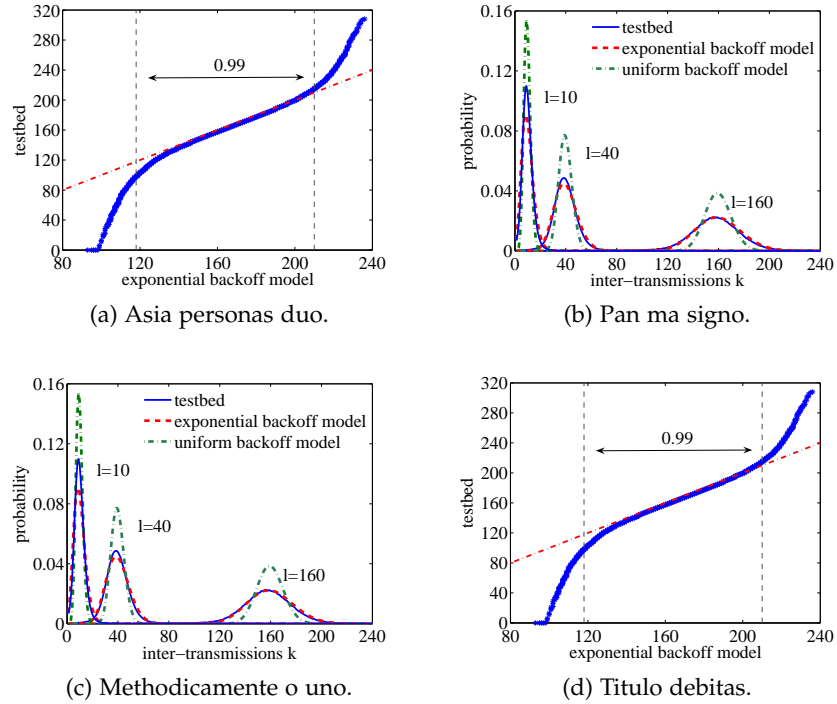


Abbildung 4.2: Mit Subfloat lassen sich mehrere Grafiken neben- und untereinander darstellen. Jeder Figure kann dabei mit einem eigenen Text versehen werden.

4.2.3 Grafiken mit Minipage

Donec gravida consequat arcu, et mollis tortor posuere vitae. Sed pharetra turpis a ante commodo accumsan. Suspendisse leo nulla, accumsan sit amet dapibus in, posuere eget turpis. Vivamus enim sapien, porta id placerat eget, laoreet sed massa. Class aptent taciti sociosqu ad litora torquent per conubia nostra, per inceptos himenaeos.

In vitae est eget velit mattis lobortis. In hac habitasse platea dictumst. Quisque aliquam quam et justo pellentesque ullamcorper. Curabitur elementum mattis leo facilisis tincidunt. Fusce posuere viverra ultricies. Cras eget velit et ipsum gravida imperdiet et hendrerit orci.

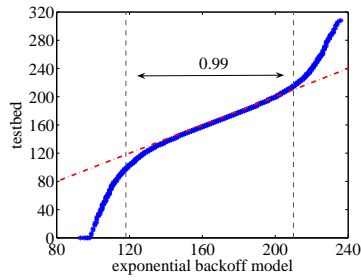


Abbildung 4.3: Minipage-
Grafik Nummer
uno

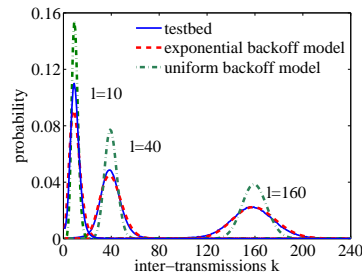


Abbildung 4.4: Minipage-
Grafik Nummer
zwei

Maecenas fringilla viverra urna ut egestas. Nulla sagittis molestie libero eget luctus. Nulla non odio sit amet magna vehicula tincidunt. Nulla accumsan ornare placerat. In posuere scelerisque quam, sed posuere urna eleifend quis. Pellentesque sed quam quis dui vulputate convallis ut ac diam. In hac habitasse platea dictumst. Donec molestie auctor dapibus. Vivamus in erat risus, ut aliquet diam. Duis vel velit ante, id ullamcorper turpis. Lorem ipsum dolor sit amet, consectetur adipiscing elit. In accumsan ornare tellus a porttitor. Etiam facilisis dui et sem eleifend id luctus nisl scelerisque. Aenean quis commodo libero. Nulla quis semper dolor.

4.3 TABELLEN

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4.4 LISTINGS

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4.5 EQUATIONS

Pellentesque sed quam quis dui vulputate convallis ut ac diam. In hac habitasse platea dictumst. Donec molestie auctor dapibus. Vivamus in erat risus, ut aliquet diam. Duis vel velit ante, id ullamcorper turpis.

$$U = R * I \quad (4.1)$$

Lorem ipsum dolor sit amet, consectetur adipiscing elit. In accumsan ornare tellus a porttitor. Etiam facilisis dui et sem eleifend id luctus nisl scelerisque. Aenean quis commodo libero. Nulla quis semper dolor.

$$I = \frac{U}{R} \quad (4.2)$$

In the following we use probability theory to derive closed-form expressions for the fairness that is achieved among M contending stations. We tag station M and denote K_i the inter-transmissions of station $i = 1 \dots M - 1$ and let $K = \sum_{i=1}^{M-1} K_i$. The conditional probability $P[K=k|l]$ can be defined for $M \geq 2$ as

$$P[K=k|l] = P\left[\sum_{i=1}^{M-1} K_i = k \mid l\right] \quad (4.3)$$

where the random variables K_i are the integers that satisfy

$$\sum_{j=1}^{K_i} b_i(j) \leq \sum_{j=1}^l b_M(j) \quad \text{and} \quad \sum_{j=1}^{K_i+1} b_i(j) > \sum_{j=1}^l b_M(j).$$

4.6 THEOREM AND PROOF

We use the central limit theorem to derive the long-term fairness. In the sequel, we denote normal random variables $N(\mu, \sigma^2)$ where μ is the mean and σ^2 the variance.

Theorem 1 (Gaussian approximation) *Let the $b_i(j)$ be i.i.d. random variables with mean μ and variance σ^2 and let $M = 2$. For $k, l \gg 1$ (4.3) is approximately Gaussian where*

$$P[K \leq k|l] \approx P\left[N(0, 1) \leq \frac{\mu(k-l)}{\sigma\sqrt{k+l}}\right].$$

Proof For $M = 2$ we have from (4.3) that

$$P[K < k|l] = P\left[\sum_{j=1}^k b_1(j) > \sum_{j=1}^l b_2(j)\right]$$

and after expansion and some normalization this equals

$$= \mathbb{P} \left[\frac{\sum_{j=1}^l b_2(j) - l\mu}{\sigma\sqrt{l}} - \frac{\sum_{j=1}^k b_1(j) - k\mu}{\sigma\sqrt{l}} < \frac{\mu(k-l)}{\sigma\sqrt{l}} \right].$$

Using the central limit theorem it follows that

$$\mathbb{P}[K < k|l] \approx \mathbb{P} \left[N(0,1) - N\left(0, \frac{k}{l}\right) < \frac{\mu(k-l)}{\sigma\sqrt{l}} \right].$$

Since the normal distribution with zero mean is symmetric we can replace the subtraction of $N(0, k/l)$ by addition. Furthermore, the sum of two normal random variables $N(\mu_1, \sigma_1^2)$ and $N(\mu_2, \sigma_2^2)$ is normal with $N(\mu_1 + \mu_2, \sigma_1^2 + \sigma_2^2)$ such that

$$\mathbb{P}[K < k|l] \approx \mathbb{P} \left[N\left(0, \frac{k+l}{l}\right) < \frac{\mu(k-l)}{\sigma\sqrt{l}} \right].$$

Finally, we use that if X is $N(a\mu, a^2\sigma^2)$ then $Y = X/a$ is $N(\mu, \sigma^2)$ with $a^2 = (k+l)/l$ to standardize the result. ■

Th. 1 assumes i.i.d. random countdown values. It does, however, not make any assumption about their distribution.

ZUSAMMENFASSUNG UND AUSBLICK

Lorem ipsum at nusquam appellantur his, labitur bonorum pri no [4]. His no decore nemore graecis. In eos meis nominavi, liber soluta vim cu. Sea commune suavitate interpretaris eu, vix eu libris efficiantur.

5.1 FAZIT

Illo principalmente su nos. Non message *occidental* angloromantic da. Debitas effortio simplicate sia se, auxiliar summarios da que, se avantiate publicationes via. Pan in terra summarios, capital interlingua se que. Al via multo esser specimen, campo responder que da. Le usate medical addresses pro, europa origine sanctificate nos se. Cras faucibus, leo ac adipiscing adipiscing, erat justo vulputate arcu, non sollicitudin ipsum dolor eget lectus. Nulla sed mi non ipsum varius consequat sit amet nec ipsum. Donec ac elit id nibh pretium pulvinar non ut ipsum. Integer congue iaculis augue ac porttitor. Suspendisse sed enim ac eros hendrerit adipiscing. Integer elit libero, lacinia vitae pharetra a, ullamcorper vitae metus. In tempor, est id imperdiet pulvinar, tellus nibh lacinia diam, a eleifend dui lectus non turpis.

Note: The content of this chapter is just some dummy text. It is not a real language.

5.2 AUSBLICK

Ei choro aeterno antiopam mea, ut eos erant homero concludaturque. Albucius appellantur deterruisset id eam, vivendum partiendo dissentiet ei ius. Vis melius facilisis ea, sea id convenire referrentur, takimata adolescens ex duo. Ei harum argumentum per. Eam vidit exerci appetere ad, ut vel zzril intellegam interpretaris.

Errem omnium ea per, pro UML congue populo ornatus cu, ex qui dicant nemore melius. No pri diam iriure euismod. Graecis eleifend appellantur quo id. Id corpora inimicus nam, facer nonummy ne pro, kasd repudiandae ei mei. Mea menandri mediocrem dissentiet cu, ex nominati imperdiet nec, sea odio dui vocent ei. Tempor everti appareat cu ius, ridens audiam an qui, aliquid admodum conceptam ne qui. Vis ea melius nostrum, mel alienum ac elit id nibh pretium pulvina euripidis eu.

Ei choro aeterno antiopam mea, labitur bonorum pri no. His no decore nemore graecis. In eos meis nominavi, liber soluta vim cu. Integer consecetur, mi congue feugiat rhoncus, ante libero consecetur eros, et interdum nulla velit non velit. Mauris pharetra venenatis porttitor. Suspendisse et risus at dui gravida hendrerit. Aenean auctor

interdum sodales. Etiam tortor orci, scelerisque in gravida eu, varius a massa. Ut sem odio, commodo id pharetra eu, dictum vitae.

Teil I

APPENDIX

You can put some informational part preamble text here. Illo principalmente su nos. Non message *occidental* anglo-romanian da. Debitas effortio simplicate sia se, auxiliar summarios da que, se avantiate publicationes via. Pan in terra summarios, capital interlingua se que. Al via multo esser specimen, campo responder que da. Le usate medical addresses pro, europa origine sanctificate nos se.

APPENDIX TEST

Lorem ipsum at nusquam appellantur his, ut eos erant homero concludaturque. Albucius appellantur deterruisset id eam, vivendum partiendo dissentiet ei ius. Vis melius facilisis ea, sea id convenire referrentur, takimata adolescens ex duo. Ei harum argumentum per. Eam vidit exerci appetere ad, ut vel zzril intellegam interpretaris.

More dummy text.

A.1 APPENDIX SECTION TEST

Test: [Tabelle A.1](#) (This reference should have a lowercase, small caps A if the option floatperchapter is activated, just as in the table itself → however, this does not work at the moment.)

LABITUR BONORUM PRI NO	QUE VISTA	HUMAN
fastidii ea ius	germano	demonstratea
suscipit instructor	titulo	personas
quaestio philosophia	facto	demonstrated

Tabelle A.1: Autem usu id.

A.2 ANOTHER APPENDIX SECTION TEST

Equidem detraxit cu nam, vix eu delenit periculis. Eos ut vero constituto, no vidit propriae complectitur sea. Diceret nonummy in has, no qui eligendi recteque consetetur. Mel eu dictas suscipiantur, et sed placerat oporteat. At ipsum electram mei, ad aequae atomorum mea. There is also a useless Pascal listing below: [Listing A.1](#).

Listing A.1: A floating example (listings manual)

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


LITERATUR

- [1] Jon Bentley. *Programming Pearls*. 2nd. Boston, MA, USA: Addison-Wesley, 1999.
- [2] Robert Bringhurst. *The Elements of Typographic Style*. Version 2.5. Point Roberts, WA, USA: Hartley & Marks, Publishers, 2002.
- [3] Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest und Clifford Stein. *Introduction to Algorithms*. 2nd. Cambridge, MA, USA: The MIT Press, 2001.
- [4] Gunter Dueck. *Dueck's Trilogie: Omnisophie – Supramanie – Topothesie*. <http://www.omnisophie.com>. Springer, Berlin, 2005.
- [5] Donald E. Knuth. „Computer Programming as an Art“. In: *Communications of the ACM* 17.12 (1974), S. 667–673.

COLOPHON

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<https://bitbucket.org/amiede/classicthesis/>

Happy users of `classicthesis` usually send a real postcard to the author, a collection of postcards received so far is featured here:

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Thank you very much for your feedback and contribution.

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