The Here Applies LATEX Package

October 24, 2023

Abstract

A LATEX package for referencing groups of pages that share something in common.

1 Overview

Here Applies is a LATEX package that allows to collect groups of labels and reference them altogether. It can be used for creating informal glossaries that cross-link concepts to their applications, or simply mentioning multiple pages that share something in common.

The package offers two commands: \hereapplies and \whereapplies (plus their "starred" versions \hereapplies* and \whereapplies*). In both cases an identifier is passed as argument, and this can be any string invented in the moment (\hereapplies additionally supports more than one identifier in the form of a comma-separated list).

Every time \hereapplies is invoked with known identifiers, the document is made aware that the place shares some kind of connection with other places in which the same identifiers were used. And so, every time the \whereapplies command is invoked with a known identifier, all occurrences of the latter within the entire document will be printed in the form of a linkable page list (e.g. "pp. 1, 5, 8–9, 14–20...").

As \hereapplies is designed to be invoked in the middle of a chapter or a section and that location must be made linkable, the \phantomsection directive is invoked by default before a label is added. To avoid calling \phantomsection, the "starred" command \hereapplies* is available.

Finally, like \whereapplies resembles a pluralizable version of \pageref, its "starred" version \whereapplies* will resemble a pluralizable version of \pageref*.

If you use LyX, the package ships a LyX module as well (please check the lyx-module subdirectory).

2 Example usage

The following LATEX manuscript

```
\documentclass{article}
  1
  2
  3
          \usepackage{hereapplies}
  4
  5
           \setminus begin \{ document \}
  6
          \langle title \{ Some title \} 
  7
  8
  9
          \author{Some author}
10
11
          \ maketitle
12
           This is concept one. To find this concept applied, please
13
14
           see \ \ eeplies \{ conceptOne \} .
15
           This is concept two. To find this concept applied, please
16
17
           see \ \ eepsilon \ explicit \ e
18
           \hereapplies{conceptOne} This is page \thepage. As you can see,
19
           ``concept one'' applies here.\newpage
20
21
           \hereapplies{conceptTwo} This is page \thepage. As you can see,
22
23
            ``concept two'' applies here.\newpage
24
           \hereapplies \{ conceptOne\,,\ conceptTwo \} \ This \ is \ page \ \hereapplies . As \ you
25
           can see, both ``concept one'' and ``concept two'' apply here.\newpage
26
27
28
           \hereapplies{conceptTwo} This is page \text{thepage}. As you can see,
           ``concept two'' applies here.\newpage
29
30
           \hereapplies[myref]{conceptOne} This is page \thepage. As you can
31
           see, ``concept one'' applies here. This point in the document is
32
           labeled \texttt{myref}.
33
34
          \mathbf{end}\{\mathbf{document}\}
35
```

will generate the hereapplies-example.pdf document attached.

3 A minimal tutorial

\hereapplies Syntax:

```
\label{label} $$ \end{tabular} $$ \end
```

The **\hereapplies** command notifies the document that one or more identifiers apply to a particular point and adds a label to it.

If the optional argument is passed the label created will be named accordingly, otherwise an opaque name will be chosen for it. This argument may contain only what is legal for **\pageref**.

The *identifiers* argument must be a comma-separated list of identifiers (leading and trailing spaces around each member will be ignored). Each of these strings will remain confined within the internal scope of the package and will not create conflicts with possible macros or labels of the same names.

After storing some internal values, \hereapplies will expand exactly to

```
\ \ black label \ \ black \ \ \ black \ \ \ black \ \ \ \ \ black \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
```

Its "starred" version (\hereapplies*) will not invoke the \phantomsection directive.

\whereapplies Syntax:

```
\label{eq:linear} $$ whereapplies {(identifier)} \\ whereapplies* {(identifier)} $
```

The \whereapplies command prints all the occurrences of an identifier, in the form "p. ..." or "pp. ..." (with page range support).

The *identifier* argument will remain confined within the internal scope of the package and will not create conflicts with possible commands or labels of the same name. Leading and trailing spaces around this string will be ignored.

If the same *identifier* is not passed to \hereapplies at least once throughout the document, \whereapplies will print "??".

The "starred" version of this command (\whereapplies*) will use \pageref* instead of \pageref for generating the page list.

4 Internationalization

Currently the localization of **Here Applies** is not automatic. It is possible however to control the strings generated by overwriting the four macros **\hapage**, **\hapages**, **\hapages**,

```
1 % German translation of **Here Applies**
2 % English: "p. | "
3 \gdef\hapage{S.\ }
4 % English: "pp. | "
5 \gdef\hapages{S.\ }
6 % English: " | and | "
7 \gdef\halastdelimiter{\ und\ }
8 % English: ", | " (exactly like in German - leave it)
9 % \gdef\hadelimiter{, \ }
```

will translate "pp. 2, 4 and 6" into "S. 2, 4 und 6".

5 Get involved

If you wish to get involved, please do not hesitate to send merge requests or participate in the discussion. The package is also available on **CTAN** under macros/latex/contrib/hereapplies/. For any issue, please drop a message.

6 Free software

Here Applies is free software. You can redistribute it and/or modify it under the terms of the AGPL license version 3 or any later version. See COPYING for details.

Code appendix

```
1 % -*- Mode: latex; indent-tabs-mode: nil; c-basic-offset: 4; tab-width: 4 -*-
2 %
3 %
4 % hereapplies.sty
5
   %
6~\%\,A LaTeX package for referencing groups of pages that share something in
7 % common
8 %
9 % https://github.com/madmurphy/hereapplies.sty
10 %
11 % Version 1.0.2
12 %
13 % Copyright (C) 2022 madmurphy <madmurphy333@gmail.com>
14
   %
15 % **Here Applies ** is free software: you can redistribute it and/or modify it
16 % under the terms of the GNU Affero General Public License as published by the
17 % Free Software Foundation, either version 3 of the License, or (at your
18 % option) any later version.
19 %
20 % **Here Applies ** is distributed in the hope that it will be useful, but
21 % WITHOUT ANY WARRANTY; without even the implied warranty of MERCHANTABILITY or
   % FITNESS FOR A PARTICULAR PURPOSE. See the GNU Affero General Public License
22
23 % for more details.
24 %
25 % You should have received a copy of the GNU Affero General Public License
26 % along with this program. If not, see < http://www.gnu.org/licenses/>.
27 %
28 %
29 %
30 % Example usage:
31 %
32
   %
         \documentclass{article}
33
   %
34 %
         35 %
36 %
         begin{document}
37 %
38 %
         \title{Some title}
39 %
         \author{Some author}
40 %
   %
41
   %
42
         \ \ maketitle
43 %
44 %
          This is concept one. To find this concept applied, please
45 %
          see |whereapplies \{conceptOne\}.
46 %
47 %
          This is concept two. To find this concept applied, please
48 %
          see \mid where applies \{concept Two\}. \mid new page
49 %
50 %
          \hereapplies{conceptOne} This is page \thepage. As you can see,
  %
          ``concept one'' applies here. \ newpage
51
52 %
53 %
         \hereapplies{conceptTwo} This is page \thepage. As you can see,
```

```
``concept two'' applies here. \ newpage
54 %
55
    %
56
   %
          |hereapplies{conceptOne, conceptTwo} This is page |thepage. As you
    %
          can see, both ``concept one'' and ``concept two'' apply here. \newpage
57
58 %
59 %
          |hereapplies \{conceptTwo\} This is page |the page. As you can see,
60 %
          ``concept two'' applies here. newpage
61 %
62 %
          \hereapplies[myref]{conceptOne} This is page \thepage. As you can
63 %
          see, ``concept one'' applies here. This point in the document is
64 %
          labeled \setminus texttt \{myref\}.
65
    %
    %
          \end{document}
66
67 %
68 %
69
   \ProvidesPackage{hereapplies}[2023/10/24 Here Applies]
70
   \backslash RequirePackage{hyperref}
71
   \backslash RequirePackage{refcount}
72 %
73 %
74 %
75 %
              TRANSLATABLE STRINGS
76 %
77 %
78 %
79 % The abbreviation of one single page
80 \providecommand*{\hapage}{p.} 
81 % The abbreviation of two or more pages
   \providecommand*{ hapages }{pp.} 
82
83 % The delimiter between page numbers
    \providecommand * { \ hadelimiter } {, } }
84
85
   % The delimiter before the last page number
    \providecommand*{ \halastdelimiter} { \ and \ }
86
87 %
88 %
89 %
90 %
             ABSTRACT UTILITIES
91 %
92 %
93
   % The following macros are not strictly related to this package, but the latter
94
   % requires them.
95
   %
96 %
97 % Macro: `\@ha@ifcomma text to check,\@then{if yes}{if no}`
99 %
100 % Check if a string contains a comma
101 %
102
    % This macro is mainly for internal purposes (but nothing forbids invoking it
    % directly). When invoked it checks whether a comma is present in `text to
103
104~\% check', then expands to 'if yes' or 'if no' accordingly.
105 %
106 % Please do not put curly brackets around the text to check. The comma at the
107~\%~end of the text is mandatory.
108 %
```

```
\log gdef = 1,#2 
109
110
       \langle if \rangle relax \langle detokenize \{ \#2 \} \rangle relax \#4 \langle else \#3 \rangle fi\%
111
    }
112
   %
113 %
114 % Macro: `\ha@trim{text}`
115 % ****************
                                              *****
116 %
117
   % Trim leading and trailing spaces from a string
118
   %
   % This macro is mainly for internal purposes (but nothing forbids invoking it
119
120
   % directly).
121
   %
   \ \ begingroup
122
123~\% Temporarily change the categories of `<` and `>`, for trimming safely
124 \langle catcode \rangle \langle =4 \rangle catcode \rangle \geq =3
125 % Helper macro
126
   127
       \langle ifcase \rangle numexpr2\#3\#8 \rangle relax \rangle or \#2 \rangle or \#7 \rangle or \#5 \rangle or \#1 \rangle fi\%
128
   }
129
   % Usable macro
130
   \log gdef = 1{%}
       131
132
   }
133
   \endgroup
134 %
135 %
136 %
137 %
             PRIVATE ENVIRONMENT
138
   %
139
   %
140
   % The following macros regulate the internal functioning of the package and
141 % should not be invoked directly.
142 %
143 %
144 % Assign a unique number to each unlabeled occurrence of an identifier
   145
   % Populate the .hax file when the document reaches the end
146
147
   AtEndDocument{\%
148
       % Do we have any content?
149
       \ ifdefined \ @ha@commons@@haxcontent\%
150
           \% \ We \ do \ - \ export \ it
151
           152
       \fi%
153
   }
154 %
155
   %
   % Macro `\@ha@makepagelist{hypermacro}{labels}`
156
157
   158
   %
159
   % Generate the list of page numbers (with page range support)
160 %
161
   % This macro is for internal purposes only. When invoked, it scans the
162 % comma-separated list of labels provided (`labels`), checks which labels refer
163 % to duplicate page numbers and which page numbers can be grouped together, and
```

```
% finally prints a list.
164
165
                 %
166
                 % The `hypermacro` argument is the macro (usually from the `hyperref` package)
167
                 % that will process the label name.
168
                %
                \% The `labels` argument must be a comma-separated list of labels.
169
170
             %
                  \gdef\@ha@makepagelist#1#2{%
171
172
                                   \begingroup%
173
                                  % Reset the current page number
174
                                   def @ha@tmp@@currp{-1}\%
175
                                   % Reset the current range offset
                                   def @ha@tmp@@prangeoffs{-1}\%
176
                                  % Ensure no comma before the first page number
177
178
                                   def@ha@tmp@@psep{}\%
179
                                  % Ensure no text before the last number if it is also the first one
                                  def @ha@tmp@@lastpsep{}%
180
181
                                  % Iterate through the `labels` argument
                                   \ensuremath{\mathbb{Q}}\
182
                                                   % Store the page number associated with this label
183
184
                                                    \ensuremath{\mathsf{def}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsfmp}\ensuremath{\mathsf{mp}}\ensuremath{\mathsfmp}\ensuremath{\mathsfmp}\ensuremath{\mathsfmp}\ensuremath{\mathsfmp}\ensuremath{\mathsfmp}\en
185
                                                   \% Check that we are not on the same page as in the last iteration
                                                   186
                                                                   % This is not the same page as in the last iteration
187
                                                                   % Is this the first page in which this identifier appears?
188
                                                                   189
190
                                                                                   % We have already met pages in which this identifiers appears
191
                                                                                   % Does this page follow immediately the previous page?
192
                                                                                    \label{eq:linear} in umexpr @ha@tmp@@currp+1=\@ha@tmp@@nextp\% in the set of the set of
193
                                                                                                    % This page follows immediately the previous page
                                                                                                   % Are these the first two contiguous pages of the range?
194
195
                                                                                                     \finum @ha@tmp@@prangeoffs=-1\%
                                                                                                                    % These are the first two contiguous pages of the range
196
197
                                                                                                                    % Store the first page number of the pair
198
                                                                                                                    \label{eq:let_lambda} \
                                                                                                                    % Store the first label of the pair
199
                                                                                                                     200
                                                                                                   \fi%
201
                                                                                    \ \ else\%
202
203
                                                                                                    % This page is far from the previous label's page
204
                                                                                                   % Was the previous page part of a contiguous range?
205
                                                                                                     \finum @ha@tmp@@prangeoffs=-1\%
206
                                                                                                                    \% The previous page was a standalone page
207
                                                                                                                    % Print "[, ]  "
                                                                                                                     {\ensuremath{\cashwedge}} 
208
209
                                                                                                                                     \#1 \ge 2
                                                                                                                                     210
                                                                                                    \ \ else\%
211
212
                                                                                                                    % The previous page was part of a contiguous range
                                                                                                                    % Print "[, ]<p-q>"
213
214
                                                                                                                     {\ensuremath{\columnwidth{\mathbb{C}}\xspace{0.5}}} 
215
                                                                                                                                     \#1 \ge ndafter = ndcsname\%
216
                                                                                                                                     \ensuremath{\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\scale{cond}\sca
217
                                                                                                                                     \#1 \ge ndafter \ge ndcsname\%
218
                                                                                                                                     \operatorname{expandafter} {\operatorname{aha@tmp@@currlbl}} %
```

219	% Reset the current range offset
220	$\langle \mathbf{def} \rangle @ha@tmp@@prangeoffs{-1}\%$
221	$\langle \mathbf{fi}\% \rangle$
222	% Ensure a comma before the next page number
223	$\langle let \rangle$ @ha@tmp@@psep $\langle hadelimiter\%$
220 224	% Ensure " and " before the last page number
225	$\langle let \rangle @ha@tmp@@lastpsep \ halast delimiter \%$
226	$\langle \mathbf{fi} \% \rangle$
220	\setminus fi%
228	% Prepare the next page number
229	$\label{eq:linear} \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \$
230	% Prepare the next label
231	$\label{eq:linear} \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \$
232	$\langle \mathbf{fi}\% \rangle$
232	}%
234 234	% Print the last page number
234 235	% Is there at least one page to print?
235 236	$\ 15 \ there \ at \ teast \ one \ page \ to \ print?$
$\frac{230}{237}$	% There is at least one page to print
238	% Was the previous page part of a contiguous range?
239 240	\ifnum\@ha@tmp@@prangeoffs=-1% % The previous page was a standalone page
240 241	% Print "[and]"
$241 \\ 242$	$\langle \alpha ha@tmp@@lastpsep csname$
243 244	$\#1\expandafter\end{symmetry} \end{symmetry} $
$244 \\ 245$	\else%
$\frac{243}{246}$	
$240 \\ 247$	% The previous page was part of a contiguous range % Print "[and] <p-q>"</p-q>
247	$ \{ \ @ha@tmp@@lastpsep \ csname $
$240 \\ 249$	$\frac{1}{expandafter} \sqrt{endesine}$
$\frac{249}{250}$	$+ 1 \exp \operatorname{andarter} \operatorname{endesname} $
$\frac{250}{251}$	$\#1$ \expandatter\endcsname%
251 252	$\operatorname{expandafter} \operatorname{endesname} $
$\frac{252}{253}$	$\langle expandancer \{ \langle enaetinp@@currisr} \} \rangle$
$\frac{253}{254}$	$\langle \mathbf{fi} \rangle$
	\end{group}
255 256	
$256 \\ 257$	8 %
257 258	70 %
258 259	$\%$ Macro `\@ha@makeoutputstrings{identifier}{preamble}{labels}`
$\frac{259}{260}$	% mucro \@nu@mukeourpuisirings{iueniijier}{preumoie}{iuoeis}
200 261	// ************************************
$262 \\ 263$	$\%$ Generate the output strings of `\whereapplies` and `\whereapplies*` $\%$
203 264	$^{\prime ho}$ % This macro is for internal purposes only. When invoked, it updates the two
264 265	% This macro is for internal purposes only. When invoked, it updates the two % macros `@ha@prop@@soutput@` and `@ha@prop@@doutput@`.
205 266	%
$260 \\ 267$	$^{\prime ho}$ % The `identifier` argument remains confined within the internal scope of the
267 268	% The identifier argument remains confined within the internal scope of the % package and does not create conflicts with possible macros or labels of the
208 269	% package and abes not create conflicts with possible macros or tabels of the % same name. Leading and trailing spaces around this string will **not** be
209 270	% same name. Leaanny ana traiting spaces around this string with **not** be % ignored.
$270 \\ 271$	% ignorea. %
$271 \\ 272$	$^{\prime ho}$ $\%$ The `preamble` argument is the text that will be expanded before the page
272 273	% The preamote argument is the text that will be expanded before the page % list (usually "p." or "pp.").
215	visi (asautiy p. 01 pp.).

```
274
             %
275
             % The `labels` argument must be a comma-separated list of labels.
276
             %
277
              \gdef\@ha@makeoutputstrings#1#2#3{%
278
                          % Write "p./pp. \pageref..." to the output
279
                           \label{eq:cond} $$ \ expandafter gdef csname @ha@prop@@doutput@#1\endcsname{\%} $$
280
                                       % `\T@pageref` is a synonym of `\pageref`
                                       #2\ensuremath{\mathbb{Q}} = \frac{1}{2} - \frac{
281
282
                          }%
283
                          % Write "p./pp. pageref * ..." to the starred output
                           \ensuremath{\mathsf{expandafter}}\gdef\csname @ha@prop@@soutput@#1\endcsname{\%}
284
285
                                       % `\@pagerefstar` is a synonym of `\pageref*`
286
                                       #2\@ha@makepagelist{@pagerefstar}{#3}\%
                           }%
287
288
                          \% Make the list of labels available to the API (via `|get@hainfo`)
289
                           \label{eq:labels} $$ \expandafter gdef con @ha@prop@@labels@#1\endcon e{#3}\% $$
290
             }
291
            %
292
             %
             % Macro `\@ha@newidentifier{identifier}`
293
294
             %
                     295
              %
296
             % Initialize a new identifier
297
            %
298 % This macro is for internal purposes only. When invoked, it sets up the helper
         % macros, counters and auxiliary files needed for keeping track of an
299
300
          % identifier. If the identifier was already initialized the macro will be no
301
           % op.
302
            %
303
             % The `identifier` argument remains confined within the internal scope of the
              \% package and does not create conflicts with possible macros or labels of the
304
305
              % same name. Leading and trailing spaces around this string will **not** be
306
             % ignored.
307
            %
308
              \gdef\@ha@newidentifier#1{%
309
                          % Was this identifier already initialized?
                           \ifcsname @ha@iter@@preamble@#1\endcsname\else%
310
                                       % The identifier was never initialized
311
312
                                       % Was the .hax input already initialized during this run?
313
                                       \ifdefined\@ha@commons@@haxcontent\else%
314
                                                    % The .hax input was never initialized
315
                                                    \% Previous versions created unwanted whitespaces; I am thankful to
316
                                                    \% David Carlisle for suggesting `|endlinechar=|m@ne`
317
                                                    {\endlinechar = \model{mene} \noise{\constraint} % \label{eq:mene} \label{eq:mene} % \label{eq:mene} % \label{eq:mene} % \label{eq:mene} % \label{eq:mene} % \label{eq:mene} % \label{eq:menee} % \labele
                                                    % Initialize the content to export to the .hax file
318
319
                                                    gdef @ha@commons@@haxcontent{}%
                                       \fi%
320
                                       % Was a .hax file already exported during a previous run?
321
322
                                       \ifcsname @ha@prop@@labels@#1\endcsname\else%
323
                                                    % This is the first run
324
                                                    \% Set the output to "??" - to be updated by the .hax file
325
                                                    expandafter gdef csname
326
                                                                ae^{1} = 1 - \frac{1}{2} 
327
                                                    \% Set the starred output to "??" - to be updated by the .hax file
328
                                                    \ensuremath{\mathsf{expandafter}}\gdef\csname
```

```
329
                                                                                                             a_{prop}@soutput}#1\endcsname{\textbf{??}}\%
330
                                                                                        % Set the list of labels to an empty value
331
                                                                                          expandafter gdef csname @ha@prop@@labels@#1\endcsname{}%
                                                                   \fi%
332
                                                                  \% Use "p." for the preamble when there is only one occurrence
333
                                                                   334
335
                                                                   % Generate the output strings
                                                                   \g@addto@macro\@ha@commons@@haxcontent{%
336
337
                                                                                        % Make sure that there are occurrences
                                                                                        338
                                                                                                             \% There are occurrences
339
                                                                                                             % Generate the output strings
340
341
                                                                                                             \protect \@ha@makeoutputstrings{#1}{\csname}
342
                                                                                                                                    aa@iter@@preamble@#1\endcsname}{\csname}
343
                                                                                                                                    @ha@iter@@labels@#1\endcsname}\%
344
                                                                                        \fi%
345
                                                                  }%
                                             \setminus fi\%
346
347
                      }
348
                      %
349
                      %
350
                      %
351
                      %
                                                                             LIBRARY ENVIRONMENT
352
                      %
353
                      %
                      \% The following macros are not directly available to the user, but are callable
354
355
                      % by other packages, if needed.
356
                      %
357
                      %
358
                       \% Macro: `\starred@nochecks@hereapplies{label}{identifiers}`
                                   *******
359
                       %
                                                                                                                                                                                                                                                                                                                                                                                                          ******
360
                      %
                      \%\ Similar to `\hereapplies*`, but without checks and with two mandatory
361
362
                      % arguments
363
                     %
364
                      % This macro is mainly for internal purposes (but nothing forbids invoking it
                      % directly). Here the two arguments are both mandatory and there will be no
365
                      % checks that first argument does not contain a comma. See the documentation of
366
                                   `\hereapplies` for more information.
367
                       %
368
                      %
369
                        \newcommand*{\starred@nochecks@hereapplies}[2]{\%}
370
                                             % Assign a label to this occurrence
371
                                             \label{#1}%
372
                                             % Iterate through the comma-separated list `identifiers`
                                              \ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ensuremath{\scale{0.1}}\ens
373
374
                                                                  % Remove trailing and leading spaces
375
                                                                   \ensuremath{\ensuremath{\mathsf{edef}}\ensuremath{\ensuremath{\mathsf{o}}\ensuremath{\mathsf{ha}}\ensuremath{\ensuremath{\mathsf{o}}\ensuremath{\mathsf{ha}}\ensuremath{\ensuremath{\mathsf{o}}\ensuremath{\mathsf{ha}}\ensuremath{\ensuremath{\mathsf{o}}\ensuremath{\mathsf{ha}}\ensuremath{\ensuremath{\mathsf{o}}\ensuremath{\mathsf{ha}}\ensuremath{\ensuremath{\mathsf{o}}\ensuremath{\mathsf{ha}}\ensuremath{\ensuremath{\mathsf{o}}\ensuremath{\mathsf{ha}}\ensuremath{\ensuremath{\mathsf{o}}\ensuremath{\mathsf{ha}}\ensuremath{\ensuremath{\mathsf{o}}\ensuremath{\mathsf{ha}}\ensuremath{\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{b}}\ensuremath{\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{o}}\
                                                                   % Make sure that the identifier is initialized
376
377
                                                                    \ensuremath{\mathsf{expandafter}} \ensuremath{\ensuremath{\mathsf{wha}}}\ensuremath{\ensuremath{\mathsf{@ha}}}\ensuremath{\ensuremath{\mathsf{mp}}}\ensuremath{\ensuremath{\mathsf{@ha}}}\ensuremath{\ensuremath{\mathsf{mp}}}\ensuremath{\ensuremath{\mathsf{@ha}}}\ensuremath{\ensuremath{\mathsf{mp}}}\ensuremath{\ensuremath{\mathsf{@ha}}}\ensuremath{\ensuremath{\mathsf{mp}}}\ensuremath{\ensuremath{\mathsf{@ha}}}\ensuremath{\ensuremath{\mathsf{mp}}}\ensuremath{\ensuremath{\mathsf{mp}}}\ensuremath{\ensuremath{\mathsf{mp}}}\ensuremath{\ensuremath{\mathbb{mp}}}\ensuremath{\ensuremath{\mathbb{mp}}}\ensuremath{\ensuremath{\mathbb{mp}}}\ensuremath{\ensuremath{\mathbb{mp}}}\ensuremath{\ensuremath{\mathbb{mp}}}\ensuremath{\ensuremath{\mathbb{mp}}}\ensuremath{\ensuremath{\mathbb{mp}}}\ensuremath{\ensuremath{\mathbb{mp}}}\ensuremath{\ensuremath{\mathbb{mp}}}\ensuremath{\ensuremath{\mathbb{mp}}}\ensuremath{\ensuremath{\mathbb{mp}}}\ensuremath{\ensuremath{\mathbb{mp}}}\ensuremath{\ensuremath{\mathbb{mp}}}\ensuremath{\ensuremath{\mathbb{mp}}}\ensuremath{\ensuremath{\mathbb{mp}}}\ensuremath{\ensuremath{\mathbb{mp}}}\ensuremath{\ensuremath{\mathbb{mp}}}\ensuremath{\ensuremath{\mathbb{mp}}}\ensuremath{\ensuremath{\mathbbmp}}\ensuremath{\ensuremath{\mathbb{mp}}}\ensuremath{\ensuremath{\mathbbmp}}\ensuremath{\ensuremath{\mathbbmp}}\ensuremath{\ensuremath{\mathbbmp}}\ensuremath{\ensuremath{\mathbbmp}}\ensuremath{\ensuremath{\mathbbmp}}\ensuremath{\ensuremath{\mathbbmp}}\ensuremath{\ensuremath{\mathbbmp}}\ensuremath{\ensuremath{\mathbbmp}}\ensuremath{\ensuremath{\mathbbmp}}\ensuremath{\ensuremath{\mathbbmp}}\ensuremath{\ensuremath{\mathbbmp}}\ensuremath{\ensuremath{\mathbbmp}}\ensuremath{\ensuremath{\mathbbmp}}\ensuremath{\ensuremath{\mathbbmp}}\ensuremath{\ensuremath{\mathbbmp}}\ensuremath{\ensuremath{\mathbbmp}}\ensuremath{\ensuremath{\mathbbmp}}\ensuremath{\ensuremath{\mathbbmp}}\ensuremath{\ensuremath{\mathbbmp}}\ensuremath{\ensuremath{\mathbbmp}}\ensuremath{\ensuremath{\mathbbmp}}\ensuremath{\ensuremath{\mathbbmp}}\ensuremath{\ensuremath{\mathbbmp}}\ensuremath{\ensuremath{\mathbbmp}}\ensuremath{\ensuremath{\mathbbmp}}\ensuremath{\ensuremath{\mathbbmp}}\ensuremath{\ensuremath{\mathbbmp}}\ensuremath{\ensuremath{\mathbbmp}}\ensuremath{\ensuremath{\mathbbmp}}\ensuremath{\ensuremath{\mathbbmp}}\ensuremath{\ensuremath{\mathbbmp}}\ensuremath{\ensuremath{\mathbbmp}}\ensuremath{\ensuremath{\mathbbmp}}\ensuremath{\ensuremath{\mathbbmp}}\en
                                                                   % Is this the first time this identifier is mentioned?
378
379
                                                                   \label{eq:labels} $$ \ endcsname \ @ha@iter@@labels@\@ha@tmp@@id\endcsname \ % \ endcsname \ endcsname \ % \ endcsname \ % \ endcsname \ endcsna
380
                                                                                       \% This is *not* the first time this identifier is mentioned
381
                                                                                        % Add this label to the list
382
                                                                                        \ensuremath{\mathsf{expandafter}g@addto@macro\csname}
383
```

```
384
                                                                              \% Use "pp." for the preamble when there are multiple occurrences
385
                                                                              global expandatter let con
386
                                                                                                 @ha@iter@@preamble@\@ha@tmp@@id\endcsname\hapages\%
387
                                                           \ \ else\%
                                                                             \% This is the first time this identifier is mentioned
388
                                                                              \% Set up the list with this label as value
389
390
                                                                              \ensuremath{\mathsf{expandafter}}\gdef\csname
                                                                                                 aha@iter@@labels@\@ha@tmp@@id\endcsname{#1}%
391
392
                                                           \setminus fi\%
393
                                        }%
                                        \% Clean the environment
394
395
                                        \label{eq:let_lambda} \
396
                     }
397
                   %
398
                    %
399
                    % Macro: `\starred@hereapplies[label]{identifiers}`
400
                    401
                    %
402
                   % Identical to `\hereapplies*`
403
                   %
404
                     % This macro is mainly for internal purposes (but nothing forbids invoking it
405
                    %
                              directly). See the documentation of `\hereapplies` for more information.
406
                    %
                     407
408
                                        % Check whether the macro has been called with one or two arguments
409
                                         \langle if \rangle relax \langle detokenize \{ \#1 \} \rangle relax \%
410
                                                           % The macro has been called with only one argument
411
                                                          \% \ Assign a unique number to the unnamed occurrence
                                                           \stepcounter{@ha@unlabeled@counter}\%
412
413
                                                           % Create an opaque label
                                                           \ensuremath{\mathsf{edef}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsf{mp}}\ensuremath{\mathsfmp}\ensuremath{\mathsf{mp}}\ensuremath{\mathsfmp}\ensuremath{\mathsfmp}\ensuremath{\mathsfmp}\ensuremath{\mathsfmp}\ensuremath{\mathsfmp}\ensuremath{\mathsfmp}\ens
414
415
                                        \ \ else\%
                                                          % The macro has been called with two arguments
416
417
                                                          % Expand the first argument for checking properly
418
                                                           \ensuremath{\mathsf{edef}}\ensuremath{\mathsf{@ha@tmp@@lbl}}\=\
                                                           % Make sure that there are no commas in the `label` argument
419
                                                           \ensuremath{\mathsf{expandafter}}\ensuremath{\ensuremath{\mathsf{o}}\ensuremath{\mathsf{ha}}\ensuremath{\ensuremath{\mathsf{o}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{o}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensuremath{\mathsf{ha}}\ensur
420
                                                                              \label{eq:comma_detected_in "\@ha@tmp@@lbl"} {\comma_detected_in "\comma_detected_in "\c
421
422
                                                                                                  It is possible to assign only one single label.%
423
                                                                              }%
                                                          }{}%
424
425
                                        \fi%
426
                                        \% Call `\starred@nochecks@hereapplies`
427
                                         expandafter starred@nochecks@hereapplies expandafter {@ha@tmp@@lbl}{#2}%
                                        \% Clean the environment
428
429
                                        \let\@ha@tmp@@lbl\undefined%
430
                                        % Ignore the spaces that might follow
                                        \ ignorespaces\%
431
432
                     }
                    %
433
                    %
434
435
                    % Macro: `\get@hainfo[property]{identifier}`
436
                   %
                               *****
                                                                                                                                                                                                                                                                             ******
437
                %
438 % Get the value of an identifier's property
```

```
439
   %
440
   % This macro is mainly for internal purposes (but nothing forbids invoking it
   % directly). If the identifier was never initialized the macro will initialize
441
442
   % it.
443 %
444 % Possible values for the `property` argument are: `doutput`, `labels` and
445
  % `soutput`. When omitted it defaults to `labels`.
446 %
447
   % The `identifier` argument remains confined within the internal scope of the
   % package and does not create conflicts with possible macros or labels of the
448
   % same name. Leading and trailing spaces around this string will be ignored.
449
450
   %
451
    452
       % Trim leading and trailing spaces from the identifier
453
       \ensuremath{\mathsf{edef}}\ensuremath{\mathsf{@ha@tmp@@id}}\ha@trim{#2}}\%
454
       \% Make sure that there are no commas
       455
456
           \PackageError{hereapplies}{Comma detected in "\@ha@tmp@@id"}{%
457
               It is possible to query only one single identifier at a time.%
458
           }%
459
       }{}%
460
       % Make sure that the identifier is initialized
       461
462
       % Print the identifier 's property
       463
464
       % Clean the environment
       \label{eq:let_lambda} \
465
466
   }
467 %
468
   %
   %
469
470
   %
             USER ENVIRONMENT
   %
471
             472 %
473 % The following macros are available to the user.
474 %
475
   %
476 % Macro: `\hereapplies[label]{identifiers}`
477
   478
   %
479
   % Notify the document that one or more identifiers apply to a particular point
480
   % and add a label to it
481 %
482 % If the optional argument is passed the label created will be named
483 % accordingly, otherwise an opaque name will be chosen. This argument may
484 % contain only what is legal for `\pageref`.
485
   %
   % The `identifiers` argument must be a comma-separated list of identifiers
486
    \% (leading and trailing spaces around each member will be ignored). Each of
487
   % these strings will remain confined within the internal scope of the package
488
   \% and will not create conflicts with possible macros or labels of the same
489
490 % names.
491 %
492 % The starred version of this command (`\hereapplies*`) will not invoke the
493 % `\phantomsection ` directive.
```

```
494 %
495
    \newcommand*{\hereapplies}{\%}
496
       \% Check if a star is present in the invocation of the command
       \ensuremath{\mathbb{G}}\
497
498
   }
499 %
500 %
501 % Macro: `\whereapplies{identifier}`
*****
503 %
504 % Print all occurrences of an identifier in the form "p. ..." or "pp. ..."
505
   % (with page range support)
506
   %
   \% The `identifier` argument remains confined within the internal scope of the
507
508 % package and does not create conflicts with possible macros or labels of the
509~\% same name. Leading and trailing spaces around this string will be ignored.
510 %
511 % If the same `identifier` is not passed to `\hereapplies` at least once
512 % throughout the document, `\whereapplies` will print "??".
513 \ \%
   % The starred version of this command (`\whereapplies*`) will use `\pageref*`
514
515
   \%\ instead of `\pageref` for generating the page list.
516
   %
517
    \newcommand*{\whereapplies}{\%}
       \% Check if a star is present in the invocation of the command
518
519
       \@ifstar{\get@hainfo[soutput]}{\get@hainfo[doutput]}%
520 }%
521 % EOF
```