

The `xtheorem` package*

AB

2008/08/03

Contents

1	Interfaces	1
1.1	The Template Type ‘theoremstyle’	1
1.2	The Template ‘std’ (type theoremstyle)	2
2	Implementation	3

Abstract

This is a conversion of the AMS theorem classes to the template system. Only the interface was changed, the internals still use $\text{\LaTeX} 2_{\epsilon}$ commands.

1 Interfaces

1.1 The Template Type ‘theoremstyle’

Arg: 1 Text of the number of the theorem (e.g., A.1), or `\NoValue` to indicate that the theorem is unnumbered.

Arg: 2 Name of the theorem (e.g. `Theorem`, `Lemma`).

Arg: 3 Additional note (e.g. `see [12]`), or `\NoValue`.

Semantics:

This template starts a new environment, typesets the head of a theorem, and sets fonts for the body of the theorem. The environment is ended by an `\@endtheorem` command.

If the first argument is given, it is printed as the number part. The second argument contains the name of the theorem, and the third one may contain an additional note.

For instance, the arguments `2.1`, `Lemma`, and `Rabin~1960` could produce the output

*This file has version number 754, last revised 2008/08/03.

Lemma 2.1 (Rabin 1960).

where the following text is set in italic.

1.2 The Template ‘std’ (type `theoremstyle`)

Attributes:

pre-skip (l)	Skip above the theorem.	Default: <code>topsep</code>
post-skip (l)	Skip below the theorem.	Default: <code>topsep</code>
body-style (f0)	Commands to be executed before the body of the theorem in order to set fonts, etc.	Default: italic
head-style (f0)	Commands to set the font of the head.	Default: bold
note-style (f0)	Commands to set the font of the note.	Default: medium upright font
head-punct (f0)	Text after the head.	Default: .
head-format (f3)	Format of the head.	Default: Name Number (Note)
head-indent (l)	Indent of the head.	Default: none
head-sep (l)	Space after the head.	Default: 5pt ± 1pt
post-head-action (f0)	Command to be executed after the head (e.g., a line break).	Default: none

Semantics & Comments:

This are all parameters provided by the AMS package, except ‘swaphead’ which can be simulated by `head-format`.

Problem. The current solution for ‘head-format’ is very clumsy. Perhaps it would be better to pass just the name of a template which does the layout instead of the actual code.

`\newtheorem` The `\newtheorem` command defines a new type of theorem. It takes the following arguments:

`\newtheorem[*]<style><name>[share counter]<label>[count relative]`

and defines an environment named ‘name’. The arguments have the following meanings:

* If present the theorem is unnumbered, otherwise it is numbered.

style The name of an instance of the ‘theoremstyle’ template which is used to typeset the theorem.

name The name of the new environment.

share counter (optional) The label of another defined theorem. If present both kinds of theorem share a common counter.

label The name of the theorem which should appear in its head.

count relative If present the counter is reset to 1 everything the counter with this name is changed (e.g., **section** or **chapter**).

For instance, the following definitions create environments named **Thm**, **Prop**, **Lem**, **Cor**, **Def**, **Rem**, and **Exam**. The first five share a common counter which is relative to the current section, the last two are unnumbered.

```
\newtheorem{plain}{Thm}{Theorem}[section]
\newtheorem{plain}{Prop}[Thm]{Proposition}
\newtheorem{plain}{Lem}[Thm]{Lemma}
\newtheorem{plain}{Cor}[Thm]{Corollary}
\newtheorem{definition}{Def}[Thm]{Definition}
\newtheorem*{remark}{Rem}{Remark}
\newtheorem*{remark}{Exam}{Example}
```

2 Implementation

```
1 \*package>
2 \ProvidesExplPackage
3   {\filename}{\filedate}{\fileversion}{\filedescription}
4 \RequirePackage{xparse}
5 \RequirePackage{template}

6 \DeclareTemplateType{theoremstyle}{3}
7
8 \skip_new:N \TS_pre_skip
9 \skip_new:N \TS_post_skip
10 \dim_new:N \TS_head_indent_dim
11 \skip_new:N \TS_head_sep_skip
12
13 \DeclareTemplate{theoremstyle}{std}{3}
14 {
15   pre-skip    =l  [\DelayEvaluation{\topsep}]    \TS_pre_skip,
16   post-skip   =l  [\DelayEvaluation{\topsep}]    \TS_post_skip,
17   body-style  =f0 [\itshape]                    \TS_body_style_tlp,
18   head-style  =f0 [\bfseries]                    \TS_head_style_tlp,
19   note-style  =f0 [\fontseries\mddefault\upshape] \TS_note_style_tlp,
20   head-punct  =f0 [.]                            \TS_head_punct_tlp,
21   head-format =f3 [\IfNoValueF{#1}{#1\IfNoValueF{#2}{\space}}]
```

```

22          \IfNoValueF{#2}{\textup{#2}}
23          \IfNoValueF{#3}{\space\TS_note_style_tlp(#3)}}]
24          \TS_head_format:nnn,
25 head-indent      =1 [0pt]          \TS_head_indent_dim,
26 head-sep         =1 [5pt plus 1pt minus 1pt] \TS_head_sep_skip,
27 post-head-action =f0 []          \TS_post_head_action_tlp
28 }
29 {
30   \DoParameterAssignments
31   \if_mode_horizontal:
32     \prg_whiledo:nT{
33       \int_compare:nNnT \etex_lastnodetype:D = \c_eleven
34       }{\tex_unskip:D}
35     \par
36   \fi:
37   \normalfont
38   \trivlist
39   \let:NN\thmheadnl\scan_stop:
40   \@topsep\TS_pre_skip
41   \@topsepadd\TS_post_skip
42   \IfNoValueF{#1}
43     {\refstepcounter{#1}}
44   \deferred@thm@head{
45     \TS_head_style_tlp
46     \skip_horizontal:N \TS_head_indent_dim
47     \IfNoValueTF{#1}
48       {\TS_head_format:nnn{#2}{#1}{#3}}
49       {\TS_head_format:nnn{#2}{\cs_use:c{the#1}}{#3}}
50     \TS_head_punct_tlp
51     \TS_post_head_action_tlp
52     \skip_horizontal:N\TS_head_sep_skip
53   }
54   \TS_body_style_tlp
55   \ignorespaces
56 }

```

These functions are used by the template above. They are copied straight away from amsclass.dtx.

```

57 \let:NN\adjust@parskip@nobreak \@nbitem
58 \toks_new:N\dth@everypar
59 \toks_set:Nn \dth@everypar{
60   \@minipagefalse
61   \global\@newlistfalse
62   \if@inlabel
63     \global\@inlabelfalse
64     \begingroup
65       \setbox\z@\lastbox
66       \ifvoid\z@ \kern-\itemindent \fi
67     \endgroup
68     \unhbox\@labels

```

```

69 \fi
70 \if@nobreak
71   \@nobreakfalse
72   \clubpenalty\@M
73 \else
74   \clubpenalty\@clubpenalty
75   \everypar{}
76 \fi
77 }

78 \def\deferred@thm@head#1{%
79 \if@inlabel \indent \par \fi % eject a section head if one is pending
80 \if@nobreak
81   \adjust@parskip@nobreak
82 \else
83   \addpenalty\@beginparpenalty
84   \addvspace\@topsep
85   \addvspace{-\parskip}%
86 \fi
87 \global\@inlabeltrue
88 \everypar\dth@everypar
89 \sbox\@labels{\normalfont#1}%
90 \ignorespaces
91 }

```

The usual styles ‘plain’, ‘definition’, and ‘remark’.

```

92 \DeclareInstance{theoremstyle}{plain}{std}{}
93
94 \DeclareInstance{theoremstyle}{definition}{std}
95 {
96   body-style = \normalfont
97 }
98
99 \DeclareInstance{theoremstyle}{remark}{std}
100 {
101   pre-skip    = \DelayEvaluation{0.5\topsep},
102   post-skip   = \DelayEvaluation{0.5\topsep},
103   body-style  = \normalfont,
104   head-style  = \itshape
105 }

```

The command to end a theorem.

```

106 \def:Npn\@endtheorem{\endtrivlist\@endpefalse }
      newtheorem just checks all cases and defines the appropriate environment.
107 \DeclareDocumentCommand{\newtheorem}{\smmomo}
108 {
109   \exp_args:Nc\@ifdefinable{#3}
110   {
111     \IfBooleanTF{#1}
112     {
113       \DeclareDocumentEnvironment{#3}{o}

```

```

114         {\UseInstance{theoremstyle}{#2}{\NoValue}{#5}{##1}}
115         {\@endtheorem}
116     }
117     {
118         \IfNoValueTF{#4}
119         {
120             \IfNoValueTF{#6}
121             {
122                 \newcounter{#3}
123             }
124             {
125                 \newcounter{#3}[#6]
126                 \gdef:cpx{the#3}{\exp_not:c{the#6}
127                     \@thmcountersep\@thmcounter{#3}}
128             }
129             \DeclareDocumentEnvironment{#3}{o}
130             {\UseInstance{theoremstyle}{#2}{#3}{#5}{##1}}
131             {\@endtheorem}
132         }
133         {
134             \cs_if_free:cTF{c@#4}
135             {
136                 \@nocounterr{#4}
137             }
138             {
139                 \gdef:cpx{the#3}{\exp_not:c{the#4}}
140                 \DeclareDocumentEnvironment{#3}{o}
141                 {\UseInstance{theoremstyle}{#2}{#4}{#5}{##1}}
142                 {\@endtheorem}
143             }
144         }
145     }
146 }
147 }
148 \endinput
149 </package>

```