

The `refproof` package

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Abstract

This package aims to at consistently numbering claims within proofs. For this purpose, take a valid $\langle label \rangle$ when starting a proof, associating it with a theorem/lemma etc. and enabling us to subnumber claims within this proof. We also provide some customizations for proofs.

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1 Proofs

1.1 Old proofs

`oldproof` (*env.*) Behaves like `proof` from `amsmath`.

`oldsubproof` (*env.*) Behaves like `subproof` from `mkessler-subproof`.

That is, behaves like the `amsmath` proof environment except that the shown keyword is “subproof” and we end the proof with a black instead of a white square.

It is not recommended to use `oldproof` or `oldsubproof`, since these have no support for the `claim` management this package provides. They only exist for legacy reasons.

1.2 Basic proofs

Both of these have `claim` support, which is explained later in [section 2](#).

`proof (env.)` `\begin{proof}*[\langle description \rangle]`

The old `proof` environment has been modified slightly. We still accept a $\langle description \rangle$, but this will be given in parentheses after the usual “proof” keyword.

Additionally, we accept an optional “star”, that will be visually displayed behind the “proof” keyword.

When nested, that is, when inside a `proof` or `subproof` environment, the name will automatically change to “subproof”. Nesting works to an arbitrary depth.

`subproof (env.)` `\begin{subproof}*[\langle description \rangle]`

Works like the `proof` environment, but will always be named “subproof” and finish with a black square.

You will probably rarely need this.

1.3 Refproofs

`refproof (env.)` `\begin{refproof}*{\langle label \rangle}[\langle description \rangle]`

For the optional “*” or the $\langle description \rangle$ see the `proof` environment.

The $\langle label \rangle$ has to be a valid L^AT_EX-known label that `\ref` would accept. This `refproof` is then associated with the corresponding theorem that $\langle label \rangle$ refers to. It will state “Proof of $\langle reference \rangle$ ” at the beginning of the environment to indicate that this proof is associated with some specific environment.

When the `hyperref` package is loaded, this is automatically detected and an `\autoref` command is used to also indicate the environment name in the reference.

When `refproof` has been called with the same label before, the name will be adjusted to “Continuation of proof of $\langle reference \rangle$ ” automatically.

Claim support is explained in [section 2](#).

2 Claim support

`claim (env.)` `\begin{claim*}`

`claim* (env.)` The star in the environment name makes the claim not to be numbered.

The `proof`, `subproof` and `refproof` environment alter the behavior of the claim numbering as follows:

- The `proof` and `subproof` environment will reset the `claim` counter at their beginning. Claims will appear as “Claim 1”, “Claim 2”,...

At the end of the environment, the previous counter is restored.

- The `refproof` environment will number claims within the proof and *all of its continuations*. Additionally, claims will be numbered as “ $\langle reference \rangle$.C1”, “ $\langle reference \rangle$.C2” where $\langle reference \rangle$ is the numbering style of the $\langle label \rangle$ that this proof is associated to.

At the end of the environment, the previous counter is restored.

3 Language support

This package makes use of the `translator` package to provide `babel`-sensitive translations dynamically throughout the document. You need the `translator-proof-dictionary- $\langle language \rangle$.dict` dictionary somewhere where L^AT_EX can find it. It should have shipped with this documentation and the package source.

Currently, only German and English are supported.

4 groupthm integration

This has not been implemented yet, but future features include:

- Integrate the `claim` environment into the `star` and `starred` groups of `groupthm`.
- Integrate the optional stars of the `proof` etc into `groupthm`, i.e. let them behave like `star` environments to toggle these in a unified way.

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The italic numbers denote the pages where the corresponding entry is described, numbers underlined point to the definition, all others indicate the places where it is used.

A		<code>refproof</code> <u>1</u>
<code>\autoref</code> 2		<code>subproof</code> <u>1</u>
B		O
<code>\begin</code> 2		<code>oldproof (env.)</code> <u>1</u>
C		<code>oldsubproof (env.)</code> <u>1</u>
<code>claim (env.)</code> <u>1</u>		P
<code>claim* (env.)</code> <u>1</u>		<code>proof (env.)</code> <u>1</u>
E		R
environments:		<code>\ref</code> 2
<code>claim</code> <u>1</u>		<code>refproof (env.)</code> <u>1</u>
<code>claim*</code> <u>1</u>		S
<code>oldproof</code> <u>1</u>		<code>subproof (env.)</code> <u>1</u>
<code>oldsubproof</code> <u>1</u>		
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