The refstate package

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1 Introduction

The refstate package provides a mechanism to pre-state and re-state theorems in a LaTeX document. It relies on the implementation details of the amsthm package and **may break if those details change**.

2 Usage

To use the refstate package, include it in your document preamble with:

```
\usepackage{refstate}
```

Declare your theorem environments like normal.

```
\theoremstyle{plain}
\newtheorem{THM}{Theorem}[section]
```

`store` You can then use the `store` environment to define a theorem like this.

```
\begin{store}{THM}[Blue sky theorem]\label{thmmain}
    The sky is blue.
\end{store}
```

Theorem 2.1 (Blue sky theorem)**.** *The sky is blue.*

`\refstate` Elsewhere in the document (before or after), use the `\refstate` command to reference it.

```
\refstate{thmmain}
```

⇝ *p. 1* **Theorem 2.1** (Blue sky theorem)**.** *The sky is blue.*

---

3 Implementation

```
\ProvidesPackage{refstate}
\RequirePackage{amsthm,xparse}
\RequirePackage{marginnote}
\ExplSyntaxOn
```

Redefine `\newtheorem` to capture theorem styles and names and save them to macros.

```
\let\rfst@newtheorem@original=\newtheorem
\RenewDocumentCommand{\newtheorem}{s m o m o}{
  \tl_if_in:nnTF {#2} {phfthm@} {
    \tl_set:Nx \l_tmpa_tl
      {\tl_range:nnn{#2}{8}{-1}}
    \cs_if_exist:NTF \cmdKV@phfmkthm@thmstyle {
      \if\relax\detokenize\expandafter{\cmdKV@phfmkthm@thmstyle}\relax % ... why?
        \tl_const:cx {rfst@style@\tl_use:N\l_tmpa_tl} {\the\thm@style}
      \else
        \tl_const:cx {rfst@style@\tl_use:N\l_tmpa_tl} {\cmdKV@phfmkthm@thmstyle}
      \fi
    }{
      \tl_const:cx {rfst@style@\tl_use:N\l_tmpa_tl} {\the\thm@style}
    }
    \tl_const:cx {rfst@style@#2} {plain}
    \tl_const:cx {rfst@name@\tl_use:N\l_tmpa_tl}
      {#4}
  }{
    \tl_const:cx {rfst@style@#2} {\the\thm@style}
    \tl_const:cx {rfst@name@#2} {#4}
  }
  \IfBooleanTF{#1}{
    \IfValueTF{#3}{
      \IfValueTF{#5}{
        \rfst@newtheorem@original*{#2}[#3]{#4}[#5]
      }{
        \rfst@newtheorem@original*{#2}[#3]{#4}
      }
    }{
      \IfValueTF{#5}{
        \rfst@newtheorem@original*{#2}{#4}[#5]
      }{
        \rfst@newtheorem@original*{#2}{#4}
      }
    }
  }{
    \IfValueTF{#3}{
      \IfValueTF{#5}{
        \rfst@newtheorem@original{#2}[#3]{#4}[#5]
      }{
        \rfst@newtheorem@original{#2}[#3]{#4}
      }
    }{
      \IfValueTF{#5}{
        \rfst@newtheorem@original{#2}{#4}[#5]
      }{
        \rfst@newtheorem@original{#2}{#4}
```

```
      }
    }
  }
}
```

Define a theorem-environment lookalike command for the restated theorem. We gobble the `\label` command for the body so that there is no labels.

```
\NewExpandableDocumentCommand{\rfst@gobble@label}{o m}{}
\NewDocumentCommand{\rfst@faketheorem}{m m m m +m O{}}{
   % 1=Label 2=Style 3=Type 4=TypeName 5=Body 6=Head
   \begingroup
   \let\label\rfst@gobble@label
   % \let\index\@gobble \let\glossary\@gobble
   % Not all of these may be desirable...
   \ifhmode\unskip\unskip\par\fi
   \normalfont
   \trivlist
   \let\thmheadnl\relax
   \let\thm@swap\@gobble
   \thm@notefont{\fontseries\mddefault\upshape}%
   \thm@headpunct{.}% add period after heading
   \thm@headsep 5\p@ plus\p@ minus\p@\relax
   \thm@space@setup
   \csname th@#2\endcsname
   \@topsep \thm@preskip         % used by thm head
   \@topsepadd \thm@postskip       % used by \@endparenv
   \@begintheorem{#4}{\ref{#1}}[#6]
   \marginnote{\textit{\footnotesize$\leadsto$\,p.\,\pageref*{#1}}}
   \ignorespaces
   #5
   \@endtheorem
   \endgroup
}
```

\refstate

```
\newcommand{\refstate}[1]{%
  \ifcsname rfst@storedthm@#1\endcsname
    \@nameuse{rfst@storedthm@#1}
  \else
```

We need an other run of latex. Put a placeholder.

```
    \ifhmode\unskip\unskip\par\fi
    \thm@space@setup
    \vskip\thm@preskip
    \noindent
    \textbf{Restate}~\texttt{\detokenize{#1}}
    \par
    \vskip\thm@postskip
  \fi
}
```

(*End of definition for* `\refstate`. *This function is documented on page 1.*)

```
\NewExpandableDocumentCommand{\rfst@thm@detok}{o m m m}{
  \detokenize{{#2}{#3}{#4}}
}
```

```
\NewDocumentEnvironment{store}{ m o +b } {%
  \IfValueTF{#2}{\begin{#1}[#2]}{\begin{#1}} % Begin wrapped theorem
    \newtoks\rfst@labelval % Capture the first label.
    \let\rfst@oldlabel\label
    \newcommand{\rfst@label}[1]{\rfst@labelval{##1}\let\label\rfst@oldlabel\label{##1}}
    \let\label\rfst@label
    #3 % Display the actual theorem contents
```

Store all the info needed to refstate the theorem into the aux file

```
    \begingroup
      \let\@thm=\rfst@thm@detok
      \protected@write\@auxout{}{%
        \string\global\string\long\string\@namedef{rfst@storedthm@\the\rfst@labelval}{%
          \string\rfst@faketheorem%
          {\the\rfst@labelval}%
          {\tl_use:c{rfst@style@#1}}{#1}{\tl_use:c{rfst@name@#1}}
          {\detokenize{#3}}%
          \IfValueT{#2}{[#2]}%
        }
      }
    \endgroup
  \end{#1} % End wrapped theorem
} {}
```