# key-theorems package

version 0.0.1$\gamma$

github.com/mbertucci47/key-theorems

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**Abstract**

An expl3-implementation of a key-value interface to amsthm, implementing most of the functionality provided by thmtools. Full of bugs and incomplete. Don't use it for anything important!

**Warning!** In addition to being a completely unreliable package, the documentation is just a skeleton! For full details look at the package code.

## 1 Load-time Options

`overload` (initially unset)

Redefines `\newtheorem` to internally use the key-theorems machinery. The syntax remains the same.

`thmtools-compat` (initially unset)

For compatibility with thmtools syntax. Currently defines the `\declaretheoremstyle`, `\declaretheorem`, and `\listoftheorems` commands and the `restatable` environment.

`store-all` (initially unset)

Tells key-theorems to grab the body of each theorem so it can later be printed with `\listofkeytheorems[print-body]`. Note that this means a theorem body *cannot* contain verbatim material.

## 2 Global Options

`\keytheoremset{`⟨*options*⟩`}`

`restate-counters={`⟨*comma-list of counters*⟩`}` (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 ⟨*comma-list*⟩.

`continues-code=`⟨*code with* `#1`⟩ (initially `continuing from p.\,\pageref{#1}`)

The code used to typeset the note produced by the `continues` → P. 2 key.

`qed-symbol=`⟨*symbol*⟩ (initially `\openbox`)

Redefines `\qedsymbol` to be ⟨*symbol*⟩.

## 3 Declaring Theorems

`\newkeytheorem{`⟨*env name*⟩`}[`⟨*options*⟩`]`

Defines a theorem environment ⟨*env name*⟩ which itself takes a few options (see subsection 3.1). You can also declare multiple theorems at once by replacing ⟨*env name*⟩ with a comma-list of names, e.g. `\newkeytheorem{theorem,lemma,proposition}[`⟨*options*⟩`]`.
By default, the theorem's printed name is a title-cased ⟨*env name*⟩. This can be changed with the `name` → P. 3 key. All ⟨*options*⟩ are described in subsections 3.2 and 3.3.

```
% preamble
\newkeytheorem{theorem}

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

**Theorem 1.** *Some text*

## 3.1 Keys available to theorem environments

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

```
\begin{theorem}[some heading]
Some text
\end{theorem}
```

**Theorem 2** (some heading)**.** *Some text*

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}[some heading]
Some text
\end{theorem}
\begin{theorem}[note=another heading]
Some more text
\end{theorem}
```

**Theorem 3** (some heading)**.** *Some text*

**Theorem 4** (another heading)**.** *Some more text*

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

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

```
\begin{theorem}[label=foo]
Some text
\end{theorem}
\ref{foo}
```

**Theorem 5.** *Some text*

5

`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. 1 option.

```
\begin{theorem}[continues=foo]
\dots and some more text.
\end{theorem}
```

**Theorem 5** (continuing from p. 2)**.** *. . . and some more text.*

`store`=⟨*csname*⟩ (initially unset)

Alias `restate`. Defines a command \⟨*csname*⟩ that can be used to restate the theorem, including the body text, later in the document. This is the local version of the `store-all` →P. 1 load-time option. A theorem given this key *cannot* contain verbatim material.

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

**Theorem 6.** *A theorem worth restating.*

More brilliant mathematics.

**Theorem 6.** *A theorem worth restating.*

## 3.2 Keys inherited from thmtools

These are the [⟨*options*⟩] passed to `\newkeytheorem`. For more description, see the thmtools package.

`name`=⟨*display name*⟩ (initially title-cased ⟨*env name*⟩)

Aliases `title` and `heading`.

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

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

**Some Name 1.** *Some text*

`numbered`=`true`|`false` (default `true`, initially `true`)

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

```
% 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 7.** *This shares its counter with `theorem`.*

`style`=⟨*style name*⟩ (initially unset)

Accepts any ⟨*style name*⟩ defined by `\newkeytheoremstyle` → P. 5, as well as any of the predefined amsthm styles: `plain`, `definition`, and `remark`.

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

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

*Remark* 1. Some text

preheadhook=⟨*code*⟩ (initially unset)
postheadhook=⟨*code*⟩ (initially unset)
prefoothook=⟨*code*⟩ (initially unset)
postfoothook=⟨*code*⟩ (initially unset)

Details in section 6.

```
% 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

refname=⟨*ref name*⟩ or {⟨*singular name*⟩,⟨*plural name*⟩} (initially ⟨*display name*⟩)

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

Refname=⟨*ref name*⟩ or {⟨*singular name*⟩,⟨*plural name*⟩} (initially ⟨*display name*⟩)

Same as refname but for `\Autoref` (not yet implemented!) and `\Cref`.

```
% 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}
\begin{theorem}
Consider \cref{abc,def}.
\end{theorem}
```

**Proposition 1.** *Some text*

**Proposition 2.** *Some more text*

**Theorem 8.** *Consider propositions 1 and 2.*

qed=⟨*symbol*⟩ (default `\openbox`, initially unset)

Adds ⟨*symbol*⟩ to the end of the theorem body. If no value is given, the symbol □ 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* ♣

### 3.3 Keys added by key-theorems

`tcolorbox={`⟨*tcolorbox options*⟩`}` (initially unset)

This key specifies that the theorem be placed inside a tcolorbox environment with ⟨*options*⟩.

```
% 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}
Some text
\end{corollary}
\begin{definition}
Some more text
\end{definition}
```

**Corollary 1.**

*Some text*

**Definition 1.**

Some more text

## 4 Theorem Styles

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

This is key-theorems' version of thmtools' `\declaretheoremstyle[`⟨*options*⟩`]{`⟨*name*⟩`}`. Since it makes little sense to define a style with no keys, we've made the ⟨*options*⟩ argument mandatory.

### 4.1 Keys inherited from thmtools

The following keys have the same meaning and syntax as the corresponding thmtools keys.

`spaceabove=`⟨*length*⟩ (initially `\topsep`)

`spacebelow=`⟨*length*⟩ (initially `\topsep`)

`bodyfont=`⟨*font declarations*⟩ (initially `\itshape`)

`headindent=`⟨*length*⟩ (initially `0pt`)

`headfont=`⟨*font declarations*⟩ (initially `\bfseries`)

`headpunct`=⟨*code*⟩ (initially `{.}`)

`postheadspace`=⟨*length*⟩ (initially `5pt plus 1pt minus 1pt`)

Do not use this with the `break` key.

`break` (initially unset)

Do not use this with the `postheadspace` key.

`notefont`=⟨*font declarations*⟩ (initially `\fontseries\mddefault\upshape`)

`notebraces`=`{`⟨*left brace*⟩`}{`⟨*right brace*⟩`}` (initially `{(}{)}`)

`headstyle`=`margin`|`swapnumber`|⟨*code using* `\NAME`*,* `\NUMBER`*, and* `\NOTE`⟩

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

### 4.2 Keys added by **key-theorems**

`inherit-style`=⟨*style name*⟩ (initially unset)

Inherit the keys of any style declared with `\newkeytheoremstyle` → P. 5. Additionally, the three styles predefined by amsthm are possible values: `plain`, `definition`, and `remark`.

## 5 Listing Theorems

`\listofkeytheorems[`⟨*options*⟩`]`

`\keytheoremlistset{`⟨*options*⟩`}`

`\listofkeytheorems`

**List of Theorems**



### 5.1 Keys inherited from **thmtools**

`numwidth`=⟨*length*⟩ (initially `2.3em`)

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

`show={`⟨*comma-list of env names*⟩`}` (initially all theorems)

`onlynamed={`⟨*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**



**List of Conjectures**



`showall` (initially set)

`title=`⟨*text*⟩ (initially `List of Theorems`)

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

### 5.2 Keys added by **key-theorems**

`title-code=`⟨*code with* `#1`⟩ (initially `\section*{#1}`)

If `\chapter` is defined, then initially this is instead `\chapter*{#1}`.

`no-title` (initially unset)

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

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

**List of Theorems**



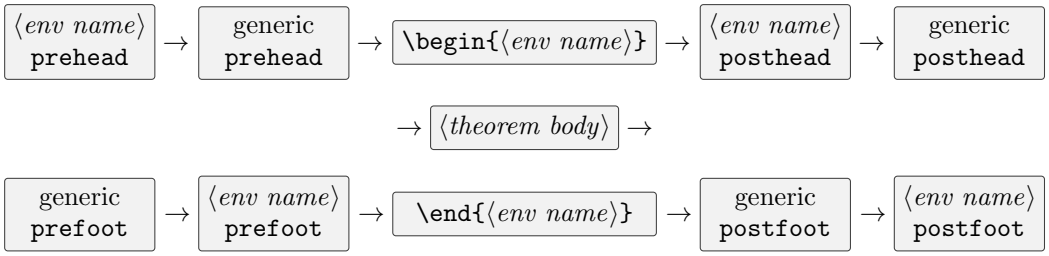
`print-body` (initially unset)

Instead of listing the theorem headings, the theorems are restated with their body text. Requires the `store-all` → P. 1 load-time option to be useful.

## 6 Theorem Hooks

`\addtotheoremhook[`⟨*env name*⟩`]{`⟨*hook name*⟩`}{`⟨*code*⟩`}`

⟨*hook name*⟩ can be `prehead`, `posthead`, `prefoot`, or `postfoot`. 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:




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

```
\addtotheorempostfoothook{A}
\addtotheorempostfoothook{B}
```

results in `BA` after the theorem. With key-theorems, 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 key-theorems uses under the hood.
Right now, code added using the hook keys `preheadhook` → P. 4, etc. is outermost, meaning executed first in `prehead` and `posthead` and last in `prefoot` and `postfoot`. This may change if I think of good reasons to do so...

# Index