

The latex-lab-amsmath code*

L^AT_EX Project

August 15, 2024

Abstract

Contents

1	Introduction	1
2	The Implementation	1
	2.1 File declaration	1
	2.2 Tagpdf support	1
	2.3 <code>\intertext</code>	2
	2.4 <code>\text</code>	2
	2.5 <code>\pmb</code>	3
	Index	4

1 Introduction

This file implements adaptations to the `amsmath` package needed for the tagging project.

2 The Implementation

```
1 <@@=math>
2 < *kernel>
```

2.1 File declaration

```
3 \ProvidesFile{latex-lab-amsmath.ltx}
4 [2024-07-05 v0.1b amsmath adaptations]
```

2.2 Tagpdf support

To make the code independent from tagging being loaded and active we load the `tagpdf-base` package:

```
5 \RequirePackage{tagpdf-base}
6 \ExplSyntaxOn
```

*

2.3 `\intertext`

The `\intertext` command errors with active tagging as it is processed twice which leads to duplicated structures.

```
7 \AddToHook{package/amsmath/after}
8 {
9   \def\intertext@{%
10    \def\intertext##1{%
11      \ifvmode\else\\@empty\fi
12      \noalign{%
```

we have to flip the sign and use a negative `\belowdisplayskip` as we flipped the sign at the outside.

```
13      \penalty\postdisplaypenalty\vskip-\belowdisplayskip
14      \vbox{
```

Stop tagging when measuring:

```
15      \ifmeasuring@\tag_stop:\fi
16      \normalbaselines
17      \ifdim\linewidth=\columnwidth
18      \else \parshape\@ne \@totalleftmargin \linewidth
19      \fi
```

End the previous mc:

```
20      \tag_mc_end_push:
```

We are already in a par so we change now to text:

```
21      \tagpdfsetup{para/tag=P}%
```

TODO why `\tagpdfpara0n` needed?

```
22      \tagpdfpara0n
23      \noindent\ignorespaces##1\par
```

Restart the MC

```
24      \tag_mc_begin_pop:n{}}%
25      \penalty\predisplaypenalty\vskip\abovedisplayskip%
26    }%
27  }}
28 }
```

2.4 `\text`

The `\text` command uses `\mathchoice` which “typesets” the argument four times. This makes it quite problematic for tagging. Without precautions structure objects would be created four times and would get MC-chunks as kids that doesn’t really exist. `amsmath` contains a switch that allows to execute code only in the first (`displaymath`) branch, but that isn’t usable here. At first because we don’t know if the first branch creates the same structure as the one that is actually used. At second because the engines executes some commands like `\label` and `\pdfannot` only at shipout from the branch that really was used. So we would get structure data from one `\mathchoice`-branch and MC-labels and links from another one and that gets very messy.

We therefore have to avoid that tagging is active in unused branches. In `pdflatex` it is not possible to detect the `mathstyle` before, so we use a label. With `lualatex` is possible to redefine `\text` not to use `\mathchoice`

```
29 \AddToHook{package/amstext/after}
```

```
30 {
```

currently amsmath is loaded in a begindocument hook, so this test is fine. If amstext is loaded earlier (in the kernel), this needs perhaps a change.

```
31 \tag_if_active:T
32 {
33   \sys_if_engine_luatex:TF
34   {
35     \def\text@#1{%
36       \ifcase\mathstyle
37       \hbox{#{#1}}\or
38       \hbox{#{#1}}\or
39       \hbox{#{#1}}\or
40       \hbox{#{#1}}\or
41       \hbox{{\let\f@size\sf@size\selectfont#1}}\or
42       \hbox{{\let\f@size\sf@size\selectfont#1}}\or
43       \hbox{{\let\f@size\ssf@size\selectfont#1}}\or
44       \hbox{{\let\f@size\ssf@size\selectfont#1}}\or
45       \ERROR
46       \fi
47       \check@mathfonts
48     }}
49   }
50   {
51     \def\text@#1
52     {{
53       \int_gincr:N\g__math_mathchoice_int
54       \tag_stop:
55       \mathchoice
56       {
57         \__math_tag_if_mathstyle:en{mathchoice-\int_use:N\g__math_mathchoice_int}{0}
58         \textdef@\displaystyle\f@size{#1}
59       }
60       {
61         \__math_tag_if_mathstyle:en{mathchoice-\int_use:N\g__math_mathchoice_int}{2}
62         \textdef@\textstyle\f@size{\firstchoice@false #1}
63       }
64       {
65         \__math_tag_if_mathstyle:en{mathchoice-\int_use:N\g__math_mathchoice_int}{4}
66         \textdef@\textstyle\sf@size{\firstchoice@false #1}
67       }
68       {
69         \__math_tag_if_mathstyle:en{mathchoice-\int_use:N\g__math_mathchoice_int}{6}
70         \textdef@\textstyle \ssf@size{\firstchoice@false #1}
71       }
72       \check@mathfonts
73     }}
74   }
75 }
76 }
```

2.5 \pmb

\pmb prints its argument three times. For tagging we must mark two of occurrences

as artifact. For luatex the attributes in the box must be reset, for this we switch to expl3-boxes.

```

77 \AddToHook{package/amsbsy/after}
78 {
79   \def\pmb@@#1#2#3{\leavevmode\hbox_set:Nn\l__math_tmpa_box{xxx#3}
80     \dimen@-\box_wd:N\l__math_tmpa_box
81     \kern-.5\ex@ \box_use:N\l__math_tmpa_box
82     \tag_mc_end:\tag_mc_begin:n{artifact}
83     \tag_mc_reset_box:N\l__math_tmpa_box
84     \kern\dimen@\kern.25\ex@\raise.4\ex@\box_use:N\l__math_tmpa_box
85     \kern\dimen@\kern.25\ex@\box_use_drop:N\l__math_tmpa_box
86     \tag_mc_end:\tag_mc_begin:n{}}
87   }
88   \def\pmb@#1#2{\hbox_set:Nn\l__math_tmpa_box{\$m@th#1{#2}$}
89     \setboxz@h{\$m@th#1\mkern.5mu$}\pmbraise@\wdz@
90     \binrel@{#2}
91     \dimen@-\box_wd:N\l__math_tmpa_box
92     \binrel@{
93       \mkern-.8mu\box_use:N\l__math_tmpa_box
94       \tag_mc_end:\tag_mc_begin:n{artifact}
95       \tag_mc_reset_box:N\l__math_tmpa_box
96       \kern\dimen@\mkern.4mu\raise\pmbraise@\box_use:N\l__math_tmpa_box
97       \kern\dimen@\mkern.4mu\box_use_drop:N\l__math_tmpa_box
98       \tag_mc_end:\tag_mc_begin:n{}}
99     }
100  }
101 }
102 \ExplSyntaxOff
103 </kernel>

```

Index

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.

Symbols	C
<code>\</code> 11	<code>\columnwidth</code> 17
A	D
<code>\abovedisplayskip</code> 25	<code>\def</code> 9, 10, 35, 51, 79, 88
<code>\AddToHook</code> 7, 29, 77	<code>\displaystyle</code> 58
B	E
<code>\belowdisplayskip</code> 2, 13	<code>\else</code> 11, 18
box commands:	<code>\ERROR</code> 45
<code>\box_use:N</code> 81, 84, 93, 96	<code>\ExplSyntaxOff</code> 102
<code>\box_use_drop:N</code> 85, 97	<code>\ExplSyntaxOn</code> 6
<code>\box_wd:N</code> 80, 91	
box internal commands:	F
<code>\l__math_tmpa_box</code> 79,	<code>\fi</code> 11, 15, 19, 46
80, 81, 83, 84, 85, 88, 91, 93, 95, 96, 97	

H		<code>\ProvidesFile</code> 3
<code>\hbox</code> 37, 38, 39, 40, 41, 42, 43, 44		
hbox commands:		R
<code>\hbox_set:Nn</code> 79, 88		<code>\raise</code> 84, 96
I		<code>\RequirePackage</code> 5
<code>\ifcase</code> 36		S
<code>\ifdim</code> 17		<code>\selectfont</code> 41, 42, 43, 44
<code>\ifvmode</code> 11		sys commands:
<code>\ignorespaces</code> 23		<code>\sys_if_engine_luatex:TF</code> 33
int commands:		T
<code>\int_gincr:N</code> 53		tag commands:
<code>\int_use:N</code> 57, 61, 65, 69		<code>\tag_if_active:TF</code> 31
int internal commands:		<code>\tag_mc_begin:n</code> 82, 86, 94, 98
<code>\g_math_mathchoice_int</code>		<code>\tag_mc_begin_pop:n</code> 24
. 53, 57, 61, 65, 69		<code>\tag_mc_end:</code> 82, 86, 94, 98
<code>\intertext</code> 2, 10		<code>\tag_mc_end_push:</code> 20
K		<code>\tag_mc_reset_box:N</code> 83, 95
<code>\kern</code> 81, 84, 85, 96, 97		<code>\tag_stop:</code> 15, 54
L		<code>\tagpdfparaOn</code> 2, 22
<code>\label</code> 2		<code>\tagpdfsetup</code> 21
<code>\leavevmode</code> 79		\TeX and $\LaTeX 2_{\epsilon}$ commands:
<code>\let</code> 41, 42, 43, 44		<code>\@empty</code> 11
<code>\linewidth</code> 17, 18		<code>\@one</code> 18
M		<code>\@totalleftmargin</code> 18
math internal commands:		<code>\binrel@</code> 90
<code>_math_tag_if_mathstyle:nn</code>		<code>\binrel@@</code> 92
. 57, 61, 65, 69		<code>\check@mathfonts</code> 47, 72
<code>\mathchoice</code> 2, 55		<code>\dimen@</code> 80, 84, 85, 91, 96, 97
<code>\mathstyle</code> 36		<code>\ex@</code> 81, 84, 85
<code>\mkern</code> 89, 93, 96, 97		<code>\f@size</code> 41, 42, 43, 44, 58, 62
N		<code>\firstchoice@false</code> 62, 66, 70
<code>\noalign</code> 12		<code>\ifmeasuring@</code> 15
<code>\noindent</code> 23		<code>\intertext@</code> 9
<code>\normalbaselines</code> 16		<code>\m@th</code> 88, 89
O		<code>\pmb@</code> 88
<code>\or</code> 37, 38, 39, 40, 41, 42, 43, 44		<code>\pmb@@</code> 79
P		<code>\pmbraise@</code> 89, 96
<code>\par</code> 23		<code>\setboxz@h</code> 89
<code>\parshape</code> 18		<code>\sf@size</code> 41, 42, 66
<code>\pdfannot</code> 2		<code>\ssf@size</code> 43, 44, 70
<code>\penalty</code> 13, 25		<code>\text@</code> 35, 51
<code>\pmb</code> 3		<code>\textdef@</code> 58, 62, 66, 70
<code>\postdisplaypenalty</code> 13		<code>\wdz@</code> 89
<code>\predisplaypenalty</code> 25		<code>\text</code> 2
		<code>\textstyle</code> 62, 66, 70
		V
		<code>\vbox</code> 14
		<code>\vskip</code> 13, 25