The statementsp Package Manual

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Abstract

The statementsp package provides a convenient way to create highly customizable theorem and proposition boxes using tcolorbox. It features a unique "Preview" and "Recall" mechanism, allowing you to display a statement box before or after its actual definition in the document.

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1 Counters

The counters for the statement environments provided by this package are strictly sequential within a section. This means that theorems, definitions, lemmas, and other environments share the same counter (e.g., Definition 1.1, Theorem 1.2, Lemma 1.3). This prevents numbering confusion across different types of mathematical statements.

2 Using the Environments

The basic syntax for using the standard numbered statement environment is:

```
\begin{statementsp}<prefix>[label](Statement Name)
    Body of the statement...
\end{statementsp}
```

2.1 Unnumbered Environments

If you do not want to assign a number to a statement, you can use the starred version of the environment: `statementsp*`. The syntax remains exactly the same, but the counter will not be incremented and no number will be displayed in the box title.

```
\begin{statementsp*}<prefix>[label](Statement Name)
    Body of the unnumbered statement...
\end{statementsp*}
```

2.2 Omitting Labels and Titles

You can choose not to provide a reference label or a specific statement name by leaving the respective brackets or parentheses empty.

- **Empty Label `[]`:** If the square brackets are empty, the package will not automatically generate a referencing label for this statement.
- **Empty Title `()`:** If the parentheses are empty, the specific statement name is hidden, leaving only the prefix name (and number, if applicable) in the title.

3 Preview and Recall Features

One of the key features of statementsp is the ability to show a box before it is defined (Preview) or show it again later (Recall). Use the `\refcallsp{prefix:label}` command.

3.1 The `\refcallsp` Command

The `\refcallsp{prefix:label}` command allows you to display a statement box anywhere in your document. The package automatically determines whether the command appears before or after the main definition:

- **Preview:** If you place `\refcallsp` *before* the main definition, it automatically generates a "Preview" box.
- **Recall:** If you place it *after* the main definition, it automatically generates a "Recall" box.

In both cases, the title of the generated box contains a hyperlink that jumps directly to the main definition in the document.

3.2 Preview Example

Here is a preview of a theorem that is defined later in Section 4. Note that clicking the title jumps to the actual definition.

Theorem 4.2: (Fermat's Last Theorem) (Preview)

No three positive integers a, b, and c satisfy the equation $a^n + b^n = c^n$ for any integer value of n greater than 2. □

4 Main Definitions

Here is a definition box.

Definition 4.1: (Limit of a Sequence)

A sequence (x_n) converges to a real number L if, for every $\epsilon > 0$, there exists a natural number N such that for all $n \geq N$, $|x_n - L| < \epsilon$. □

Here is the main theorem box that was previewed earlier.

Theorem 4.2: (Fermat's Last Theorem)

No three positive integers a, b, and c satisfy the equation $a^n + b^n = c^n$ for any integer value of n greater than 2. □

Here is an example of an unnumbered environment using `statementsp*`. Notice that it does not have a sequential number like the theorem and definition above.

Lemma (Zorn's Lemma)

Suppose a non-empty partially ordered set P has the property that every chain in P has an upper bound in P. Then the set P contains at least one maximal element. □

Here is an example demonstrating empty labels and titles. This definition is numbered, but it cannot be referenced, and it does not have a specific name attached to it.

Definition 4.3

A real number is called rational if it can be expressed as the quotient of two integers. □

And here is an unnumbered lemma with no label and no title.

Lemma

This is a simple lemma that only displays its prefix. □

5 Referencing

5.1 Standard Referencing: `\refsp` and `\refnamesp`

When referencing a statement, you must include the prefix defined in the `\newstatementsp` command. For example, to reference the theorem defined above, you must use the prefix `th` and the label `fermat` like this: `\refsp{th:fermat}`. Like `\refcallsp`, these referencing commands can be used anywhere, before or after the main definition.

If you provided a specific name for the statement (e.g., "Fermat's Last Theorem"), you can use the `\refnamesp` command to reference both the number and the name together.

5.2 Reference Examples

- Using `\refsp`: The famous theorem is Theorem 4.2.
- Using `\refnamesp`: The full reference is Theorem 4.2 :(Fermat's Last Theorem) .

Now we can also recall the definition defined earlier. This will automatically become a "Recall" box:

Definition 4.1: (Limit of a Sequence) (Recall)

A sequence (x_n) converges to a real number L if, for every $\epsilon > 0$, there exists a natural number N such that for all $n \geq N$, $|x_n - L| < \epsilon$. □