The hagenberg-thesis Package

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Abstract

The hagenberg-thesis package is a collection of modern LaTeX templates for university theses (bachelor, master or diploma programs) and related documents. This manual describes the main features of this package. Pre-configured document templates for English and German manuscripts and a complete tutorial are available on the package's home repository.

1 Introduction

The complete source of this package and auxiliary materials are available on CTAN[1] and its development repository.[2] The package is made available under the terms of the Creative Commons Attribution 4.0 International Public License.[3]

2 Document classes

The `hgb` package provides the following document classes, which are based on the standard LaTeX classes `book`, `report` and `article`, respectively:

- **`hgbthesis`** (`book`): for Bachelor, Master and Diploma theses;
- **`hgbreport`** (`report`): for project and term reports;
- **`hgbarticle`** (`article`): for drafting journal articles.

2.1 Class options

The above document classes accept the following options:

- **`hgbthesis`**: `master`, `diploma`, `bachelor`, `internship`, `english`, `german`, `smartquotes`, `noUpdateCheck`;
- **`hgbreport`**: `notitlepage`, `english`, `german`, `smartquotes`, `noUpdateCheck`;

[1] https://ctan.org/pkg/hagenberg-thesis
[2] https://github.com/Digital-Media/HagenbergThesis
[3] https://creativecommons.org/licenses/by/4.0/legalcode

- **hgbarticle**: twocolumn, english, german, smartquotes, noUpdateCheck.

For example, to start a Master thesis in German one would simply simply place

```
\documentclass[master,german,smartquotes]{hgbthesis}
```

at the beginning of the document.

2.2 Thesis parameters (class hgbthesis)

hgbthesis supports several types of thesis documents. The following parameters must be specified for *all* types:

- \title{...},
- \author{...},
- \programtype{...},
- \programname{...},
- \placeofstudy{...},
- \dateofsubmission{yyyy}{mm}{dd},
- \advisor{...} (optional).

3 Style files and user commands

The package comes with a set of style (*.sty) files that can be used independently of the document classes listed above: hgb.sty, hgbabbrev.sty, hgbbib.sty, hgbheadings.sty, hgblistings.sty, hgbmath.sty.

3.1 General user commands and environments(hgb.sty)

- **\hgbDate**: Outputs the package version date, e.g., "2020/01/23".
- \calibrationbox{width}{height}: Inserts a test box for checking the final print size (in millimeters).
- \begin{english} ... \end{english}
- \begin{german} ... \end{german}

3.2 Text commands (hgbabbrev.sty)

Special characters:

- **\bs**: Inserts a backslash character (short for \textbackslash).
- **\obnh**: Inserts an optional break with no hyphen (e.g., PlugIn{\obnh}Filter).

German abbreviations:

- **\bzgl**: bzgl.
- **\bzw**: bzw.
- **\ca**: ca.
- **\dah**: d. h.

- **\Dah**: D. h.
- **\ds**: d. sind
- **\etc**: etc.
- **\evtl**: evtl.
- **\ia**: i. Allg.
- **\sa**: s. auch
- **\so**: s. oben
- **\su**: s. unten
- **\ua**: u. a.
- **\Ua**: U. a.
- **\uae**: u. Ä.
- **\usw**: usw.
- **\uva**: u. v. a.
- **\uvm**: u. v. m.
- **\va**: vor allem
- **\vgl**: vgl.
- **\zB**: z. B.
- **\ZB**: Zum Beispiel

English abbreviations:

- **\ie**: i.e.
- **\eg**: e.g.
- **\etc**: etc.
- **\Eg**: E.g.
- **\wrt**: w.r.t.

3.3 Bibliography commands (hgbbib.sty)

- **\AddBibFile**: A wrapper to biblatex's **\addbibresource** macro (for backward compatibility only).
- **\MakeBibliography[*options*]**: Inserts the reference section or chapter. By default, references are automatically split into category subsections.[4] Use the option **nosplit** to produce a traditional (i.e., contiguous) list of references.
- **\citenobr{*keys*}**: Analogous to the standard **\cite{*keys*}** command, but inserts no "backref" page numbers in the bibliography.
- **\mcite[*text1*]{*key1*}[*text2*]{*key2*}...[*textN*]{*keyN*}**: Analogous to biblatex's **\cites** command,[5] but inserts semicolons between reference entries for better readability.

[4] Predefined reference categories are **literature**, **avmedia**, **online** and **software**.

[5] http://mirrors.ctan.org/macros/latex/contrib/biblatex/doc/biblatex.pdf (see Sec. 3.8.3)

3.4 Code environments (hgblistings.sty)

The following types of code environments are defined:

- **CCode**: for C (ANSI),
- **CppCode**: for C++ (ISO),
- **CsCode**: for C#,
- **CssCode**: for CSS,
- **GenericCode**: for generic code,
- **HtmlCode**: for HTML,
- **JavaCode**: for Java,
- **JsCode**: for JavaScript,
- **LaTeXCode**: for LaTeX,
- **ObjCCode**: for ObjectiveC,
- **PhpCode**: for PHP,
- **Swift**: for Swift,
- **XmlCode**: for XML.

hgblistings is based on the **listingsutf8**[6] package, thus any valid **listings**[7] option may be used; for example, the option **numbers=none** to suppress line numbers:

```
\begin{JavaCode}[numbers=none]
... // Java code comes here
\end{JavaCode}
```

3.5 Mathematical commands (hgbmath.sty)

hgbmath requires (and automatically loads) the **amsmath**[8] package, thus all commands and symbols of **amsmath** are available by default. The following *additional* commands can only be used in math mode:

- **\Cpx**: $\mathbb{C}$ (complex numbers),
- **\N**: $\mathbb{N}$ (natural numbers),
- **\R**: $\mathbb{R}$ (real numbers),
- **\Q**: $\mathbb{Q}$ (rational numbers),
- **\Z**: $\mathbb{Z}$ (integer numbers).

3.6 Algorithms (hgbalgo.sty)

hgbalgo is a stand-alone package that is based on – and extends – the **algorithmicx** and **algpseudocode** packages.[9] It fixes some (mostly indentation-related) problems,

[6] https://ctan.org/pkg/listingsutf8
[7] https://ctan.org/pkg/listings
[8] https://ctan.org/pkg/amsmath
[9] https://ctan.org/pkg/algorithmicx

adds color and provides some additional commands. It also loads the `algorithm`[10] package which defines a compatible float container for algorithms: `\begin{algorithm} ... \end{algorithm}`.

Additional user commands:

- **`\StateL{<text>}`**: Creates a *numbered* statement like `algorithmicx`'s `\State` command but provides consistent indentation on multi-line statements. Note that the argument `<text>` must be passed as a single argument in `{...}` braces.
- **`\StateNN[<nesting>]{<text>}`**: Creates a *non-numbered* statement like `algorithmicx`'s `\Statex` command but provides consistent indentation inside nested constructs and over multiple lines. The optional integer argument `<nesting>` can be used to specify the *nesting depth* to compensate for a bug in `algorithmicx` (the nesting level inside a block is not set properly before the first `\State` command). Omitting the optional argument should give correct indentation in most cases.
- **`\Input{<text>}`**: For describing the input parameters in a procedure's preamble.
- **`\Output{<text>}`**: For describing the output values in a procedure's preamble.
- **`\Returns{<text>}`**: For describing the return values in a procedure's preamble.

Defined algorithm colors:

`AlgKeywordColor` (for algorithm keywords),
`AlgProcedureColor` (for procedure and function names),
`AlgCommentColor` (for comments).

The above colors can be redefined at any time (see the `xcolor`[11] package), e.g., by

```
\definecolor{AlgKeywordColor}{named}{black}
\definecolor{AlgProcedureColor}{rgb}{0.0, 0.5, 0.0}      % dark green
```

4 Package dependencies

The `hagenberg-thesis` package builds on the following LaTeX packages:
`abstract`, `algorithm`, `algorithmicx`, `algpseudocode`, `amsbsy`, `amsfonts`, `amsmath`, `amssymb`, `babel`, `biblatex`, `breakurl`, `caption`, `cmap`, `csquotes`, `datetime2`, `enumitem`, `epstopdf`, `eurosym`, `exscale`, `fancyhdr`, `float`, `fontenc`, `geometry`, `graphicx`, `hypcap`, `hyperref`, `ifpdf`, `inputenc`, `listingsutf8`, `lmodern`, `moreverb`, `overpic`, `pdfpages`, `pict2e`, `subdepth`, `titlesec`, `titling`, `tocbasic`, `url`, `upquote`, `verbatim`, `xcolor`, `xifthen`, `xstring`, `xspace`.

[10] https://ctan.org/pkg/algorithms
[11] https://ctan.org/pkg/xcolor