The `latex-lab-amsmath` code*

LaTeX Project

June 1, 2024

Abstract

Contents

1 Introduction **1**

2 The Implementation **1**
2.1 File declaration 1
2.2 Tagpdf support 1
2.3 `\intertext` 2
2.4 `\text` 2
2.5 `\pmb` 3

Index **4**

1 Introduction

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

2 The Implementation

```
⟨@@=math⟩
⟨*kernel⟩
```

2.1 File declaration

```
\ProvidesFile{latex-lab-amsmath.ltx}
         [2024-02-12 v0.1b amsmath adaptions]
```

2.2 Tagpdf support

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

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

*

2.3 \intertext

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

```
\AddToHook{package/amsmath/after}
 {
    \def\intertext@{%
      \def\intertext##1{%
        \ifvmode\else\\\@empty\fi
        \noalign{%
```

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

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

Stop tagging when measuring:

```
           \ifmeasuring@\tag_stop:\fi
           \normalbaselines
            \ifdim\linewidth=\columnwidth
            \else \parshape\@ne \@totalleftmargin \linewidth
            \fi
```

End the previous mc:

```
            \tag_mc_end_push:
```

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

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

TODO why \tagpdfparaOn needed?

```
            \tagpdfparaOn
            \noindent\ignorespaces##1\par
```

Restart the MC

```
            \tag_mc_begin_pop:n{}}%
          \penalty\predisplaypenalty\vskip\abovedisplayskip%
        }%
    }}
 }
```

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 is possible to redefine \text not to use \mathchoice

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

```
{
```

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.

```
  \tag_if_active:T
   {
     \sys_if_engine_luatex:TF
      {
        \def\text@#1{{%
          \ifcase\mathstyle
          \hbox{{#1}}\or
          \hbox{{#1}}\or
          \hbox{{#1}}\or
          \hbox{{#1}}\or
          \hbox{{\let\f@size\sf@size\selectfont#1}}\or
          \hbox{{\let\f@size\sf@size\selectfont#1}}\or
          \hbox{{\let\f@size\ssf@size\selectfont#1}}\or
          \hbox{{\let\f@size\ssf@size\selectfont#1}}\or
          \ERROR
          \fi
          \check@mathfonts
        }}
      }
      {
        \def\text@#1
         {{
          \int_gincr:N\g__math_mathchoice_int
          \tag_stop:
          \mathchoice
           {
            \__math_tag_if_mathstyle:en{mathchoice-\int_use:N\g__math_mathchoice_int}{0}
            \textdef@\displaystyle\f@size{#1}
           }
           {
            \__math_tag_if_mathstyle:en{mathchoice-\int_use:N\g__math_mathchoice_int}{2}
            \textdef@\textstyle\f@size{\firstchoice@false #1}
           }
           {
            \__math_tag_if_mathstyle:en{mathchoice-\int_use:N\g__math_mathchoice_int}{4}
            \textdef@\textstyle\sf@size{\firstchoice@false #1}
           }
           {
             \__math_tag_if_mathstyle:en{mathchoice-\int_use:N\g__math_mathchoice_int}{6}
             \textdef@\textstyle \ssf@size{\firstchoice@false #1}
           }
           \check@mathfonts
         }}
      }
   }
}
```

2.5 \pmb

\pmb prints is argument three times. For tagging we must mark two of occurences as

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

```
\AddToHook{package/amsbsy/after}
 {
   \def\pmb@@#1#2#3{\leavevmode\hbox_set:Nn\l__math_tmpa_box{xxx#3}
      \dimen@-\box_wd:N\l__math_tmpa_box
      \kern-.5\ex@\box_use:N\l__math_tmpa_box
      \tag_mc_end:\tag_mc_begin:n{artifact}
      \tag_mc_reset_box:N\l__math_tmpa_box
      \kern\dimen@\kern.25\ex@\raise.4\ex@\box_use:N\l__math_tmpa_box
      \kern\dimen@\kern.25\ex@\box_use_drop:N\l__math_tmpa_box
      \tag_mc_end:\tag_mc_begin:n{}
    }
   \def\pmb@#1#2{\hbox_set:Nn\l__math_tmpa_box{$\m@th#1{#2}$}
     \setboxz@h{$\m@th#1\mkern.5mu$}\pmbraise@\wdz@
     \binrel@{#2}
     \dimen@-\box_wd:N\l__math_tmpa_box
     \binrel@@{
       \mkern-.8mu\box_use:N\l__math_tmpa_box
       \tag_mc_end:\tag_mc_begin:n{artifact}
       \tag_mc_reset_box:N\l__math_tmpa_box
       \kern\dimen@\mkern.4mu\raise\pmbraise@\box_use:N\l__math_tmpa_box
       \kern\dimen@\mkern.4mu\box_use_drop:N\l__math_tmpa_box
       \tag_mc_end:\tag_mc_begin:n{}
       }
    }
 }
\ExplSyntaxOff
⟨/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

\\ 11

A

\abovedisplayskip 25
\AddToHook 7, 29, 77

B

\belowdisplayskip *2*, 13
box commands:
  \box_use:N 81, 84, 93, 96
  \box_use_drop:N 85, 97
  \box_wd:N 80, 91
box internal commands:
  \l__math_tmpa_box 79, 80, 81, 83, 84, 85, 88, 91, 93, 95, 96, 97

C

\columnwidth 17

D

\def 9, 10, 35, 51, 79, 88
\displaystyle 58

E

\else 11, 18
\ERROR 45
\ExplSyntaxOff 102
\ExplSyntaxOn 6

F

\fi 11, 15, 19, 46

H

\hbox 37, 38, 39, 40, 41, 42, 43, 44
hbox commands:
\hbox_set:Nn 79, 88

I

\ifcase 36
\ifdim 17
\ifvmode 11
\ignorespaces 23
int commands:
\int_gincr:N 53
\int_use:N 57, 61, 65, 69
int internal commands:
\g__math_mathchoice_int 53, 57, 61, 65, 69
\intertext *2*, 10

K

\kern 81, 84, 85, 96, 97

L

\label *2*
\leavevmode 79
\let 41, 42, 43, 44
\linewidth 17, 18

M

math internal commands:
__math_tag_if_mathstyle:nn 57, 61, 65, 69
\mathchoice *2*, 55
\mathstyle 36
\mkern 89, 93, 96, 97

N

\noalign 12
\noindent 23
\normalbaselines 16

O

\or 37, 38, 39, 40, 41, 42, 43, 44

P

\par 23
\parshape 18
\pdfannot *2*
\penalty 13, 25
\pmb *3*
\postdisplaypenalty 13
\predisplaypenalty 25
\ProvidesFile 3

R

\raise 84, 96
\RequirePackage 5

S

\selectfont 41, 42, 43, 44
sys commands:
\sys_if_engine_luatex:TF 33

T

tag commands:
\tag_if_active:TF 31
\tag_mc_begin:n 82, 86, 94, 98
\tag_mc_begin_pop:n 24
\tag_mc_end: 82, 86, 94, 98
\tag_mc_end_push: 20
\tag_mc_reset_box:N 83, 95
\tag_stop: 15, 54
\tagpdfparaOn *2*, 22
\tagpdfsetup 21
TEX and LATEX 2ε commands:
\@empty 11
\@ne 18
\@totalleftmargin 18
\binrel@ 90
\binrel@@ 92
\check@mathfonts 47, 72
\dimen@ 80, 84, 85, 91, 96, 97
\ex@ 81, 84, 85
\f@size 41, 42, 43, 44, 58, 62
\firstchoice@false 62, 66, 70
\ifmeasuring@ 15
\intertext@ 9
\m@th 88, 89
\pmb@ 88
\pmb@@ 79
\pmbraise@ 89, 96
\setboxz@h 89
\sf@size 41, 42, 66
\ssf@size 43, 44, 70
\text@ 35, 51
\textdef@ 58, 62, 66, 70
\wdz@ 89
\text *2*
\textstyle 62, 66, 70

V

\vbox 14
\vskip 13, 25