# The latex-lab-firstaid package
# Temporary patches to external packages needed for the tagging project

LaTeX 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    \ltlabfirstaiddate\space v\ltlabfirstaiddate\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 csname `\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`*. This function is documented on page* **??***.*)

## 2.1   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.

```
18  \AddToHook{class/amsart/after}
19   {\def\@author{\authors}}
20  \AddToHook{class/amsbook/after}
21   {\def\@author{\authors}}
22  \AddToHook{class/amsproc/after}
23   {\def\@author{\authors}}
```

## 2.2   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 completly identical output (similar to the new theorem code, see [https://github.com/latex3/tagging-project/issues/715](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.

```
24  \AddToHook{class/amsart/after}[latex-lab-testphase-firstaid/amsthm]
25   {\tag_if_active:T{\__tag_firstaid_amsthm:}}
26  \AddToHook{class/amsbook/after}[latex-lab-testphase-firstaid/amsthm]
27   {\tag_if_active:T{\__tag_firstaid_amsthm:}}
28  \AddToHook{class/amsproc/after}[latex-lab-testphase-firstaid/amsthm]
29   {\tag_if_active:T{\__tag_firstaid_amsthm:}}
30  \AddToHook{package/amsthm/after}[latex-lab-testphase-firstaid/amsthm]
31   {\tag_if_active:T{\__tag_firstaid_amsthm:}}

32  \cs_new_protected:Npn \__tag_firstaid_amsthm:
33    {
```

`\@endtheorem` must use the endblock code

```
34       \def\@endtheorem{\endblockenv}
```

In `\@thm` we have to remove the `\trivlist`

```
35       \RenewDocumentCommand\@thm{mmmO{}}{%
36         \ifhmode\unskip\unskip\par\fi
37         \normalfont
38         \let\thmheadnl\relax
39         \let\thm@swap\@gobble
40         \thm@notefont{\fontseries\mddefault\upshape}%
41         \thm@headpunct{.}% add period after heading
42         \thm@headsep 5\p@ plus\p@ minus\p@\relax
43         \thm@space@setup
44         ##1% style overrides
45         \@topsep \thm@preskip              % used by thm head
46         \@topsepadd \thm@postskip          % used by \@endparenv
```

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

```
47        \tl_set:Nn \l__block_thm_current_counter_tl{##2}
48        \tl_if_empty:nTF{##2}
49         {
50          \@begintheorem{##3}{}[##4]
51         }
52         {
53           \@kernel@refstepcounter{##2}
54           \@begintheorem{##3}{\csname the##2\endcsname}[##4]
55         }
56        }
```

`\@begintheorem` has a larger number of changes

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

We use the theorem instance.

```
58        \UseInstance{blockenv}{theorem}{}
```

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

```
59        \tagpdfparaOff
60        \mode_leave_vertical:
```

The anchor for links

```
61        \MakeLinkTarget{\l__block_thm_current_counter_tl}
62        \group_begin:
63        \normalfont
64        \the\thm@headfont \thm@indent
65         \@ifempty{##1}
66          {\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.

```
67         {\def\thmname####1{\tag_mc_begin:n {}####1\tag_mc_end:}}%
68        \@ifempty{##2}
69         {\let\thmnumber\@gobble}
70         {\def\thmnumber####1
71           {\tag_struct_begin:n{tag=Lbl}\tag_mc_begin:n {}
72             ####1
73            \tag_mc_end:\tag_struct_end:}}%
74        \@ifempty{##3}
75         {\let\thmnote\@gobble}
76         {\def\thmnote####1{\tag_mc_begin:n{}####1\tag_mc_end:}}%
77        \thm@swap\swappedhead\thmhead{##1}{##2}{##3}%
78        \thmheadnl % possibly a newline.
79        \hskip\thm@headsep
80        \group_end:
```

Now we restart para tagging and start a paragraph. The socket is currently defined in tagpdf, so the code should only be used if tagging is active!

```
81        \tagpdfparaOn
82        \UseTaggingSocket{para/begin}  %
83        \ignorespaces}
```

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

```
84        \def\thmhead@plain##1##2##3{%
```

```
85    \tag_struct_begin:n{tag=Caption}
86    \thmname{##1}
87    \thmnumber{
88      \@ifnotempty{##1}{~}\@upn{##2}
89      }%
90    \thmnote{\pdffakespace\space{\the\thm@notefont(##3)}}
91    %moved for easier tagging
92    \tag_mc_begin:n{}\the\thm@headpunct\tag_mc_end:
93    \tag_struct_end:
94      }
95    \let\thmhead\thmhead@plain
96    \def\swappedhead##1##2##3{%
97      \tag_struct_begin:n{tag=Caption}
98      \thmnumber{##2}
99      \thmname{\@ifnotempty{##2}{\nobreakspace}##1}
100     \thmnote{\pdffakespace\space{\the\thm@notefont(##3)}}
101     \tag_mc_begin:n{}\the\thm@headpunct\tag_mc_end:
102     \tag_struct_end:
103      }
104    \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.

```
105    \renewcommand{\openbox}{\leavevmode
106      \hbox to.77778em{\pdf_bdc:nn{Span}{/ActualText<FEFF220E>}%
107      \pdffakespace\hfil\vrule
108      \vbox to.675em{\hrule width.6em\vfil\hrule}%
109      \vrule\hfil\pdf_emc:}}
```

And redefine proof to no longer use a trivlist.

```
110    \renewenvironment{proof}[1][\proofname]{\par
111      \pushQED{\qed}%
112      \UseInstance{blockenv}{theorem}{beginsep=6\p@\@plus6\p@}
113      \normalfont
114      \tagpdfparaOff
115      \AddToHookNext{para/begin}
116       {\tag_struct_begin:n{tag=Caption}
117        \tag_mc_begin:n{}%
118         \textit{##1\@addpunct{.}}%
119        \tag_mc_end:
120        \tag_struct_end:
121        \tagpdfparaOn
122        \UseTaggingSocket{para/begin}
123        \pdffakespace\hspace{\labelsep}}
124      \ignorespaces
125    }{%
126      \popQED\endblockenv\par
127      }
128  }
129 \ExplSyntaxOff
```

## 2.3   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.

```
130 \AddToHook{package/verse/after}[latex-lab-firstaid]{%
131   \FirstAidNeededT{verse}{sty}{2014/05/10 v2.4b verse typesetting}%
132     {%
133       \AtBeginDocument{%
134         \renewenvironment{verse}[1][\linewidth]{%
135           \stepcounter{verse@envctr}%
136           \setcounter{poemline}{0}\refstepcounter{poemline}%
137           \setcounter{vslineno}{1}%
138           \let\\=\@vscentercr
139           \list{}{\itemsep \z@
140                   \itemindent  -\vindent
141                   \listparindent\itemindent
142                   \parsep        \stanzaskip
143                   \ifdim #1 < \linewidth
144                     \rightmargin         \z@
145                     \setlength{\leftmargin}{\linewidth}%
146                     \addtolength{\leftmargin}{-#1}%
147                     \addtolength{\leftmargin}{-0.5\leftmargin}%
148                   \else
149                     \rightmargin         \leftmargin
150                   \fi
151                   \addtolength{\leftmargin}{\vindent}}%
152           \item[]%
153         }%
154         {\endlist}%
155       }%
156     }%
157 }
```

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:nnN { #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}!O{\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,%
            parindent   =-\vindent,%
            par-skip    =\stanzaskip,%
            item-skip   =0pt,%
            leftmargin  = (\linewidth-\@vswidth)/2+\vindent,%
            rightmargin = \ifdim\@vswidth<\linewidth 0pt
                          \else (\linewidth-\@vswidth)/2\fi,%
            ##1%
          }}%
      \ExpandArgs{o}\next\@vsremainingkvlist
      \item\relax
    }{\endblockenv}%
  }%
}
\makeatother
```

## 2.4 cleveref

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

```
158 \AddToHook{package/cleveref/after}
159  {
160    \let\@makefntext\cref@old@makefntext
161    \AddToHook{cmd/@makefntext/before}{%
162    \cref@constructprefix{footnote}{\cref@result}%
163    \protected@edef\cref@currentlabel{%
164      [footnote][\arabic{footnote}][\cref@result]%
```

```
165    \p@footnote\@thefnmark}}
```

The second problem is that it redefines `\refstepcounter` to use an argument. In itself this isn't a problem but as the new definition doesn't grab the arguments directly it fails over the generic hook inserted at the end of the definition

```
166    \RenewDocumentCommand\refstepcounter{om}{%
167      \IfNoValueTF{#1}%
168        {\refstepcounter@noarg{#2}}%
169        {\refstepcounter@optarg[#1]{#2}}%
170    }%
171  }
```

## 2.5  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

```
172  \ExplSyntaxOn
173  \AddToHook{package/booktabs/after}
174  {
175   \def\@cmidrulea{
176    \multispan\@cmidla
177    &\multispan\@cmidlb
178    \unskip\hskip\cmrkern@l
179   {
180    \tag_mc_begin:n{artifact}
181    \CT@arc@\leaders\hrule \@height\@thisrulewidth\hfill\kern\z@}
182    \hskip\cmrkern@r
183    \tag_mc_end: \int_gdecr:N \g__tbl_row_int
184    \cr}
185
186   \def\@cmidruleb{%
187      \multispan\@cmidlb
188      \unskip\hskip \cmrkern@l%
189    {
190     \tag_mc_begin:n{artifact}
191     \CT@arc@\leaders\hrule \@height\@thisrulewidth\hfill\kern\z@}
192     \hskip\cmrkern@r
193     \tag_mc_end: \int_gdecr:N \g__tbl_row_int
194     \cr}
195  }
196  \ExplSyntaxOff
```

## 2.6  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, currently outside 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.

```
197  \ExplSyntaxOn
198  \AddToHook{package/fancyvrb/after}
199  {
200    \def\FV@LeaveVMode{%
201      \if@noskipsec
202        \leavevmode
203      \else
204        \if@FV@ResetMargins\if@inlabel\leavevmode\fi\fi
205      \fi
206      \ifvmode
207        \@noparlisttrue
208        \__tag_gincr_para_main_begin_int:
209        \tag_struct_begin:n{tag=\l__tag_para_main_tag_tl}
210      \else
211        \bool_set_true:N\l__tag_para_flattened_bool
212        \@noparlistfalse
213        \unskip\par
214      \fi
215      }
```

(*End of definition for* `\FV@LeaveVMode`*. This function is documented on page* **??**.)

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

```
216    \def\FV@List#1{%
217      \begingroup
218      \FV@UseKeyValues
219      \FV@LeaveVMode
220      \if@inlabel\else\setbox\@labels=\box\voidb@x\fi
221      \FV@ListNesting{#1}%
222      \FV@ListParameterHook
223      \FV@ListVSpace
224      \FV@SetLineWidth
225      \FV@InterLinePenalty
226      \let\FV@ProcessLine\FV@ListProcessLine@i
227      \FV@CatCodes
228      \FV@FormattingPrep
229      \FV@ObeyTabsInit
230      \cs_if_exist:NT \FV@BeginListFrame
231        {
232         \tag_mc_begin:n{artifact}
233         \FV@BeginListFrame
234         \tag_mc_end:
235        }
236      \tag_struct_begin:n{tag=verbatim}
237      }
```

(*End of definition for* `\FV@List`*. This function is documented on page* **??**.)

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

```
238    \def\FV@EndList{%
```

```
239        \FV@ListProcessLastLine
240        \tag_struct_end:
241        \cs_if_exist:NT \FV@EndListFrame
242          {
243           \tag_mc_begin:n{artifact}
244           \FV@EndListFrame
245           \tag_mc_end:
246          }
247        \@endparenv
248        \endgroup
249        \@endpetrue
250          }
```

(*End of definition for* `\FV@EndList`. *This function is documented on page* **??**.)

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

```
251        \def\FV@ListProcessLine#1{%
252          \hbox to \hsize{%
253            \kern\leftmargin
254            \hbox to \linewidth{%
255              \cs_if_exist:NT \FV@LeftListNumber
256                {
257                  \tag_struct_begin:n{tag=Lbl}
258                  \tag_mc_begin:n{}
259                  \FV@LeftListNumber
260                  \tag_mc_end:
261                  \tag_struct_end:
262                }
263              \cs_if_exist:NT \FV@LeftListFrame
264                {
265                  \tag_mc_begin:n{artifact}
266                  \FV@LeftListFrame
267                  \tag_mc_end:
268                }
269              \tag_struct_begin:n{tag=codeline}
270              \tag_mc_begin:n{}%
271              \FancyVerbFormatLine{#1}%
272              \tag_mc_end:
273              \tag_struct_end:\hss
274              \cs_if_exist:NT \FV@RightListFrame
275                {
276                  \tag_mc_begin:n{artifact}
277                  \FV@RightListFrame
278                  \tag_mc_end:
279                }
280              \cs_if_exist:NT \FV@RightListNumber
281                {
282                  \tag_struct_begin:n{tag=Lbl}
283                  \tag_mc_begin:n{}
284                  \FV@RightListNumber
285                  \tag_mc_begin:n{}
286                  \tag_struct_end:
287                }
```

```
288            }
289          \hss}}
290    }
291 \ExplSyntaxOff
```

(*End of definition for* \FV@ListProcessLine. *This function is documented on page* **??**.)

```
292 ⟨/package⟩
293 ⟨∗latex-lab⟩
294 \ProvidesFile{firstaid-latex-lab-testphase.ltx}
295        [\ltlabfirstaiddate\space v\ltlabfirstaidversion\space
296         latex-lab wrapper firstaid]
297
298 \RequirePackage{latex-lab-testphase-firstaid}
299
300 ⟨/latex-lab⟩
```