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\footnote{https://ctan.org/pkg/hagenberg-thesis} and its development repository\footnote{https://github.com/Digital-Media/HagenbergThesis}. The package is made available under the terms of the Creative Commons Attribution 4.0 International Public License\footnote{https://creativecommons.org/licenses/by/4.0/legalcode}.

2 Document classes

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

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

2.1 Class options

The above document classes accept the following options:

- \texttt{hgbthesis}: master, diploma, bachelor, praktikum, internship, english, german;
- \texttt{hgbreport}: notitlepage, english, german;
3 Style files and user commands

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

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

\documentclass[master,german]{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{...},
- \programname{...},
- \placeofstudy{...},
- \dateofsubmission{yyyy}{mm}{dd}.

A *Bachelor* thesis requires the following, additional items (not relevant for Diploma and Master theses):

- \thesisnumber{...},
- \coursetitle{...},
- \semester{...},
- \advisor{...}.

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 (hgb.sty)

- \hgbDate: Outputs the package version date, e.g., “2018/11/28”.
- \calibrationbox: Inserts a test box for checking the final print size.

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.
3 Style files and user commands

- \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. 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 but inserts semicolons between reference entries for better readability.

\footnote{Predefined reference categories are literature, avmedia, online and software. http://mirrors.ctan.org/macros/latex/contrib/biblatex/doc/biblatex.pdf (see Sec. 3.8.3)}
3 Style files and user commands

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* package, thus any valid *listings* option may be used; for example, the option `numbers=none` to suppress line numbers:

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

3.5 Mathematical commands (hgbmath.sty)

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

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

3.6 Algorithms (hgbalgo.sty)

*hgbalgo* is a stand-alone package that is based on – and extends – the *algorithmicx* and *algpseudocode* packages. It fixes some (mostly indentation-related) problems,
adds color and provides some additional commands. It also loads the \texttt{algorithm} package which defines a compatible float container for algorithms: \texttt{\begin{algorithm} ... \end{algorithm}}.

Additional user commands:

- \texttt{\StateL{<text>}}: Creates a \textit{numbered} statement like \texttt{algorithmicx}'s \texttt{\State} command but provides consistent indentation on multi-line statements. Note that the statement \texttt{<text>} must be passed as a single argument in \{...\} brackets.

- \texttt{\StateNN[<nesting>]{<text>}}: Creates a \textit{non-numbered} statement like \texttt{algorithmicx}'s \texttt{\State} command but provides consistent indentation inside nested constructs and over multiple lines. The optional integer argument \texttt{<nesting>} can be used to specify the \textit{nesting depth} to compensate for a bug in \texttt{algorithmicx} (the nesting level inside a block is not set properly before the first \texttt{\State}). Omitting the optional argument should give correct indentation in most cases.

- \texttt{\Input{<text>}}: For describing the input parameters in a procedure’s preamble.

- \texttt{\Output{<text>}}: For describing the output values in a procedure’s preamble.

- \texttt{\Returns{<text>}}: For describing the return values in a procedure’s preamble.

Defined algorithm colors:

- \texttt{\AlgKeywordColor} (for algorithm keywords),
- \texttt{\AlgProcedureColor} (for procedure and function names),
- \texttt{\AlgCommentColor} (for comments).

The above colors can be redefined at any time (see the \texttt{xcolor} package), e.g., by

\begin{verbatim}
\definecolor{AlgKeywordColor}{named}{black}
\definecolor{AlgProcedureColor}{rgb}{0.0, 0.5, 0.0} % dark green
\end{verbatim}

4 Package dependencies

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

\footnotesize
\begin{itemize}
\item \texttt{\url{https://ctan.org/pkg/algorithms}}
\item \texttt{\url{https://ctan.org/pkg/xcolor}}
\end{itemize}