

keytheorems package

version 0.2.5dev

github.com/mbertucci47/keytheorems

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Abstract

An `expl3`-implementation of a key-value interface to `amsthm`, implementing most of the functionality provided by `thmtools`. Several issues encountered with `thmtools` are avoided (see the README for a list) and a few new features are added.

Contents

1	Dependencies	2
2	Global options	2
2.1	Compatibility options	2
2.2	Other global options	2
3	Defining theorems	3
3.1	Keys available to theorem environments	4
3.2	Keys also defined in <code>thmtools</code>	8
3.3	Keys added by <code>keytheorems</code>	11
4	Theorem styles	13
4.1	Keys also defined in <code>thmtools</code>	13
4.2	Keys added by <code>keytheorems</code>	14
5	Restating theorems	15
6	Listing theorems	15
6.1	Keys also defined in <code>thmtools</code>	16
6.2	Keys added by <code>keytheorems</code>	17
6.3	Adding code to list of theorems	19
7	Theorem hooks	19
8	Miscellaneous notes	20
8.1	<code>beamer</code> support	20
8.2	Support for other classes	20
8.3	Support for font packages	20
8.4	Support for tagged PDF	20
8.5	Public coding interfaces	21

9 Further examples	21
Index	22

1 Dependencies

The package depends on the `aliascnt`, `amsthm`, `refcount`, and `translations` packages. The `tcolorbox`^{→P.11} and `tcolorbox-no-titlebar`^{→P.12} keys require `tcolorbox`, and the `numbered=unless-unique`^{→P.8} key requires the `unique` package. A L^AT_EX kernel no older than 2023-06-01 is required; if older than 2024-06-01, `nameref` is required.

2 Global options

`\keytheoremset{<options>}`

Every key in this section can be given as an option to `\usepackage` or in `\keytheoremset`, with the exception that `continues-code`^{→P.3} can only be used in the latter.

2.1 Compatibility options

`overload` (initially unset)

Redefines `\newtheorem` to internally use the `keytheorems` machinery. The syntax remains the same. This is automatically set by `thmtools-compat`.

`thmtools-compat` (initially unset)

For compatibility with `thmtools` syntax. For most documents,

```
\usepackage[thmtools-compat]{keytheorems}
```

should be a drop-in replacement for `\usepackage{amsthm,thmtools}`. The option defines the commands in the left column below. The right column lists the corresponding `keytheorems` replacement that should be used in new documents.

thmtools command	keytheorems replacement
<code>\declaretheorem</code>	→ <code>\newkeytheorem</code> ^{→P.3}
<code>\declaretheoremstyle</code>	→ <code>\newkeytheoremstyle</code> ^{→P.13}
<code>\listoftheorems</code>	→ <code>\listofkeytheorems</code> ^{→P.15}
<code>\listtheoremname</code>	→ <code>title</code> ^{→P.17} key
<code>\addtotheoremheadhook</code>	
<code>\addtotheoremheadhook</code>	→ <code>\addtotheoremhook</code> ^{→P.19}
<code>\addtotheoremfoothook</code>	
<code>\addtotheoremfoothook</code>	
<code>restatable</code> environment	→ <code>store</code> ^{→P.5} key
<code>restatable*</code> environment	→ <code>store*</code> ^{→P.5} key

Also defined are the `shaded` and `thmbox` keys, implemented internally with `tcolorbox` rather than the `shadethm` and `thmbox` packages, respectively.

2.2 Other global options

`auto-translate=true|false` (default `true`, initially `true`)

If `false`, `keytheorems` does not automatically translate the title text used for `\listofkeytheorems`^{→P.15} and the note produced by the `continues`^{→P.5} key. These texts can be manually customized with the `title`^{→P.17} and `continues-code`^{→P.3} keys, respectively.

`continues-code`= \langle *code with #1* \rangle (initially \backslash GetTranslation{keythms_continues} \backslash pageref{#1})

The code used to typeset the note produced by the `continues`^{→P.5} key. If English or an unknown language is used, defaults to `continuing from p.\, \pageref{#1}`. Currently (likely inaccurate!) translations exist for several European languages.

`qed-symbol`= \langle *symbol* \rangle (initially \backslash openbox)
Redefines \backslash qedsymbol to be \langle *symbol* \rangle .

`restate-counters`= \langle *comma-list of counters* \rangle (initially {equation})
Additional counters whose values are preserved when a theorem is restated. This key does not reset the list, so you don't need to include `equation` in \langle *comma-list* \rangle .

`store-all` (initially unset)
Tells `keytheorems` to grab the body of each theorem so it can later be printed with the `print-body`^{→P.18} option of `\listofkeytheorems`^{→P.15}. Note that this means a theorem body *cannot* contain verbatim material.

`store-sets-label` (initially unset)
Defines the `store`^{→P.5} key to also set `label`^{→P.4}, i.e. it makes `store`= \langle *tag* \rangle equivalent to `store`= \langle *tag* \rangle , `label`= \langle *tag* \rangle . Similarly for `store*`^{→P.5}.

3 Defining theorems

`\newkeytheorem`{ \langle *env name* \rangle }[\langle *options* \rangle]

Defines a theorem environment \langle *env name* \rangle which itself takes a few options (see subsection 3.1). You can also declare multiple theorems at once by replacing \langle *env name* \rangle with a comma-list of names, e.g.

\backslash newkeytheorem{theorem,lemma,proposition}[\langle *options* \rangle].

By default, the theorem's printed name is a title-cased \langle *env name* \rangle . This can be changed with the `name`^{→P.8} key. All \langle *options* \rangle are described in subsections 3.2 and 3.3.

```
% preamble
\newkeytheorem{theorem}

% document
\begin{theorem}
There are infinitely many prime numbers.
\end{theorem}
```

Theorem 1. *There are infinitely many prime numbers.*

`\renewkeytheorem`{ \langle *env name* \rangle }[\langle *options* \rangle]

`\providekeytheorem`{ \langle *env name* \rangle }[\langle *options* \rangle]

`\declarekeytheorem{⟨env name⟩}[⟨options⟩]`

Sometimes a package or class defines theorems that need to be overwritten by the user. For this case, `keytheorems` provides `\renewkeytheorem` which redefines `⟨env name⟩` or errors if it is not defined. For completeness, also provided are `\providekeytheorem` and `\declarekeytheorem`. The former only defines `⟨env name⟩` if it is not already defined; the latter always overwrites `⟨env name⟩`.

3.1 Keys available to theorem environments

As in `amsthm`, theorems can take an optional argument that contains a note or heading.

```
\begin{theorem}[Bertrand's postulate]
For every  $n \geq 1$ , there is a prime number  $p$  with  $n < p \leq 2n$ .
\end{theorem}
```

Theorem 2 (Bertrand's postulate). *For every $n \geq 1$, there is a prime number p with $n < p \leq 2n$.*

Alternatively, the optional argument may contain any of the following keys.

`note=⟨text⟩` (initially unset)

Alias `name`. This is the key-value equivalent of the optional argument described above. This syntax, however, allows the argument to contain other keys.

```
\begin{theorem}[note=Legendre's formula]
The number  $n!$  contains the prime factor  $p$  exactly
 $\left[ \sum_{k \geq 1} \left\lfloor \frac{n}{p^k} \right\rfloor \right]$ 
times.
\end{theorem}
```

Theorem 3 (Legendre's formula). *The number $n!$ contains the prime factor p exactly*

$$\sum_{k \geq 1} \left\lfloor \frac{n}{p^k} \right\rfloor$$

times.

`short-note=⟨text⟩` (initially unset)

Alias `short-name`. This replaces the value of `note` when displayed in the list of theorems (`\listofkeytheorems`^{→ P. 15}).

`label=⟨label name⟩` (initially unset)

This is the key-value equivalent of `\begin{theorem} \label{⟨label name⟩}`.

```
\begin{theorem}[label=bezout,note=Bézout's identity]
Let  $a$  and  $b$  be integers. Then there exist integers  $x$  and  $y$ 
such that  $ax+by=\gcd(a,b)$ .
\end{theorem}
See \zcref{bezout}.
```

Theorem 4 (Bézout’s identity). *Let a and b be integers. Then there exist integers x and y such that $ax + by = \gcd(a, b)$.*

See theorem 4.

`manual-num={⟨text⟩}` (initially unset)

Use this to override the printed number of a theorem. It is useful for making “starred” versions of other theorems, perhaps to represent a reformulated or more difficult version.

```
\begin{theorem}[manual-num=\ref*{bezout}]*
Let  $a_1, \dots, a_n$  be integers. Then there exist integers
 $x_1, \dots, x_n$  such that  $a_1x_1 + \dots + a_nx_n = \gcd(a_1, \dots, a_n)$ .
\end{theorem}
\begin{theorem}[manual-num=\faRocket] % requires fontawesome5
Don't confuse your readers by changing the numbering without good
reason.
\end{theorem}
```

Theorem 4*. *Let a_1, \dots, a_n be integers. Then there exist integers x_1, \dots, x_n such that $a_1x_1 + \dots + a_nx_n = \gcd(a_1, \dots, a_n)$.*

Theorem 🚀. *Don’t confuse your readers by changing the numbering without good reason.*

`continues*=⟨label name⟩` (initially unset)

Pick up a theorem where you left off. The theorem number remains the same. The printed text can be customized with the `continues-code`^{P.3} option. The starred version also copies the theorem `note`^{P.4} and `short-note`^{P.4} if they are nonempty.

```
\begin{theorem}[continues=bezout]
Moreover, the integers of the form  $az+bt$  are exactly the multiples
of  $\gcd(a,b)$ .
\end{theorem}
\begin{theorem}[continues*=bezout]
Moreover, the integers of the form  $az+bt$  are exactly the multiples
of  $\gcd(a,b)$ .
\end{theorem}
```

Theorem 4 (continuing from p. 5). *Moreover, the integers of the form $az + bt$ are exactly the multiples of $\gcd(a, b)$.*

Theorem 4 (Bézout’s identity, continuing from p. 5). *Moreover, the integers of the form $az + bt$ are exactly the multiples of $\gcd(a, b)$.*

`store*=⟨tag⟩` (initially unset)

Alias `restate*`. Stores the the theorem to be restated at any point in the document with `\getkeytheorem`^{P.15}. With the starred version, counters and labels are taken from the copy called with `\getkeytheorem`, so in this case can only be restated once. This allows you, for example, to write all theorems and proofs in the appendix and

call `\getkeytheorem` at the appropriate time mid-document. For the numbering to be correct, the unstarred key will need at most two runs and the starred key at most three runs.

```
\begin{theorem}[store=blub]
A theorem worth restating.
\end{theorem}
More brilliant mathematics.
\getkeytheorem{blub}
```

Theorem 5. *A theorem worth restating.*

More brilliant mathematics.

Theorem 5. *A theorem worth restating.*

A theorem given this key *cannot* contain verbatim material or other unexpected catcodes such as a `tikz-cd` diagram. The latter issue can be averted with the `ampersand-replacement` key.

```
% preamble
\usepackage{tikz}
\usetikzlibrary{cd}

% document
\begin{lemma}[store=fiberprod]
For any  $S$ -schemes  $X$  and  $Y$ , there exists a scheme  $X \times_S Y$ 
with morphisms to  $X$  and  $Y$  such that the diagram
\begin{tikzcd}[ampersand replacement=\&]
X \times_S Y \ar[r] \ar[d] \& X \ar[d] \\
Y \ar[r] \& S
\end{tikzcd}
commutes and is universal with respect to this property.
\end{lemma}
\dots
\getkeytheorem{fiberprod}
```

Lemma 6. *For any S -schemes X and Y , there exists a scheme $X \times_S Y$ with morphisms to X and Y such that the diagram*

$$\begin{array}{ccc} X \times_S Y & \longrightarrow & X \\ \downarrow & & \downarrow \\ Y & \longrightarrow & S \end{array}$$

commutes and is universal with respect to this property.

...

Lemma 6. *For any S -schemes X and Y , there exists a scheme $X \times_S Y$ with morphisms to X and Y such that the diagram*

$$\begin{array}{ccc} X \times_S Y & \longrightarrow & X \\ \downarrow & & \downarrow \\ Y & \longrightarrow & S \end{array}$$

commutes and is universal with respect to this property.

restate-keys= $\{\langle \text{list of keys} \rangle\}$ (initially unset)

Allows passing different keys to the restated theorem. At the moment this is only useful with the **note**^{→P.4} key.

```
\begin{theorem}[
  store=rktest,
  note=ORIGINAL,
  restate-keys={note=RESTATED}
]
Wow, yet another theorem.
\end{theorem}
\getkeytheorem{rktest}
```

Theorem 7 (ORIGINAL). *Wow, yet another theorem.*

Theorem 7 (RESTATED). *Wow, yet another theorem.*

listhack=**true**|**false** (initially **false**)

Meant only to be used with the **break**^{→P.14} style key for a theorem starting with a list. Compare:

```
% preamble
\newkeytheoremstyle{breaksty}{break}
\newkeytheorem{observation}[style=breaksty]

% document
\begin{observation}
\begin{enumerate}
\item First item
\item Second item
\end{enumerate}
\end{observation}

\begin{observation}[listhack=true]
\begin{enumerate}
\item First item
\item Second item
\end{enumerate}
\end{observation}
```

Observation 1. *1. First item*

2. Second item

Observation 2.

1. First item

2. Second item

Note that the value **true** must be explicitly set so that **listhack** is not interpreted as the note text.

`seq=<name>` (initially unset)

Adds the theorem to a custom sequence `<name>` that can then be listed with `\listofkeytheorems[seq=<name>]`. See `seq`^{→P.18} for more details.

3.2 Keys also defined in thmtools

These are the `[<options>]` available to `\newkeytheorem`. Except for `name` and `style`^{→P.9}, each key below can also be used in `\newkeytheoremstyle`^{→P.13}. For more description, see the `thmtools` package.

`name=<display name>` (initially title-cased `<env name>`)

Aliases `heading` and `title`.

```
% preamble
\newkeytheorem{mythm}[name=Some Name]

% document
\begin{mythm}
Some text
\end{mythm}
```

Some Name 1. Some text

`numbered=true|false|unless-unique` (default `true`, initially `true`)

For compatibility with `thmtools`, also accepts the values `yes`, `no`, and `unless unique`.

```
% preamble
\newkeytheorem{theorem*}[name=Theorem, numbered=false]

% document
\begin{theorem*}
An unnumbered theorem.
\end{theorem*}
```

Theorem. *An unnumbered theorem.*

`parent=<counter>` (initially unset)

Aliases `numberwithin` and `within`.

```
% preamble
\newkeytheorem{conjecture}[parent=section]

% document
\begin{conjecture}
The first number is the section.
\end{conjecture}
```

Conjecture 3.1. *The first number is the section.*

`sibling=<counter>` (initially unset)

Aliases `numberlike` and `sharenumber`.


```

% preamble
\newkeytheorem{lemma}[sibling=theorem]

% document
\begin{lemma}
This shares its counter with \texttt{theorem}.
\end{lemma}

```

Lemma 8. *This shares its counter with `theorem`.*

`style=` \langle *style name* \rangle (initially unset)

Accepts any \langle *style name* \rangle defined by `\newkeytheoremstyle`^{→ P.13}, as well as any of the predefined amsthm styles: `plain`, `definition`, and `remark`.

```

% preamble
\newkeytheorem{remark}[style=remark]

% document
\begin{remark}
It's nice to distinguish remarks from definitions and theorems.
\end{remark}

```

Remark 1. It's nice to distinguish remarks from definitions and theorems.

`preheadhook=` \langle *code* \rangle (initially unset)

`postheadhook=` \langle *code* \rangle (initially unset)

`prefoothook=` \langle *code* \rangle (initially unset)

`postfoothook=` \langle *code* \rangle (initially unset)

Details in [section 7](#).

```

% preamble
\newkeytheorem{test}[
  preheadhook=PREHEAD,
  postheadhook=POSTHEAD,
  prefoothook=PREFOOT,
  postfoothook=POSTFOOT
]

% document
\begin{test}
Some text
\end{test}

```

PREHEAD

Test 1. *POSTHEAD*Some text *PREFOOT*

POSTFOOT

`qed=` \langle *symbol* \rangle (default `\qedsymbol`, initially unset)

Adds \langle *symbol* \rangle to the end of the theorem body. If no value is given, the symbol \square is used.

```
% preamble
\newkeytheorem{example}[qed]
\newkeytheorem{solution}[qed=$\clubsuit$]

% document
\begin{example}
Some text.
\end{example}
\begin{solution}
Some more text.
\end{solution}
```

Example 1. *Some text.*



Solution 1. *Some more text.*



refname= \langle ref name \rangle or $\{\langle$ singular name \rangle, \langle plural name $\rangle\}$ (initially \langle display name \rangle)

If a single string, then the name used by `hyperref`'s `\autoref`, `cleveref`'s `\cref`, and `zref-clever`'s `\zcref`. If two strings separated by a comma, then the second string is the plural form used by `\cref`.

Refname= \langle ref name \rangle or $\{\langle$ singular name \rangle, \langle plural name $\rangle\}$ (initially \langle display name \rangle)

Same as **refname** but for `\Autoref`, `\Cref`, and `\zcref` with any of its capitalizing options. Note that `\Autoref` is defined by `keytheorems`, but requires `hyperref` to work. As with `\autoref`, there is also a starred version `\Autoref*` that suppresses the hyperlink.

```
% preamble
\newkeytheorem{prop}[
  name=Proposition,
  refname={proposition,propositions},
  Refname={Proposition,Propositions}
]

% document
\begin{prop}[label=abc]
Some text.
\end{prop}
\begin{prop}[label=def]
Some more text.
\end{prop}
Consider \zcref{abc,def}. \Autoref{abc} \dots
```

Proposition 1. *Some text.*

Proposition 2. *Some more text.*

Consider propositions 1 and 2. Proposition 1 ...



The `cleveref`^{→CTAN} package has not been updated since 2018 and contains several incompatibilities with the \LaTeX kernel. These are often patched by the \LaTeX team, but further incompatibilities are likely to arise with each future update. For this reason, I recommend moving to `zref-clever`^{→CTAN}. It offers all the same features as `cleveref` and is actively maintained.

3.3 Keys added by `keytheorems`

`leftmargin=<length>`
`rightmargin=<length>`

Sets the left (respectively, right) margin of the theorem relative to the text width. This sets the theorem apart from the text, similar to a block quote. The code was adapted from Enrico Gregorio's \TeX Stack Exchange answers:

- [How to change margins in enunciation \(theorem-like environment\)?](#)
- [A theoremstyle with complete indentation using `amsthm`](#)

```
% preamble
\newcommand{\marginthmtext}{%
  We need some text to show off theorems with margins. }
\newkeytheorem{quotethm}[
  name=Quote Theorem,
  leftmargin=1cm, rightmargin=1cm]
\newkeytheorem[indentedthm][name=Indented Theorem, leftmargin=1cm]

% document
\marginthmtext\marginthmtext\marginthmtext

\begin{quotethm}
\marginthmtext\marginthmtext\marginthmtext
\end{quotethm}

\marginthmtext\marginthmtext\marginthmtext

\begin{indentedthm}
\marginthmtext\marginthmtext\marginthmtext
\end{indentedthm}
```

We need some text to show off theorems with margins. We need some text to show off theorems with margins. We need some text to show off theorems with margins.

Quote Theorem 1. *We need some text to show off theorems with margins. We need some text to show off theorems with margins. We need some text to show off theorems with margins.*

We need some text to show off theorems with margins. We need some text to show off theorems with margins. We need some text to show off theorems with margins.

Indented Theorem 1. *We need some text to show off theorems with margins. We need some text to show off theorems with margins. We need some text to show off theorems with margins.*

`tcolorbox={\tcolorbox options}` (initially unset)

This key specifies that the theorem be placed inside a `tcolorbox` environment with `\tcolorbox` options. The theorem head is typeset as a `tcolorbox` title; to avoid this see `tcolorbox-no-titlebar`^{→ P. 12}.

```

% preamble
\tcbset{
  defstyle/.style={
    arc=0mm,
    colback=blue!5!white,
    colframe=blue!75!black
  },
}
\newkeytheorem{corollary}[tcolorbox]
\newkeytheorem{definition}[style=definition, tcolorbox={defstyle}]

% document
\begin{corollary}
Products exist in the category of schemes over  $S$ .
\end{corollary}
\begin{definition}[Dedekind domains]
A \emph{Dedekind domain} is an integrally closed, Noetherian domain of
dimension one.
\end{definition}

```

Corollary 1.

Products exist in the category of schemes over S .

Definition 1 (Dedekind domains).

A *Dedekind domain* is an integrally closed, Noetherian domain of dimension one.

`tcolorbox-no-titlebar={\langle tcolorbox options \rangle}` (initially unset)

Same usage as `tcolorbox`^{P.11} but the theorem head is typeset as usual, not as a `tcolorbox` title.

```

% preamble
\newkeytheorem{boxcor}[
  tcolorbox-no-titlebar={colback=red!10},
  name=Corollary, sibling=corollary
]

% document
\begin{boxcor}[Cauchy's theorem]
Let  $G$  be a finite group and  $p$  a prime dividing the order of  $G$ .
Then  $G$  contains an element of order  $p$ .
\end{boxcor}

```

Corollary 2 (Cauchy's theorem). *Let G be a finite group and p a prime dividing the order of G . Then G contains an element of order p .*

`tcolorbox` offers its own comprehensive `theorems` library. If all of your theorems are to be `tcolorboxes`, I highly recommend using it instead of this package! However, if

only some of your theorems will use a `tcolorbox`, you may want to replicate the styles of `\NewTcbTheorem`. Here is an example that emulates `tcolorbox`’s `standard` theorem style.

```
% preamble
\tcbset{
  thmstyle/.style={
    colback=green!5,
    colframe=green!35!black},
}
\newkeytheoremstyle{tcb-standard}{
  tcolorbox=thmstyle,
  headpunct={},
  notebraces={}{},
  noteseparator={: },
  notefont=\bfseries,
  bodyfont=\normalfont,
}
\newkeytheorem{mytheo}[
  name=Theorem,
  style=tcb-standard
]

% document
\begin{mytheo}[Quillen-Suslin]
Every finitely generated projective module over a polynomial ring is free.
\end{mytheo}
```

Theorem 1: Quillen-Suslin

Every finitely generated projective module over a polynomial ring is free.

4 Theorem styles

`\newkeytheoremstyle{⟨name⟩}{⟨options⟩}`

This is `keytheorems`’ version of `thmtools`’ `\declaretheoremstyle`. Since it makes little sense to define a style with no keys, we’ve made the `⟨options⟩` argument mandatory. Note that unlike `amsthm`’s `\newtheoremstyle`, this command will error if a style has already been defined. To overwrite an existing style, there is the analogous `\renewkeytheoremstyle`. For completeness, there are also `\providekeytheoremstyle` and `\declarekeytheoremstyle`.

The defined style can be used with either the `style`^{P.9} key or the traditional `\theoremstyle`.



For the AMS classes `amsart`, `amsbook`, and `amsproc`, as well as the `amsart`-based `acmart` and `aomart`, the initial key values are slightly different than what’s below in order to match those class’s defaults. See [subsection 8.2](#) for details.

4.1 Keys also defined in `thmtools`

The following keys have the same meaning and syntax as the corresponding `thmtools` keys. In addition to the list below, most of the keys available to `\newkeytheorem`^{P.3}

can be used in `\newkeytheoremstyle`.

`bodyfont`= \langle font declarations \rangle (initially `\itshape`)

`break` (initially unset)

Do not use this with the `postheadspace` key.

`headfont`= \langle font declarations \rangle (initially `\bfseries`)

`headformat`=`margin`|`swapnumber`| \langle code using `\NAME`, `\NUMBER`, and `\NOTE` \rangle

Alias `headstyle`. Within \langle code \rangle , the commands `\NAME`, `\NUMBER`, and `\NOTE` correspond to the formatted parts of the theorem head.

! In `headformat`, you may also use the traditional `amsthm` commands `\thmname`, `\thmnumber`, and `\thmnote`, where #1 is the theorem name, #2 the number, and #3 the note. `keytheorems` expands the head spec inside `\text_expand:n` so for these commands to work properly, the package adds them to `\l_text_expand_exclude_tl`. Note also that if you use these lower-level commands, the style keys `notebraces`, `notefont`, `noteseparator`, and `numberfont` will have no effect (of course, you can manually control these things inside the commands' arguments).

`headindent`= \langle length \rangle (initially 0pt)

`headpunct`= \langle code \rangle (initially `{.}`)

`notebraces`= $\{\langle$ left brace $\rangle\}\{\langle$ right brace $\rangle\}$ (initially `{(}{)}`)

`notefont`= \langle font declarations \rangle (initially `\fontseries\mddefault\upshape`)

`postheadspace`= \langle skip expr \rangle (initially 5pt plus 1pt minus 1pt)

Do not use this with the `break` key.

`spaceabove`= \langle skip expr \rangle (initially `\topsep`)

`spacebelow`= \langle skip expr \rangle (initially `\topsep`)

! With `tcolorbox`^{P.11} and `tcolorbox-no-titlebar`^{P.12}, the `spaceabove` and `spacebelow` keys are internally passed to `tcolorbox`'s `before skip` and `after skip`. When no explicit `spaceabove` or `spacebelow` values are given, `tcolorbox` defaults are used instead of `\topsep`.

4.2 Keys added by `keytheorems`

`inherit-style`= \langle style name \rangle (initially unset)

Inherit the keys of any style declared with `\newkeytheoremstyle`^{P.13}. Additionally, the three styles predefined by `amsthm` are possible values: `plain`, `definition`, and `remark`.

`noteseparator`= \langle code \rangle (initially `\quad`)

The code inserted before the note, and printed only if there is a note. This is executed *before* the font commands set by `notefont` take effect.

`numberfont`= \langle font declarations \rangle (initially)

For almost all theorem styles, it is recommended that you *do not* change this setting.

5 Restating theorems

When a theorem is given the `store`^{P.5} key, the contents of the theorem are saved and written to a `.thlist` file. At the start of the next run, this file is input at the beginning of the document and allows you to retrieve the stored theorems at any point, before or after the original theorem.

`\getkeytheorem[⟨property⟩]{⟨tag⟩}`

Retrieves the theorem given the key `store=⟨tag⟩` or `store*=⟨tag⟩`. An optional `⟨property⟩` can be given to retrieve only the corresponding part of the theorem. Currently only the property `body` is implemented, which retrieves the (unformatted) body of the theorem.

```
\getkeytheorem{mytag}

\begin{example}[store=mytag]
Fascinating example.
\end{example}

\getkeytheorem[body]{mytag}
```

Example 2. *Fascinating example.* □

Example 2. *Fascinating example.* □

Fascinating example.

`\IfRestatingTF{⟨true code⟩}{⟨false code⟩}`

`\IfRestatingT{⟨true code⟩}`

`\IfRestatingF{⟨false code⟩}`

Executes `⟨true code⟩` if being retrieved with `\getkeytheorem` and `⟨false code⟩` if in the original theorem. This is reversed if `store*` is used.

```
\begin{example}[store=hmm]
I am the \IfRestatingTF{restated}{original} example!
\end{example}

\getkeytheorem{hmm}
```

Example 3. *I am the original example!* □

Example 3. *I am the restated example!* □

6 Listing theorems


`\listofkeytheorems[⟨options⟩]`

Similar to `\listoffigures` or `\listoftables` but for theorems. For memoir and the AMS classes, `keytheorems` tries to copy the formatting of these commands as defined by the class. For other classes, manual adjustments to `numwidth`^{P.17} and `indent`^{P.17} may be necessary.

`\keytheoremset{⟨options⟩}`

```
\listofkeytheorems
```

List of Theorems

1	Theorem	3
2	Theorem (Bertrand's postulate)	4
3	Theorem (Legendre's formula)	4
4	Theorem (Bézout's identity)	4
4*	Theorem	5
	Theorem	5
4	Theorem (continuing from p. 5)	5
4	Theorem (Bézout's identity, continuing from p. 5)	5
5	Theorem	6
6	Lemma	6
7	Theorem (ORIGINAL)	7
1	Observation	7
2	Observation	7
1	Some Name	8
	Theorem	8
3.1	Conjecture	8
8	Lemma	8
1	Remark	9
1	Test	9
1	Example	9
1	Solution	9
1	Proposition	10
2	Proposition	10
1	Quote Theorem	11
1	Indented Theorem	11
1	Corollary	11
1	Definition (Dedekind domains)	11
2	Corollary (Cauchy's theorem)	12
1	Theorem (Quillen-Suslin)	13
2	Example	15
3	Example	15

6.1 Keys also defined in thmtools

`ignore={⟨comma-list of env names⟩}` (initially unset)

`ignoreall` (initially unset)

```
\listofkeytheorems[ignoreall,show=theorem]
\listofkeytheorems[
  ignoreall, show=conjecture,
  title=List of Conjectures
]
```


List of Theorems

1	Theorem	3
2	Theorem (Bertrand's postulate)	4
3	Theorem (Legendre's formula)	4
4	Theorem (Bézout's identity)	4
4*	Theorem	5
☛	Theorem	5
4	Theorem (continuing from p. 5)	5
4	Theorem (Bézout's identity, continuing from p. 5)	5
5	Theorem	6
7	Theorem (ORIGINAL)	7

List of Conjectures

3.1	Conjecture	8
-----	----------------------	---

`numwidth`= $\langle length \rangle$ (initially 2.3em)

For the AMS classes, this is initially 1.5pc.

`onlynamed`= $\{\langle comma\text{-}list\ of\ env\ names \rangle\}$ (initially unset)

`show`= $\{\langle comma\text{-}list\ of\ env\ names \rangle\}$ (initially all theorems)

`showall` (initially set)

`swapnumber`=`true|false` (initially false)

`title`= $\langle text \rangle$ (initially `\GetTranslation{keythms_listof_title}`)

Defaults to “List of Theorems” if English or an unknown language is used. Currently several European languages have (likely inaccurate!) translations. A translation can be added with a GitHub pull request or manually with

`\DeclareTranslation{\langle lang \rangle}{keythms_listof_title}{\langle text \rangle}`.

6.2 Keys added by keytheorems

`format-code`= $\langle code\ with\ \#1,\ \#2,\ and\ \#3 \rangle$ (initially `\numberline{\#2}\#1\#3`)

Allows full control over the format for list entries. The theorem name is `\#1`, the number is `\#2`, and the (formatted) note is `\#3`. The note formatting is still controlled by `note-code`^{P.18}.

`indent`= $\langle length \rangle$ (initially 1.5em)

Sets the left indent of items in the list of theorems. For `memoir` and the AMS classes, the indent is initially `Opt`. It is not recommended to change this unless your class has different defaults not already covered.

`no-chapter-skip`=`true|false` (initially false)

By default a small vertical space is inserted between each chapter's chunk of theorems. Setting this key to `true` removes this space.

chapter-skip-length= $\langle length \rangle$ (initially 10pt)

Controls the amount of space inserted between chunks.

no-continues=true|false (initially false)

Suppresses the printing of theorems given the **continues**^{→P.5} key in the list of theorems.

no-title=true|false (initially false)

Suppresses the title of the list of theorems. Useful for custom ordering of the list.

```
\keytheoremset{ignoreall}
\listofkeytheorems[show=example]
\listofkeytheorems[show=solution, no-title]
```

List of Theorems

1	Example	9
2	Example	15
3	Example	15
1	Solution	9

no-toc=true|false (initially false)

With the standard classes, lists of figures/tables are not added to the table of contents by default. The same is true for **\listofkeytheorems**, and with those classes this key does nothing. However some classes, notably **memoir** and the AMS classes, do add lists to the table of contents. With these classes, this key suppresses the addition of the list of theorems to the table of contents.

note-code= $\langle code \text{ with } \#1 \rangle$ (initially { (#1)})

Formats the optional note in the list of theorems.

onlynumbered= $\{ \langle comma-list \text{ of } env \text{ names} \rangle \}$ (initially unset)

Similar to **onlynamed**^{→P.17}, but lists only those theorems which are numbered. This is useful if you'd like to exclude things like unnumbered definitions and remarks from the list of theorems.

print-body (initially unset)

Instead of listing the theorem headings, the theorems are restated with their body text. Not very useful without the **store-all**^{→P.3} load-time option.

seq= $\langle name \rangle$ (initially unset)

Used to list only the theorems added to the custom sequence $\langle name \rangle$ with the **seq**^{→P.8} theorem key. This is the only way to fully customize which theorems appear in the list of theorems. Unlike with **show**^{→P.17}, you do not need to use **ignoreall**^{→P.16} to prevent theorems not in $\langle name \rangle$ from being printed.

title-code= $\langle code \text{ with } \#1 \rangle$ (initially \section*{#1})

If **\chapter** is defined, then initially this is instead **\chapter*{#1}**. This key has no effect if used with an AMS class because these classes hard-code the section heading into **\@starttoc**.

6.3 Adding code to list of theorems

There are analogous commands to `\addcontentsline` and `\addtocontents` for adding entries or arbitrary code to the list of theorems.

! You *must* use these commands rather than the aforementioned because the `.thlist` file is also used to define restated theorems and cannot contain unexpected code.

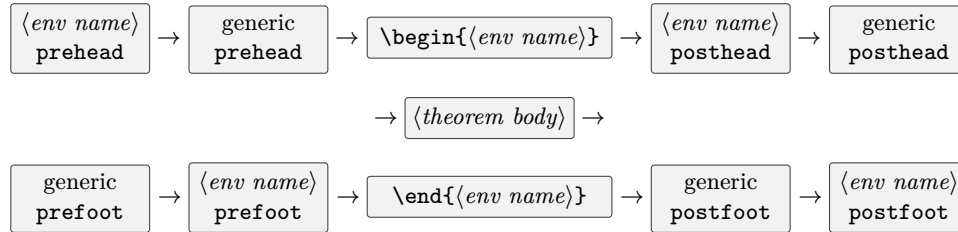
```
\addtheoremcontentsline{<level>}{<text>}
```

```
\addtotheoremcontents{<code>}
```

7 Theorem hooks

```
\addtotheoremhook[<env name>]{<hook name>}{<code>}
```

The `<hook name>` can be `prehead`, `posthead`, `prefoot`, `postfoot`, or `restated`. If no `<env name>` is given, the `<code>` is added to the “generic” hook, i.e. applied to all theorems. As in `thmtools`, the order of hooks is as follows:



The `restated` hook is applied at the start of theorems retrieved with the command `\getkeytheorem`, after the `prehead` hook. This can be useful for disabling commands such as `\footnote` in the restated theorems, e.g.

```
\addtotheoremhook{restated}{\renewcommand\footnote[2] [] {}}
```

By default, the `restated` hook disables the `\glossary`, `\index`, `\label`, and `\RecordProperties` commands.

In `thmtools`, the `prefoot` and `postfoot` hooks always prepend code, i.e. the code

```
\addtotheoremhook{postfoot}{A}
\addtotheoremhook{postfoot}{B}
```

results in BA after the theorem. With `keytheorems`, code is added in the order declared, meaning

```
\addtotheoremhook{postfoot}{A}
\addtotheoremhook{postfoot}{B}
```

results in AB after the theorem. This is the behavior of the \LaTeX kernel hooks that `keytheorems` uses under the hood.

Code added using the hook keys `preheadhook`^{P.9}, etc. is outermost, meaning executed first in `prehead` and `posthead` and last in `prefoot` and `postfoot`. Furthermore, if present, the `qed`^{P.9} symbol is placed *before* the `prefoot` hook.

8 Miscellaneous notes

8.1 beamer support

The package contains some *highly experimental* code to support theorems with beamer, including overlays. Most style keys are disabled by the default beamer theorem template. More become functional by setting

```
\setbeamertemplate{theorems}[ams style]
```

in the preamble. Alternatively, you have full control of theorems by setting the class option `noamsthm`.

Note that by default beamer defines a set of theorems when the class is loaded. These can be overwritten with `\renewkeytheorem`^{P.3} or disabled entirely with the `notheorems` class option.

Due to complications with overlays, writing contents of theorems to the `thlist` file is disabled. This means theorems can only be restated *after* their original statement. Furthermore, `\listofkeytheorems`^{P.15} is disabled and a warning issued if used.

User feedback is necessary to make this code fully compatible. Please report issues on the [Github page](#)!

8.2 Support for other classes

As mentioned in [section 4](#), the initial style key values set by `keytheorems` are adjusted for the AMS classes `amsart`, `amsbook`, and `amsproc`, the `amsart`-based `acmart` and `aomart`, and `jlreq`. You can find the exact changed values in the support files `keythms-⟨class⟩-support.tex`.

These class support files also contain code to adapt to class' formatting of lists-of as mentioned in [section 6](#); changes are made for the AMS classes, `memoir`, `IEEEtran`, and `jlreq`.

8.3 Support for font packages

Some font packages, all by Michael Sharpe, offer a `theoremfont` option that redefines the `plain` style body font to have italic text with upright figures, punctuation, and delimiters. `keytheorems` detects this option and sets its initial style values accordingly. The supported packages are `baskerville`, `cochineal`, `libertinust1math`, `newpxtext`, `newtx-text`, `scholax`, and `XCharter`.

8.4 Support for tagged PDF

The L^AT_EX team has been working hard to support the creation of tagged PDFs (see <https://latex3.github.io/tagging-project/>). The current `dev` formats make `amsthm` compatible with the kernel tagging code. Most of `keytheorems` is supported too, and anything that doesn't work should be reported. Explicitly not supported are the `tcolorbox`^{P.11} and `tcolorbox-no-titlebar`^{P.12} keys.

To produce a tagged PDF, add `\DocumentMetadata` in the first line of your document (additional instructions are found on the Tagging Project [website](#)). An example invocation might look like

```

\DocumentMetadata
{
  lang=en-US,
  pdfversion=2.0,
  pdfstandard=ua-2,
  testphase={phase-III,math,table,title,firstaid}
}

```

At a minimum, the `testphase` modules `phase-III` and `firstaid` are required.

8.5 Public coding interfaces

`\l_keythms_thmuse_envname_tl`

Inside theorem environments and in all theorem hooks, you have access to the theorem’s environment and counter name in this token list variable.

`keytheorems/allthms/⟨hook name⟩`
`keytheorems/⟨envname⟩/⟨hook name⟩`

These are the “real” names for the hooks described in [section 7](#). They can be useful with `\AddToHookNext` or the kernel’s label mechanism for hooks.

9 Further examples

More examples will be added soon – rather, eventually... For now, you can find a `keytheorems` adaptation of `amsthm`’s classic `thmtest.tex` in the Github `tests` folder: `keytheorems-amsthmtest.tex`. There is also a version for tagged PDF: `tagged-keytheorems-amsthmtest.tex`.

Index

`\addtheoremcontentsline`, 19
`\addtotheoremcontents`, 19
`\addtotheoremhook`, 19
auto-translate key, 2
`\Autoref`, 10
`\Autoref*`, 10

bodyfont key, 14
break key, 14

chapter-skip-length key, 18

Commands

`\addtheoremcontentsline`, 19
`\addtotheoremcontents`, 19
`\addtotheoremhook`, 19
`\Autoref`, 10
`\Autoref*`, 10
`\declarekeytheorem`, 4
`\declarekeytheoremstyle`, 13
`\getkeytheorem`, 15
`\IfRestatingF`, 15
`\IfRestatingT`, 15
`\IfRestatingTF`, 15
`\keytheoremset`, 15
`\keytheoremset`, 2
`\l_keythms_thmuse_envname_tl`, 21
`\listofkeytheorems`, 15
`\NAME`, 14
`\newkeytheorem`, 3
`\newkeytheoremstyle`, 13
`\NOTE`, 14
`\NUMBER`, 14
`\providekeytheorem`, 3
`\providekeytheoremstyle`, 13
`\renewkeytheorem`, 3
`\renewkeytheoremstyle`, 13

continues key, 5
continues-code key, 3

`\declarekeytheorem`, 4
`\declarekeytheoremstyle`, 13
definition value, 9, 14

format-code key, 17

`\getkeytheorem`, 15

headfont key, 14
headformat key, 14
headindent key, 14
heading key, 8
headpunct key, 14
headstyle key, 14

`\IfRestatingF`, 15

`\IfRestatingT`, 15
`\IfRestatingTF`, 15
ignore key, 16
ignoreall key, 16
indent key, 17
inherit-style key, 14

Keys

auto-translate, 2
bodyfont, 14
break, 14
chapter-skip-length, 18
continues, 5
continues-code, 3
format-code, 17
headfont, 14
headformat, 14
headindent, 14
heading, 8
headpunct, 14
headstyle, 14
ignore, 16
ignoreall, 16
indent, 17
inherit-style, 14
label, 4
leftmargin, 11
listhack, 7
manual-num, 5
name, 4, 8
no-chapter-skip, 17
no-continues, 18
no-title, 18
no-toc, 18
note, 4
note-code, 18
notebraces, 14
notefont, 14
noteseparator, 14
numbered, 8
numberfont, 14
numberlike, 8
numberwithin, 8
numwidth, 17
onlynamed, 17
onlynumbered, 18
overload, 2
parent, 8
postfoothook, 9
postheadhook, 9
postheadspace, 14
prefoothook, 9
preheadhook, 9
print-body, 18

- qed, 9
- qed-symbol, 3
- Refname, 10
- refname, 10
- restate, 5
- restate-counters, 3
- restate-keys, 7
- rightmargin, 11
- seq, 8, 18
- sharenumber, 8
- short-name, 4
- short-note, 4
- show, 17
- showall, 17
- sibling, 8
- spaceabove, 14
- spacebelow, 14
- store, 5
- store-all, 3
- store-sets-label, 3
- style, 9
- swapnumber, 17
- tcolorbox, 11
- tcolorbox-no-titlebar, 12
- thmtools-compatible, 2
- title, 8, 17
- title-code, 18
- within, 8
- \keytheoremset, 15
- \keytheoremset, 2
- \l_keythms_thmuse_envname_tl, 21
- label key, 4
- leftmargin key, 11
- listhack key, 7
- \listofkeytheorems, 15
- manual-num key, 5
- margin value, 14
- \NAME, 14
- name key, 4, 8
- \newkeytheorem, 3
- \newkeytheoremstyle, 13
- no-chapter-skip key, 17
- no-continues key, 18
- no-title key, 18
- no-toc key, 18
- \NOTE, 14
- note key, 4
- note-code key, 18
- notebraces key, 14
- notefont key, 14
- noteseparator key, 14
- \NUMBER, 14
- numbered key, 8
- numberfont key, 14
- numberlike key, 8
- numberwithin key, 8
- numwidth key, 17
- onlynamed key, 17
- onlynumbered key, 18
- overload key, 2
- parent key, 8
- plain value, 9, 14
- postfoothook key, 9
- postheadhook key, 9
- postheadsapce key, 14
- prefoothook key, 9
- preheadhook key, 9
- print-body key, 18
- \providekeytheorem, 3
- \providekeytheoremstyle, 13
- qed key, 9
- qed-symbol key, 3
- Refname key, 10
- refname key, 10
- remark value, 9, 14
- \renewkeytheorem, 3
- \renewkeytheoremstyle, 13
- restate key, 5
- restate-counters key, 3
- restate-keys key, 7
- rightmargin key, 11
- seq key, 8, 18
- sharenumber key, 8
- short-name key, 4
- short-note key, 4
- show key, 17
- showall key, 17
- sibling key, 8
- spaceabove key, 14
- spacebelow key, 14
- store key, 5
- store-all key, 3
- store-sets-label key, 3
- style key, 9
- swapnumber key, 17
- swapnumber value, 14
- tcolorbox key, 11
- tcolorbox-no-titlebar key, 12
- thmtools-compatible key, 2
- title key, 8, 17
- title-code key, 18
- unless-unique value, 8
- Values
 - definition, 9, 14

margin, 14
plain, 9, 14
remark, 9, 14
swapnumber, 14
unless-unique, 8

within key, 8