

# The latex-lab-firstaid package

## Temporary patches to external packages needed for the tagging project

L<sup>A</sup>T<sub>E</sub>X Project\*

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### Abstract

## 1 Introduction

The followings contains small temporary changes to external packages to avoid errors with the new tagging code.

Similar to the main firstaid package the goal is to remove the patches once the packages have been updated.

## 2 Implementation

```
1 <*package>
2 <@@=tag>

3 \ProvidesPackage {latex-lab-testphase-firstaid} [%
4   \ltxlabfirstaiddatetime\space v\ltxlabfirstaiddatetime\space
5   Temporary patches to external packages needed for the tagging project]
```

`\FirstAidNeededT` This is a very simple help to ensure that we only apply first aid to an unmodified package or class. It only works in the case the file has already been loaded and the `cname` `\ver@#1.#2` got defined (holding the current date, version, and short description info). We then compare its content to a frozen string and make the modification `#3` only if both agree. If they differ we assume that the package/class in question got updated by its maintainer.

```
6 \ExplSyntaxOn
7 \providecommand\FirstAidNeededT[3]{
8   \exp_args:Ncx\str_if_eq:onF{ver@#1.#2}{#3}
9   { \typeout{==>~ First~ Aid~ for~ #1.#2~ no~ longer~ applied!^^J
10     \@spaces Expected:^^J
11     \@spaces\@spaces #3^^J
12     \@spaces but~ found:^^J
13     \@spaces\@spaces \use:c{ver@#1.#2}^^J
14     \@spaces so~ I'm~ assuming~ it~ got~ fixed.
```

---

\*Initial implementation done by Ulrike Fischer

```

15     } }
16     \exp_args:Ncx\str_if_eq:ont{ver@#1.#2}{#3}
17 }

```

(End of definition for \FirstAidNeededT.)

## 2.1 tikz/pgf

tikz inputs libraries with the primitive `\input` command. This means that these libraries are not listed in the file list written by `\listfiles` and the new tagging status report created with the `check-tagging-status` key.

We therefore redefine one `pgf` command to use the  $\text{\LaTeX}$  `\input` command. Check <https://github.com/pgf-tikz/pgf/issues/1424> for changes.

```

18 \AddToHook{package/pgfrcs/after}
19 { \def\pgfutil@InputIfFileExists#1#2#3{\pgfutil@IfFileExists{#1}{\input{#1}\relax#2}{#3}} }

```

## 2.2 ams classes

The `amsart`, `amsbook` and `amsproc` classes do not use `\@author` to store the author list but a command `\authors`. To be able to nevertheless use the authors in the xmp-metadata we map `\@author` to this new command.

```

20 \AddToHook{class/amsart/after}
21 { \def\@author{\authors} }
22 \AddToHook{class/amsbook/after}
23 { \def\@author{\authors} }
24 \AddToHook{class/amsproc/after}
25 { \def\@author{\authors} }

```

## 2.3 ams classes and amsthm

The `amsart`, `amsbook` and `amsproc` classes redefine the theorem code and this breaks the tagging added by the block code. The following reenables tagging. It does *not* give a completely identical output (similar to the new theorem code, see <https://github.com/latex3/tagging-project/issues/715>). The code also does not try to use sockets yet, as the theorem definitions in the block code don't do that yet either.

```

26 \AddToHook{class/amsart/after}[latex-lab-testphase-firstaid/amsthm]
27 { \__tag_firstaid_amsthm:\__tag_firstaid_ams_abstract: }
28 \AddToHook{class/amsbook/after}[latex-lab-testphase-firstaid/amsthm]
29 { \__tag_firstaid_amsthm:\__tag_firstaid_ams_abstract: }
30 \AddToHook{class/amsproc/after}[latex-lab-testphase-firstaid/amsthm]
31 { \__tag_firstaid_amsthm: }
32 \AddToHook{package/amsthm/after}[latex-lab-testphase-firstaid/amsthm]
33 { \__tag_firstaid_amsthm: }

34 \cs_new_protected:Npn \__tag_firstaid_ams_abstract:
35 {
36 \renewenvironment{abstract}{%
37 \ifx\maketitle\relax
38 \ClassWarning{\@classname}{Abstract~ should~ precede~
39 \protect\maketitle\space in~ AMS~ document~ classes;~ reported}%

```

```

40 \fi
41 \global\setbox\abstractbox=\vtop \bgroup
42 \normalfont\Small
43 \list{}{\labelwidth\z@
44 \leftmargin3pc \rightmargin\leftmargin
45 \listparindent\normalparindent \itemindent\z@
46 \parsep\z@ \@plus\p@
47 \let\fullwidthdisplay\relax
48 }%
49 \item[\hskip\labelsep\scshape\abstractname.]%
50 }{%
51 \endlist
52 \par % <--- added
53 \egroup
54 \ifx\@setabstract\relax \setabstracta \fi
55 }
56 }

57 \cs_new_protected:Npn \__tag_firstaid_amsthm:
58 {

\@endtheorem must use the endblock code

59 \def\@endtheorem{\endblockenv}

In \@thm we have to remove the \trivlist

60 \RenewDocumentCommand\@thm{mmmO{}}{%
61 \ifhmode\unskip\unskip\par\fi
62 \normalfont
63 \let\thmheadnl\relax
64 \let\thm@swap\@gobble
65 \thm@notefont{\fontseries\mddefault\upshape}%
66 \thm@headpunct{.}% add period after heading
67 \thm@headsep 5\p@ plus\p@ minus\p@\relax
68 \thm@space@setup
69 ##1% style overrides
70 \@topsep \thm@preskip % used by thm head
71 \@topsepadd \thm@postskip % used by \@endparenv

We store the counter name so that the anchor can make use of it.

72 \tl_set:Nn \l__block_thm_current_counter_tl{##2}
73 \tl_if_empty:nTF{##2}
74 {
75 \begintheorem{##3}{}[##4]
76 }
77 {
78 \kernel@refstepcounter{##2}
79 \begintheorem{##3}{\csname the##2\endcsname}[##4]
80 }
81 }

\@begintheorem has a larger number of changes

82 \def\@begintheorem##1##2[##3]{%

```

We use the theorem instance.

```
83 \UseInstance{blockenv}{theorem}{begin-vspace=\thm@preskip}
```

There is no working key to set the endskip, so we set the skip directly similar to what amsthm is doing after the `\trivlist`.

```
84 \skip_set:Nn\l_block_topsepadd_skip { \thm@postskip }
```

While create the caption/label we disable para-tagging.

```
85 \tag_socket_use:n {para/off}
86 \group_begin:
87 \normalfont
88 \the\thm@headfont \thm@indent
```

The anchor for links. It must be inserted when we have started hmode (which happens with `\thm@indent`). `amsthm` allows for unnumbered theorems so we have to test for an empty counter.

```
89 \tl_if_empty:NTF \l_block_thm_current_counter_tl
90   {\MakeLinkTarget[theorem]{} }
91   {\MakeLinkTarget{\l_block_thm_current_counter_tl} }
92 \ifempty{##1}
93   {\let\thmname\@gobble}
```

we insert the MC and the Lbl structure into `\thmname`, `\thmnumber` and `\thmnote`. This will also work with new theorem style as long as they use these command.

```
94   {\def\thmname####1{\tag_socket_use:nnn {mc}{-}{####1}}}%
95 \ifempty{##2}
96   {\let\thmnumber\@gobble}
97   {\def\thmnumber####1
98     {\tag_socket_use:nnn{struct-mc}{tag=Lbl}{####1}}
99   }%
100 \ifempty{##3}
101   {\let\thmnote\@gobble}
102   {\def\thmnote####1{\tag_socket_use:nnn {mc}{-}{####1}}}%
103 \tag_socket_use:nnn{block/theorem/caption}{-}
104 {
105   \thm@swap\swappedhead\thmhead{##1}{##2}{##3}%
106   \tag_socket_use:nnn {mc}{-}{\the\thm@headpunct}
107 }
108 \thmheadnl % possibly a newline.
109 \group_end:
```

Now we restart para tagging and start a paragraph.

```
110 \tag_socket_use:n {para/on}
111 \tag_socket_use:n {para/begin}
112 \hskip\thm@headsep
113 \ignorespaces}
```

This redefines the standard styles for the theorem heads. `\thm@headpunct` has been moved into the head code to make tagging more easier.

```

114 \def\thmhead@plain##1##2##3{%
115   \thmname{##1}
116   \thmnumber{
117     \@ifnotempty{##1}{~}\@upn{##2}
118   }%
119   \thmnote{\pdfspacespace\space{\the\thm@notefont(##3)}}
120 }
121 \let\thmhead\thmhead@plain
122 \def\swappedhead##1##2##3{%
123   \thmnumber{##2}
124   \thmname{\@ifnotempty{##2}{\nobreakspace}##1}
125   \thmnote{\pdfspacespace\space{\the\thm@notefont(##3)}}
126 }
127 \let\swappedhead@plain=\swappedhead

```

At last some adjustments for the proof environment. The qed symbols use a drawn box by default. We add an actualtext.

```

128 \renewcommand{\openbox}{\leavevmode
129   \hbox to.77778em{\pdf_bdc:nn{Span}{/ActualText<FEFF220E>}}%
130   \pdfspacespace\hfil\vrule
131   \vbox to.675em{\hrule width.6em\vfil\hrule}%
132   \vrule\hfil\pdf_emc:}}

```

And redefine proof to no longer use a trivlist.

```

133 \renewenvironment{proof}[1][\proofname]{\par
134   \pushQED{\qed}%
135   \UseInstance{blockenv}{theorem}{begin-vspace=6\p@\@plus6\p@}
136   \normalfont

137   \tag_socket_use:n {para/off}
138   \AddToHookNext{para/begin}
139   {
140     \tag_socket_use:nnn{block/theorem/caption}{\}
141     {
142       \tag_socket_use:nnn {mc}{\}
143       {\textit{##1}\@addpunct{.}}
144     }

```

If tagging is not active, we avoid reenabling paratagging as this leads to warnings.

```

145   \tag_socket_use:n {para/on}
146   \tag_socket_use:n {para/begin}
147   \pdfspacespace\hspace{\labelsep}}
148   \ignorespaces
149 }{%
150   \popQED\endblockenv\par
151 }
152 }
153 \ExplSyntaxOff

```

## 2.4 verse

The `verse` package has its own definition of the `verse` environment, which would tag correctly, except that it is overwritten by the block code in the hook `begindocument/before`. So the simplest way to make tagging work is to reinstall the package version afterwards, which is what we are doing here.

```

154 \AddToHook{package/verse/after}[latex-lab-firstaid]{%
155   \FirstAidNeededT{verse}{sty}{2014/05/10 v2.4b verse typesetting}%
156   {%
157     \AtBeginDocument{%
158       \renewenvironment{verse}[1][\linewidth]{%
159         \stepcounter{verse@envctr}%
160         \setcounter{poemline}{0}\refstepcounter{poemline}%
161         \setcounter{vslineno}{1}%
162         \let\=\@vscentercr
163         \list{}{\itemsep \z@
164           \itemindent -\vindent
165           \listparindent\itemindent
166           \parsep \stanzaskip
167           \ifdim #1 < \linewidth
168             \rightmargin \z@
169             \setlength{\leftmargin}{\linewidth}%
170             \addtolength{\leftmargin}{-#1}%
171             \addtolength{\leftmargin}{-0.5\leftmargin}%
172           \else
173             \rightmargin \leftmargin
174             \fi
175             \addtolength{\leftmargin}{\vindent}}}%
176         \item[]%
177       }%
178       {\endlist}%
179     }%
180   }%
181 }

```

Of course, this means that the optional argument of the environment then only accepts a length value and not any more a key value list for altering the environment settings.

A more elaborate version could be something like this that allows key/val and legacy interface. Or one could extend the list template to support a `list-width` key.

```

\ExplSyntaxOn
\cs_new_protected:Npn \ExtractAndDropKey #1#2#3#4#5 {
  \tl_set_eq:NN #4 \c_novalue_tl % or empty?
  \keys_define:nn { #1 } { #2 .code:n = \tl_set:Nn #4{##1} }
  \keys_set_known:nn { #1 } { #3 } #5
}
\ExplSyntaxOff

```

```

% Change the env definition for verse matching verse.sty
% This keeps the verse.sty interface as it is and only adjusts the
% main environment to use the basic list env with the verse.sty
% specific settings.
\makeatletter

```

```

\AddToHook{package/verse/after}{%
  \AtBeginDocument{%
    \RenewDocumentEnvironment{verse}{={verse-width}!0{\linewidth}}{%
      {%
        \stepcounter{verse@envctr}%
        \setcounter{poemline}{0}\refstepcounter{poemline}%
        \setcounter{vslineno}{1}%
        \let\=\@vscentercr
      }%
    }%
    \ExtractAndDropKey{verse}{verse-width}{#1}\@vswidth\@vsremainingkvlist
    % If other keys have been specified but not verse-width we have no
    % default for \@vswidth and need to set it again
    \ExpandArgs{o}\IfNoValueT \@vswidth
      {\def\@vswidth{\linewidth}}}%
  }%
  % This is a bit ugly but we can't stick \cs{@vsremainingkvlist} into
  % the instance argument as keys are expected to be visible on
  % top-level not hidden inside a macro. The alternative is to push
  % in \verb=#1= but then the key/value \verb/verse-width=.../ is
  % passed into the instance which is not known there (not harmful as
  % it will get ignored but noticeably more and unnecessary
  % processing).
  %
  \def\next##1{%
    \UseInstance{blockenv}{list}%
    {%
      item-indent = -\vindent,%
      para-indent = -\vindent,%
      para-vspace = \stanzaskip,%
      item-skip = Opt,%
      left-margin = (\linewidth-\@vswidth)/2+\vindent,%
      right-margin = \ifdim\@vswidth<\linewidth Opt
        \else (\linewidth-\@vswidth)/2\fi,%
      ##1%
    }%
    \ExpandArgs{o}\next\@vsremainingkvlist
    \item\relax
  }\endblockenv}%
}%
\makeatother

```

## 2.5 cleveref

The cleveref package redefines `\makefnrtxt` and this means that the patches in the new footnote code fails. We use a hook instead.

```

182 \AddToHook{package/cleveref/after}
183 {

```

```

184 \let\@makefntext\cref@old@makefntext
185 \AddToHook{cmd/@makefntext/before}{%
186 \cref@constructprefix{footnote}{\cref@result}%
187 \protected@edef\cref@currentlabel{%
188 [footnote] [\arabic{footnote}] [\cref@result]%
189 \p@footnote\@thefnmark}}
190 }

```

## 2.6 booktabs

In some cases booktabs inserts a `\multispan` into the table (through the commands `\@cmidruleb` and `\@cmidrulea` and this then errors with the tagging code. This affects both tabular and longtable (but longtable more as booktabs handles lines in longtable differently). See also issue <https://github.com/latex3/tagging-project/issues/69>

```

191 \ExplSyntaxOn
192 \AddToHook{package/booktabs/after}
193 {
194 \def\@cmidrulea{
195 \multispan\@cmidla
196 &\multispan\@cmidlb
197 \unskip\hskip\cmrkern@l
198 {
199 \tag_mc_begin:n{artifact}
200 \CT@arc@\leaders\hrule \@height\@thisrulewidth\hfill\kern\z@}
201 \hskip\cmrkern@r
202 \tag_mc_end: \int_gdecr:N \g__tbl_row_int
203 \cr}
204
205 \def\@cmidruleb{%
206 \multispan\@cmidlb
207 \unskip\hskip \cmrkern@l%
208 {
209 \tag_mc_begin:n{artifact}
210 \CT@arc@\leaders\hrule \@height\@thisrulewidth\hfill\kern\z@}
211 \hskip\cmrkern@r
212 \tag_mc_end: \int_gdecr:N \g__tbl_row_int
213 \cr}
214 }
215 \ExplSyntaxOff

```

## 2.7 fancyvrb

The firstaid adds first partial tagging support to the environments of fancyvrb (inline verbatim is untested). This supports then also packages like minted which internally uses fancyvrb and classes like l3doc (where currently the verbatim environment based on fancyvrb is overwritten by the block code). The environments are surrounded by a `verbatim` structure, every line by a `codeline` structure (this requires the block code, but firstaid should be used only with phase-III anyway). Line numbers are tagged as Lbl, inside of the `codeline` structure. The frame lines are marked as artifact.

`\FV@LeaveVMode` If we are in vmode we have to open a text-unit structure, if we are in hmode we have to set para mode to flattened before the fancyhdr code issues the `\par`. The closing of the text-unit structure is handled by the doendpe code in the block code.



```

216 \ExplSyntaxOn
217 \AddToHook{package/fancyvrb/after}
218 {
219     \def\FV@LeaveVMode{%
220         \if@noskipsec
221             \leavevmode
222         \else
223             \if\FV@ResetMargins\if@inlabel\leavevmode\fi\fi
224         \fi
225         \ifvmode
226             \@nparlisttrue
227             \__tag_gincr_para_main_begin_int:
228             \tag_struct_begin:n{tag=\l__tag_para_main_tag_tl}
229         \else
230             \bool_set_true:N\l__tag_para_flattened_bool
231             \@nparlistfalse
232             \unskip\par
233         \fi
234     }

```

*(End of definition for \FV@LeaveVMode.)*

**\FV@List** At the begin of the list code we have to tag the frame as artifact and start the `verbatim` structure

```

235 \def\FV@List#1{%
236     \begingroup
237     \FV@UseKeyValues
238     \FV@LeaveVMode
239     \if@inlabel\else\setbox\@labels=\box\voidb{x}\fi
240     \FV@ListNesting{#1}%
241     \FV@ListParameterHook
242     \FV@ListVSpace
243     \FV@SetLineWidth
244     \FV@InterLinePenalty
245     \let\FV@ProcessLine\FV@ListProcessLine@i
246     \FV@CatCodes
247     \FV@FormattingPrep
248     \FV@ObeyTabsInit
249     \cs_if_exist:NT \FV@BeginListFrame
250     {
251         \tag_mc_begin:n{artifact}
252         \FV@BeginListFrame
253         \tag_mc_end:
254     }
255     \tag_struct_begin:n{tag=verbatim}
256 }

```

*(End of definition for \FV@List.)*

**\FV@endList** At the end of the list code we close the `verbatim` structure and tag the frame as artifact.

```

257 \def\FV@endList{%
258     \FV@ListProcessLastLine

```

```

259     \tag_struct_end:
260     \cs_if_exist:NT \FV@EndListFrame
261     {
262         \tag_mc_begin:n{artifact}
263         \FV@EndListFrame
264         \tag_mc_end:
265     }
266     \@endparenv
267     \endgroup
268     \@endpetrue
269 }

```

*(End of definition for \FV@EndList.)*

**\FV@ListProcessLine** At last the tagging of the code lines. Here we have to tag also numbers and frame parts if they exist.

```

270 \def\FV@ListProcessLine#1{%
271     \hbox to \hsize{%
272         \kern\leftmargin
273         \hbox to \linewidth{%
274             \tag_struct_begin:n{tag=codeline}
275             \cs_if_exist:NT \FV@LeftListNumber
276             {
277                 \tag_struct_begin:n{tag=Lbl}
278                 \tag_mc_begin:n{}
279                 \FV@LeftListNumber
280                 \tag_mc_end:
281                 \tag_struct_end:
282             }
283             \cs_if_exist:NT \FV@LeftListFrame
284             {
285                 \tag_mc_begin:n{artifact}
286                 \FV@LeftListFrame
287                 \tag_mc_end:
288             }
289             \tag_mc_begin:n{}%
290             \FancyVerbFormatLine{#1}%
291             \tag_mc_end:
292             \tag_struct_end:\hss
293             \cs_if_exist:NT \FV@RightListFrame
294             {
295                 \tag_mc_begin:n{artifact}
296                 \FV@RightListFrame
297                 \tag_mc_end:
298             }
299             \cs_if_exist:NT \FV@RightListNumber
300             {
301                 \tag_struct_begin:n{tag=Lbl}
302                 \tag_mc_begin:n{}
303                 \FV@RightListNumber
304                 \tag_mc_begin:n{}
305                 \tag_struct_end:
306             }

```

```

307     }
308     \hss}}
309   }
310 \ExplSyntaxOff

```

## 2.8 The microtype package first aid

The microtype package fails in kernel 2025/11 if tagging is active as due to the change to `\partokencontext` para tagging is triggered and then is unbalanced in an unwanted place. We disable the tagging in this command.

```

311 \AddToHook{package/microtype/after}[firstaid]{%
312   \FirstAidNeededT{microtype}{sty}{2025/07/09 v3.2b
313     Micro-typographical refinements
314     (RS)}
315   {%
316     \def\MT@get@prot#1#2{%
317       \begingroup
318       \SuspendTagging{\MT@get@prot}%%added by firstaid
319       \setbox\MT@tempbox\vbox{%
320         \everypar{}%
321         \parfillskip=\z@skip
322         \hbadness\@M
323         \clubpenalty\z@
324         \widowpenalty\z@
325         \interlinepenalty\z@
326         \@newlistfalse
327         \MT@prot@hook
328         \begingroup
329           \MT@noindent #1\relax\MT@csq@eqgroup
330         \endgroup}%
331       \vbadness=\@M
332       \splittopskip=\z@
333       \vfuzz=\maxdimen
334       \setbox\MT@tempbox\vbox{%
335         \ifvbox\MT@tempbox
336           \global\setbox\MT@tempbox=\vsplit\MT@tempbox to \normalbaselineskip
337         \unvbox\MT@tempbox
338         \global\setbox\MT@tempbox=\lastbox
339       \fi
340     }%
341   \endgroup
342   \ifhbox\MT@tempbox
343     \@tempdima=\@nameuse{#2marginkern}\MT@tempbox\relax
344     \expandafter\ifdim\@tempdima=\z@ \else
345       \leavevmode
346       \MT@vinfo{<< adding #2 margin kern for `#1':\MessageBreak
347         \the\@tempdima \on@line}%
348       \kern\@tempdima
349     \fi
350   \fi
351 }}
352 }

```

*(End of definition for \FV@ListProcessLine.)*

```
353 </package>

354 <*latex-lab>
355 \ProvidesFile{firstaid-latex-lab-testphase.ltx}
356     [\tlabfirstaiddatetime\space v\tlabfirstaidversion\space
357     latex-lab wrapper firstaid]
358
359 \RequirePackage{latex-lab-testphase-firstaid}
360
361 </latex-lab>
```