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 book, report and article, respectively:

- \texttt{hgbthesis} (book): for bachelor’s, master’s 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, internship, english, german, smartquotes, noUpdateCheck;
- \texttt{hgbreport}: notitlepage, english, german, smartquotes, noUpdateCheck;
3 Style files and user commands

- **hgbarticle**: twocolumn, english, german, smartquotes, noUpdateCheck.
  For example, to start a master’s thesis in German one would 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).

Note that *hgbthesis* only supports a *single author* inside the \author{...} macro argument (commands \texttt{\and} and \texttt{\thanks{...}} are deactivated)!

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., “2020/10/29”.
- \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 \texttt{\textbackslash}).
- \obnh: Inserts an optional break with no hyphen (e.g., PlugIn{\obnh}Filter).

German abbreviations:

- \bzgl: bzgl.
- \bzw: bzw.
3 Style files and user commands

- \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.

Note that none of the above abbreviation macros “eats” subsequent white space, i.e., they can be used without additional controls, as in “\wrt what I said”, for example.

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.

\footnote{Predefined reference categories are literature, avmedia, online and software.}
• \texttt{mcite[text1][key1][text2][key2]...[textN][keyN]}: Analogous to \texttt{biblatex}'s \texttt{cites} command\textsuperscript{5} but inserts semicolons between reference entries for better readability.

3.4 Code environments (hgblistings.sty)

The following types of code environments are defined:

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

\texttt{hgblistings} is based on the \texttt{listingsutf8\textsuperscript{6}} package, thus any valid \texttt{listings\textsuperscript{7}} option may be used; for example, the option \texttt{numbers=none} to suppress line numbers:

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

3.5 Mathematical commands (hgbmath.sty)

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

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

\footnotesize{\textsuperscript{5}http://mirrors.ctan.org/macros/latex/contrib/biblatex/doc/biblatex.pdf (see Sec. 3.8.3)}

\footnotesize{\textsuperscript{6}https://ctan.org/pkg/listingsutf8}

\footnotesize{\textsuperscript{7}https://ctan.org/pkg/listings}

\footnotesize{\textsuperscript{8}https://ctan.org/pkg/amsmath}
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 algorithms 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 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.