The **setouterhbox** package

Heiko Oberdiek

<oberdiek@uni-freiburg.de>

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Abstract

If math stuff is set in an \hbox, then TeX performs some optimization and omits the implicite penalties \binoppenalty and \relpenalty. This packages tries to put stuff into an \hbox without getting lost of those penalties.

Contents

1 Documentation

1.1 Introduction

There is a situation in hyperref's driver for dvips where the user wants to have links that can be broken across lines. However dvips doesn't support the feature. With option breaklinks hyperref sets the links as usual, put them in a box and write the link data with box dimensions into the appropriate \specials. Then, however, it does not set the complete unbreakable box, but it unwrappes the material inside to allow line breaks. Of course line breaking and glue setting will falsify the link dimensions, but line breaking was more important for the user.

1.2 Acknowledgement

Jonathan Fine, Donald Arsenau and me discussed the problem in the newsgroup comp.text.tex where Damian Menscher has started the thread, see [1].

The discussion was productive and generated many ideas and code examples. In order to have a more permanent result I wrote this package and tried to implement most of the ideas, a kind of summary of the discussion. Thus I want and have to thank Jonathan Fine and Donald Arsenau very much.

Two weeks later David Kastrup (posting in comp.text.tex, [2]) remembered an old article of Michael Downes ([3]) in TUGboat, where Michael Downes already presented the method we discuss here. Nowadays we have ε-TeX that extends the tool set of a TeX macro programmer. Especially useful ε-TeX was in this package for detecting and dealing with errorneous situations.

However also nowadays a perfect solution for the problem is still missing at macro level. Probably someone has to go deep in the internals of the TeX compiler to implement a switch that let penalties stay where otherwise TeX would remove them for optimization reasons.

1.3 Usage

Package loading. LaTeX: as usually:

    \usepackage{setouterhbox}

The package can also be included directly, thus plain-TeX users write:

    \input setouterhbox.sty

Register allocation. The material will be put into a box, thus we need to know these box number. If you need to allocate a new box register:

LaTeX: \newsavebox{\⟨name⟩}

plain-TeX: \newbox\⟨name⟩

Then \⟨name⟩ is a command that held the box number.

Box wrapping. LaTeX users put the material in the box with an environment similar to lrbox. The environment setouterhbox uses the same syntax and offers the same features, such as verbatim stuff inside:

    \begin{setouterhbox}{⟨box number⟩}...\end{setouterhbox}

Users with plain-TeX do not have environments, they use instead:

    \setouterhbox{⟨box number⟩}...\endsetouterhbox

In both cases the material is put into an \hbox and assigned to the given box, denoted by ⟨box number⟩. Note the assignment is local, the same way lrbox behaves.

Unwrapping. The box material is ready for unwrapping:

> \unhbox⟨*box number*⟩

1.4 Option **hyperref**

Package url uses math mode for typesetting urls. Break points are inserted by \binoppenalty and \relpenalty. Unhappily these break points are removed, if hyperref is used with option breaklinks and drivers that depend on pdfmark: dvips, vtexpdfmark, textures, and dvipsone. Thus the option hyperref enables the method of this package to avoid the removal of \relpenalty and \binoppenalty. Thus you get more break points. However, the link areas are still wrong for these drivers, because they are not supporting broken links.

Note, you need version 2006/08/16 v6.75c of package hyperref, because starting with this version the necessary hook is provided that package setouterhbox uses.

> \usepackage[...]{hyperref}[2006/08/16]
> \usepackage[hyperref]{setouterhbox}

Package order does not matter.

1.5 Example

```
 1 ⟨*example⟩
 2 \documentclass[a5paper]{article}
 3 \usepackage{url}[2005/06/27]
 4 \usepackage{setouterhbox}
 5
 6 \newsavebox{\testbox}
 7
 8 \setlength{\parindent}{0pt}
 9 \setlength{\parskip}{2em}
10
11 \begin{document}
12 \raggedright
13
14 \url{http://this.is.a.very.long.host.name/followed/%
15 by/a/very_long_long_long_path.html}%
16
17 \sbox\testbox{%
18   \url{http://this.is.a.very.long.host.name/followed/%
19   by/a/very_long_long_long_path.html}%
20 }%
21 \unhbox\testbox
22
23 \begin{setouterhbox}{\testbox}%
24   \url{http://this.is.a.very.long.host.name/followed/%
25   by/a/very_long_long_long_path.html}%
26 \end{setouterhbox}
27 \unhbox\testbox
28
29 \end{document}
30 ⟨/example⟩
```

2 Implementation

Internal macros are prefixed by \setouterhbox, @ is not used inside names, thus we do not need to care of its catcode if we are not using it as LaTeX package.

2.1 Package start stuff

```
31 ⟨*package⟩
```

Prevent reloading more than one, necessary for plain-TeX: Reload check, especially if the package is not used with LaTeX.

```
32 \begingroup
33   \catcode44 12 % ,
34   \catcode45 12 % -
35   \catcode46 12 % .
36   \catcode58 12 % :
37   \catcode64 11 % @
38   \catcode123 1 % {
39   \catcode125 2 % }
40   \expandafter\let\expandafter\x\csname ver@setouterhbox.sty\endcsname
41   \ifx\x\relax % plain-TeX, first loading
42   \else
43     \def\empty{}%
44     \ifx\x\empty % LaTeX, first loading,
45       % variable is initialized, but \ProvidesPackage not yet seen
46     \else
47       \catcode35 6 % #
48       \expandafter\ifx\csname PackageInfo\endcsname\relax
49         \def\x#1#2{%
50           \immediate\write-1{Package #1 Info: #2.}%
51         }%
52       \else
53         \def\x#1#2{\PackageInfo{#1}{#2, stopped}}%
54       \fi
55       \x{setouterhbox}{The package is already loaded}%
56       \aftergroup\endinput
57     \fi
58   \fi
59 \endgroup
```

Package identification:

```
60 \begingroup
61   \catcode35 6 % #
62   \catcode40 12 % (
63   \catcode41 12 % )
64   \catcode44 12 % ,
65   \catcode45 12 % -
66   \catcode46 12 % .
67   \catcode47 12 % /
68   \catcode58 12 % :
69   \catcode64 11 % @
70   \catcode91 12 % [
71   \catcode93 12 % ]
72   \catcode123 1 % {
73   \catcode125 2 % }
74   \expandafter\ifx\csname ProvidesPackage\endcsname\relax
75     \def\x#1#2#3[#4]{\endgroup
76       \immediate\write-1{Package: #3 #4}%
77       \xdef#1{#4}%
78     }%
79   \else
80     \def\x#1#2[#3]{\endgroup
81       #2[{#3}]%
82       \ifx#1\@undefined
83         \xdef#1{#3}%
84       \fi
85       \ifx#1\relax
86         \xdef#1{#3}%
87       \fi
88     }%
89   \fi
90 \expandafter\x\csname ver@setouterhbox.sty\endcsname
```

```
91 \ProvidesPackage{setouterhbox}%
92   [2007/09/09 v1.7 Set hbox in outer horizontal mode (HO)]
93 \begingroup
94   \catcode123 1 % {
95   \catcode125 2 % }
96   \def\x{\endgroup
97     \expandafter\edef\csname setouterhboxAtEnd\endcsname{%
98       \catcode35 \the\catcode35\relax
99       \catcode64 \the\catcode64\relax
100      \catcode123 \the\catcode123\relax
101      \catcode125 \the\catcode125\relax
102    }%
103  }%
104 \x
105 \catcode35 6 % #
106 \catcode64 11 % @
107 \catcode123 1 % {
108 \catcode125 2 % }
109 \def\TMP@EnsureCode#1#2{%
110   \edef\setouterhboxAtEnd{%
111     \setouterhboxAtEnd
112     \catcode#1 \the\catcode#1\relax
113   }%
114   \catcode#1 #2\relax
115 }
116 \TMP@EnsureCode{40}{12}% (
117 \TMP@EnsureCode{41}{12}% )
118 \TMP@EnsureCode{44}{12}% ,
119 \TMP@EnsureCode{45}{12}% -
120 \TMP@EnsureCode{46}{12}% .
121 \TMP@EnsureCode{47}{12}% /
122 \TMP@EnsureCode{58}{12}% :
123 \TMP@EnsureCode{60}{12}% <
124 \TMP@EnsureCode{61}{12}% =
125 \TMP@EnsureCode{62}{12}% >
126 \TMP@EnsureCode{96}{12}% `
```

2.2 Interface macros

\setouterhboxBox   The method requires a global box assignment. To be on the safe side, a new box register is allocated for this global box assignment.

```
127 \newbox\setouterhboxBox
```

\setouterhboxFailure   Error message for both plain-TeX and LaTeX

```
128 \begingroup\expandafter\expandafter\expandafter\endgroup
129 \expandafter\ifx\csname RequirePackage\endcsname\relax
130   \input infwarerr.sty\relax
131 \else
132   \RequirePackage{infwarerr}[2007/09/09]%
133 \fi
134 \edef\setouterhboxFailure#1#2{%
135   \expandafter\noexpand\csname @PackageError\endcsname
136       {setouterhbox}{#1}{#2}%
137 }
```

2.3 Main part

eTeX provides much better means for checking error conditions. Thus lines marked by "E" are executed if eTeX is available, otherwise the lines marked by "T" are used.

```
138 \begingroup\expandafter\expandafter\expandafter\endgroup
139 \expandafter\ifx\csname lastnodetype\endcsname\relax
```

```
140    \catcode`T=9 % ignore
141    \catcode`E=14 % comment
142 \else
143    \catcode`T=14 % comment
144    \catcode`E=9 % ignore
145 \fi
```

`\setouterhboxRemove` Remove all kern, glue, and penalty nodes; poor man's version, if ε-TeX is not available

```
146 \def\setouterhboxRemove{%
147 E \ifnum\lastnodetype<11 %
148 E    \else
149 E    \ifnum\lastnodetype>13 %
150 E    \else
151       \unskip\unkern\unpenalty
152 E       \expandafter\expandafter\expandafter\setouterhboxRemove
153 E    \fi
154 E \fi
155 }%
```

`\setouterhbox` Passing the box contents by macro parameter would prevent catcode changes in the box contents like by `\verb`. Also `\bgroup` and `\egroup` does not work, because stuff has to be added at the begin and end of the box, thus the syntax `\setouterhbox{⟨box number⟩}`... `\endsetouterhbox` is used. Also we automatically get an environment `setouterhbox` if LaTeX is used.

```
156 \def\setouterhbox#1{%
157    \begingroup
158       \def\setouterhboxNum{#1}%
159       \setbox0\vbox\bgroup
160 T       \kern.123pt\relax % marker
161 T       \kern0pt\relax % removed by \setouterhboxRemove
162       \begingroup
163          \everypar{}%
164          \noindent
165 }
```

`\endsetouterhbox` Most of the work is done in the end part, thus the heart of the method follows:

```
166 \def\endsetouterhbox{%
167       \endgroup
```

Omit the first pass to get the penalties of the second pass.

```
168       \pretolerance-1 %
```

We don't want a third pass with `\emergencystretch`.

```
169       \tolerance10000 %
170       \hsize\maxdimen
```

Line is not underfull:

```
171       \parfillskip 0pt plus 1filll\relax
172       \leftskip0pt\relax
```

Suppress underful `\hbox` warnings, is explicit line breaks are used.

```
173       \rightskip0pt plus 1fil\relax
174       \everypar{}%
```

Ensure that there is a paragraph and prevents `\endgraph` from eating terminal glue:

```
175       \kern0pt%
176       \endgraf
177       \setouterhboxRemove
178 E     \ifnum\lastnodetype=1 %
179 E        \global\setbox\setouterhboxBox\lastbox
180 E        \loop
```

```
181 E          \setouterhboxRemove
182 E        \ifnum\lastnodetype=1 %
183 E          \setbox0=\lastbox
184 E          \global\setbox\setouterhboxBox=\hbox{%
185 E            \unhbox0 %
```

Remove \rightskip, a penalty with -10000 is part of the previous line.

```
186 E            \unskip
187 E            \unhbox\setouterhboxBox
188 E          }%
189 E        \repeat
190 E      \else
191 E        \setouterhboxFailure{%
192 E          Something is wrong%
193 E        }{%
194 E          Could not find expected line.%
195 E          \MessageBreak
196 E          (\string\lastnodetype: \number\lastnodetype, expected: 1)%
197 E        }%
198 E      \fi
199 E      \setouterhboxRemove
200 T      \global\setbox\setouterhboxBox\lastbox
201 T      \loop
202 T        \setouterhboxRemove
203 T        \setbox0=\lastbox
204 T      \ifcase\ifvoid0 1\else0\fi
205 T        \global\setbox\setouterhboxBox=\hbox{%
206 T          \unhbox0 %
```

Remove \rightskip, a penalty with -10000 is part of the previous line.

```
207 T          \unskip
208 T          \unhbox\setouterhboxBox
209 T        }%
210 T      \repeat
211 T      \ifdim.123pt=\lastkern
212 T      \else
213 T        \setouterhboxFailure{%
214 T          Something is wrong%
215 T        }{%
216 T          Unexpected stuff was detected before the line.%
217 T        }%
218 T      \fi
219 T    \egroup
220 T    \ifcase \ifnum\wd0=0 \else 1\fi
221 T            \ifdim\ht0=.123pt \else 1\fi
222 T            \ifnum\dp0=0 \else 1\fi
223 T            0 %
224 E      \ifnum\lastnodetype=-1 %
```

There was just one line that we have caught.

```
225        \else
226          \setouterhboxFailure{%
227            Something is wrong%
228          }{%
229            After fetching the line there is more unexpected stuff.%
230 E          \MessageBreak
231 E          (\string\lastnodetype: \number\lastnodetype, expected: -1)%
232          }%
233        \fi
234 E    \egroup
235    \expandafter\endgroup
236    \expandafter\setouterhboxFinish\expandafter{%
237      \number\setouterhboxNum
238    }%
```

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239 }

2.4 Environment support

Check `\@currenvir` for the case that `\setouterhbox` was called as environment. Then the box assignment must be put after the `\endgroup` of `\end{...}`.

```
240 \def\setouterhboxCurr{setouterhbox}
241 \def\setouterhboxLast#1{%
242   \setbox#1\hbox{%
243     \unhbox\setouterhboxBox
244     \unskip % remove \rightskip glue
245     \unskip % remove \parfillskip glue
246     \unpenalty % remove paragraph ending \penalty 10000
247     \unkern % remove explicit kern inserted above
248   }%
249 }
```

`\setouterhboxFinish` #1 is an explicit number.

```
250 \def\setouterhboxFinish#1{%
251   \begingroup\expandafter\expandafter\expandafter\endgroup
252   \expandafter\ifx\csname @currenvir\endcsname\setouterhboxCurr
253     \aftergroup\setouterhboxLast
254     \aftergroup{%
255     \setouterhboxAfter #1\NIL
256     \aftergroup}%
257   \else
258     \setouterhboxLast{#1}%
259   \fi
260 }
```

`\setouterhboxAfter` #1 is an explicit number.

```
261 \def\setouterhboxAfter#1#2\NIL{%
262   \aftergroup#1%
263   \ifx\\#2\\%
264   \else
265     \setouterhboxReturnAfterFi{%
266       \setouterhboxAfter#2\NIL
267     }%
268   \fi
269 }
```

`\setouterhboxReturnAfterFi` A utility macro to get tail recursion.

```
270 \long\def\setouterhboxReturnAfterFi#1\fi{\fi#1}
```

Restore catcodes we have need to distinguish between the implementation with and without ε-TeX.

```
271 \catcode69=11\relax % E
272 \catcode84=11\relax % T
```

2.5 Option **hyperref**

```
273 \begingroup
274   \def\x{LaTeX2e}%
275 \expandafter\endgroup
276 \ifx\x\fmtname
277 \else
278   \setouterhboxAtEnd
279   \expandafter\endinput
280 \fi
```

`\Hy@setouterhbox` `\Hy@setouterhbox` is the internal hook that hyperref uses since 2006/02/12 v6.75a.

```
281 \DeclareOption{hyperref}{%
282   \long\def\Hy@setouterhbox#1#2{%
283     \setouterhbox{#1}#2\endsetouterhbox
284   }%
285 }

286 \ProcessOptions\relax

287 \setouterhboxAtEnd
288 ⟨/package⟩
```

3 Test

3.1 Catcode checks for loading

```
289 ⟨*test1⟩
290 \catcode`\{=1 %
291 \catcode`\}=2 %
292 \catcode`\#=6 %
293 \catcode`\@=11 %
294 \expandafter\ifx\csname count@\endcsname\relax
295   \countdef\count@=255 %
296 \fi
297 \expandafter\ifx\csname @gobble\endcsname\relax
298   \long\def\@gobble#1{}%
299 \fi
300 \expandafter\ifx\csname @firstofone\endcsname\relax
301   \long\def\@firstofone#1{#1}%
302 \fi
303 \expandafter\ifx\csname loop\endcsname\relax
304   \expandafter\@firstofone
305 \else
306   \expandafter\@gobble
307 \fi
308 {%
309   \def\loop#1\repeat{%
310     \def\body{#1}%
311     \iterate
312   }%
313   \def\iterate{%
314     \body
315       \let\next\iterate
316     \else
317       \let\next\relax
318     \fi
319     \next
320   }%
321   \let\repeat=\fi
322 }%
323 \def\RestoreCatcodes{}
324 \count@=0 %
325 \loop
326   \edef\RestoreCatcodes{%
327     \RestoreCatcodes
328     \catcode\the\count@=\the\catcode\count@\relax
329   }%
330 \ifnum\count@<255 %
331   \advance\count@ 1 %
332 \repeat
333
334 \def\RangeCatcodeInvalid#1#2{%
335   \count@=#1\relax
```

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```
336    \loop
337      \catcode\count@=15 %
338    \ifnum\count@<#2\relax
339      \advance\count@ 1 %
340    \repeat
341 }
342 \expandafter\ifx\csname LoadCommand\endcsname\relax
343    \def\LoadCommand{\input setouterhbox.sty\relax}%
344 \fi
345 \def\Test{%
346    \RangeCatcodeInvalid{0}{47}%
347    \RangeCatcodeInvalid{58}{64}%
348    \RangeCatcodeInvalid{91}{96}%
349    \RangeCatcodeInvalid{123}{255}%
350    \catcode'\@=12 %
351    \catcode'\\=0 %
352    \catcode'\{=1 %
353    \catcode'\}=2 %
354    \catcode'\#=6 %
355    \catcode'\[=12 %
356    \catcode'\]=12 %
357    \catcode'\%=14 %
358    \catcode'\ =10 %
359    \catcode13=5 %
360    \LoadCommand
361    \RestoreCatcodes
362 }
363 \Test
364 \csname @@end\endcsname
365 \end
366 ⟨/test1⟩
```

3.2   Test with package url

```
367 ⟨*test2⟩
368 \nofiles
369 \documentclass[a5paper]{article}
370 \usepackage{url}[2005/06/27]
371 \usepackage{setouterhbox}
372
373 \newsavebox{\testbox}
374
375 \setlength{\parindent}{0pt}
376 \setlength{\parskip}{2em}
377
378 \begin{document}
379 \raggedright
380
381 \url{http://this.is.a.very.long.host.name/followed/%
382 by/a/very_long_long_long_path.html}%
383
384 \sbox\testbox{%
385    \url{http://this.is.a.very.long.host.name/followed/%
386    by/a/very_long_long_long_path.html}%
387 }%
388 \unhbox\testbox
389
390 \begin{setouterhbox}{\testbox}%
391    \url{http://this.is.a.very.long.host.name/followed/%
392    by/a/very_long_long_long_path.html}%
393 \end{setouterhbox}
394 \unhbox\testbox
395
```

```
396 \end{document}
397 ⟨/test2⟩
```

4 Installation

4.1 Download

Package. This package is available on CTAN[1]:

CTAN:macros/latex/contrib/oberdiek/setouterhbox.dtx The source file.

CTAN:macros/latex/contrib/oberdiek/setouterhbox.pdf Documentation.

Bundle. All the packages of the bundle 'oberdiek' are also available in a TDS compliant ZIP archive. There the packages are already unpacked and the documentation files are generated. The files and directories obey the TDS standard.

CTAN:install/macros/latex/contrib/oberdiek.tds.zip

TDS refers to the standard "A Directory Structure for TeX Files" (CTAN:tds/tds.pdf). Directories with `texmf` in their name are usually organized this way.

4.2 Bundle installation

Unpacking. Unpack the `oberdiek.tds.zip` in the TDS tree (also known as `texmf` tree) of your choice. Example (linux):

```
unzip oberdiek.tds.zip -d ~/texmf
```

Script installation. Check the directory `TDS:scripts/oberdiek/` for scripts that need further installation steps. Package attachfile2 comes with the Perl script `pdfatfi.pl` that should be installed in such a way that it can be called as `pdfatfi`. Example (linux):

```
chmod +x scripts/oberdiek/pdfatfi.pl
cp scripts/oberdiek/pdfatfi.pl /usr/local/bin/
```

4.3 Package installation

Unpacking. The `.dtx` file is a self-extracting `docstrip` archive. The files are extracted by running the `.dtx` through plain-TeX:

```
tex setouterhbox.dtx
```

TDS. Now the different files must be moved into the different directories in your installation TDS tree (also known as `texmf` tree):

```
setouterhbox.sty            → tex/generic/oberdiek/setouterhbox.sty
setouterhbox.pdf            → doc/latex/oberdiek/setouterhbox.pdf
setouterhbox-example.tex    → doc/latex/oberdiek/setouterhbox-example.tex
test/setouterhbox-test1.tex → doc/latex/oberdiek/test/setouterhbox-test1.tex
test/setouterhbox-test2.tex → doc/latex/oberdiek/test/setouterhbox-test2.tex
setouterhbox.dtx            → source/latex/oberdiek/setouterhbox.dtx
```

If you have a `docstrip.cfg` that configures and enables `docstrip`'s TDS installing feature, then some files can already be in the right place, see the documentation of docstrip.

4.4 Refresh file name databases

If your TeX distribution (teTeX, mikTeX, . . .) relies on file name databases, you must refresh these. For example, teTeX users run `texhash` or `mktexlsr`.

---

[1] ftp://ftp.ctan.org/tex-archive/

4.5 Some details for the interested

Attached source. The PDF documentation on CTAN also includes the `.dtx` source file. It can be extracted by AcrobatReader 6 or higher. Another option is pdftk, e.g. unpack the file into the current directory:

```
pdftk setouterhbox.pdf unpack_files output .
```

Unpacking with LaTeX. The `.dtx` chooses its action depending on the format:

plain-TeX: Run docstrip and extract the files.

LaTeX: Generate the documentation.

If you insist on using LaTeX for docstrip (really, docstrip does not need LaTeX), then inform the autodetect routine about your intention:

```
latex \let\install=y\input{setouterhbox.dtx}
```

Do not forget to quote the argument according to the demands of your shell.

Generating the documentation. You can use both the `.dtx` or the `.drv` to generate the documentation. The process can be configured by the configuration file `ltxdoc.cfg`. For instance, put this line into this file, if you want to have A4 as paper format:

```
\PassOptionsToClass{a4paper}{article}
```

An example follows how to generate the documentation with pdfLaTeX:

```
pdflatex setouterhbox.dtx
makeindex -s gind.ist setouterhbox.idx
pdflatex setouterhbox.dtx
makeindex -s gind.ist setouterhbox.idx
pdflatex setouterhbox.dtx
```

5 References

[1] Damian Menscher, news:comp.text.tex, *overlong lines in List of Figures*, <dh058tqbd1@news.ks.uiuc.edu>, 23rd September 2005. http://groups.google.com/group/comp.text.tex/msg/79648d4cf1f8bc13

[2] David Kastrup, news:comp.text.tex, *Re: ANN: outerhbox.sty – collect horizontal material, for unboxing into a paragraph*, <85y855lrx3.fsf@lola.goethe.zz>, 7th October 2005. http://groups.google.com/group/comp.text.tex/msg/7cf0a345ef932e52

[3] Michael Downes, *Line breaking in \unhboxed Text*, TUGboat 11 (1990), pp. 605–612.

[4] Sebastian Rahtz, Heiko Oberdiek: *The hyperref package*; 2006/08/16 v6.75c; CTAN:macros/latex/contrib/hyperref/.

6 History

[2005/10/05 v1.0]

- First version.

[2005/10/07 v1.1]

- Option hyperref added.

[2005/10/18 v1.2]

- Support for explicit line breaks added.

[2006/02/12 v1.3]

- DTX format.

- Documentation extended.

[2006/08/26 v1.4]

- Date of hyperref updated.

[2007/04/26 v1.5]

- Use of package infwarerr.

[2007/05/17 v1.6]

- Standard header part for generic files.

[2007/09/09 v1.7]

- Catcode section added.

7 Index

Numbers written in italic refer to the page where the corresponding entry is described; numbers underlined refer to the code line of the definition; numbers in roman refer to the code lines where the entry is used.

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