

# The `setouterhbox` package

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## Abstract

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

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# 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  $\varepsilon$ -TeX that extends the tool set of a TeX macro programmer. Especially useful  $\varepsilon$ -TeX was in this package for detecting and dealing with erroneous 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.** L<sup>A</sup>T<sub>E</sub>X: 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:

**L<sup>A</sup>T<sub>E</sub>X:** `\newsavebox{\<name>}`

**plain-TeX:** `\newbox\<name>`

Then `\<name>` is a command that held the box number.

**Box wrapping.** L<sup>A</sup>T<sub>E</sub>X 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  $\text{\LaTeX}$  package.

### 2.1 Package start stuff

```
31 <*package>
```

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

```

32 \begingroup
33   \catcode44 12 % ,
34   \catcode45 12 % -
35   \catcode46 12 % .
36   \catcode58 12 % :
37   \catcode64 11 % @
38   \expandafter\let\expandafter\x\csname ver@setouterhbox.sty\endcsname
39   \ifcase 0%
40     \ifx\x\relax % plain
41     \else
42       \ifx\x\empty % LaTeX
43       \else
44         1%
45       \fi
46     \fi
47   \else
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 \endgroup
57 \expandafter\endinput
58 \fi
59 \endgroup

```

Package identification:

```

60 \begingroup
61   \catcode40 12 % (
62   \catcode41 12 % )
63   \catcode44 12 % ,
64   \catcode45 12 % -
65   \catcode46 12 % .
66   \catcode47 12 % /
67   \catcode58 12 % :
68   \catcode64 11 % @
69   \expandafter\ifx\csname ProvidesPackage\endcsname\relax
70     \def\x#1#2#3[#4]{\endgroup
71       \immediate\write-1{Package: #3 #4}%
72       \xdef#1{#4}%
73     }%
74   \else
75     \def\x#1#2[#3]{\endgroup
76       #2[#{#3}]%
77       \ifx#1\relax
78         \xdef#1{#3}%
79       \fi
80     }%
81   \fi
82 \expandafter\x\csname ver@setouterhbox.sty\endcsname
83 \ProvidesPackage{setouterhbox}%
84 [2007/05/17 v1.6 Set hbox in outer horizontal mode (H0)]

```

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

```
85 \newbox\setouterhboxBox
```

$\text{\setouterhboxFailure}$  Error message for both plain- $\text{\TeX}$  and  $\text{\LaTeX}$

```

86 \begingroup\expandafter\expandafter\expandafter\endgroup
87 \expandafter\ifx\csname RequirePackage\endcsname\relax
88   \input infwarerr.sty\relax
89 \else
90   \RequirePackage{infwarerr}%
91 \fi
92 \edef\setouterhboxFailure#1#2{%
93   \expandafter\noexpand\csname @PackageError\endcsname
94     {setouterhbox}{#1}{#2}%
95 }

```

## 2.2 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.

```

96 \begingroup\expandafter\expandafter\expandafter\endgroup
97 \expandafter\ifx\csname lastnodetype\endcsname\relax
98   \catcode'T=9 % ignore
99   \catcode'E=14 % comment
100 \else
101   \catcode'T=14 % comment
102   \catcode'E=9 % ignore
103 \fi

```

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

```

104 \def\setouterhboxRemove{%
105 E \ifnum\lastnodetype<11 %
106 E   \else
107 E   \ifnum\lastnodetype>13 %
108 E   \else
109     \unskip\unkern\unpenalty
110 E   \expandafter\expandafter\expandafter\setouterhboxRemove
111 E   \fi
112 E \fi
113 }%

```

`\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 L<sup>A</sup>T<sub>E</sub>X is used.

```

114 \def\setouterhbox#1{%
115   \begingroup
116   \def\setouterhboxNum{#1}%
117   \setbox0\vbox\bgroup
118 T   \kern.123pt\relax % marker
119 T   \kern0pt\relax % removed by \setouterhboxRemove
120   \begingroup
121   \everypar{}%
122   \noindent
123 }

```

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

```

124 \def\endsetouterhbox{%
125   \endgroup

```

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

```

126   \pretolerance-1 %

```

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

```
127      \tolerance10000 %
128      \hsize\maxdimen
```

Line is not underfull:

```
129      \parfillskip 0pt plus 1filll\relax
130      \leftskip0pt\relax
```

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

```
131      \rightskip0pt plus 1fil\relax
132      \everypar{}%
```

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

```
133      \kern0pt%
134      \endgraf
135      \setouterhboxRemove
136 E      \ifnum\lastnodetype=1 %
137 E          \global\setbox\setouterhboxBox\lastbox
138 E          \loop
139 E              \setouterhboxRemove
140 E              \ifnum\lastnodetype=1 %
141 E                  \setbox0=\lastbox
142 E                  \global\setbox\setouterhboxBox=\hbox{%
143 E                      \unhbox0 %
```

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

```
144 E          \unskip
145 E          \unhbox\setouterhboxBox
146 E      }%
147 E      \repeat
148 E      \else
149 E          \setouterhboxFailure{%
150 E              Something is wrong%
151 E          }{%
152 E              Could not find expected line.%
153 E              \MessageBreak
154 E              (\string\lastnodetype: \number\lastnodetype, expected: 1)%
155 E          }%
156 E      \fi
157 E      \setouterhboxRemove
158 T      \global\setbox\setouterhboxBox\lastbox
159 T      \loop
160 T          \setouterhboxRemove
161 T          \setbox0=\lastbox
162 T      \ifcase\ifvoid0 1\else0\fi
163 T          \global\setbox\setouterhboxBox=\hbox{%
164 T              \unhbox0 %
```

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

```
165 T          \unskip
166 T          \unhbox\setouterhboxBox
167 T      }%
168 T      \repeat
169 T      \ifdim.123pt=\lastkern
170 T      \else
171 T          \setouterhboxFailure{%
172 T              Something is wrong%
173 T          }{%
174 T              Unexpected stuff was detected before the line.%
175 T          }%
176 T      \fi
177 T      \egroup
178 T      \ifcase \ifnum\wd0=0 \else 1\fi
```

```

179 T          \ifdim\ht0=.123pt \else 1\fi
180 T          \ifnum\dp0=0 \else 1\fi
181 T          0 %
182 E          \ifnum\lastnodetype=-1 %
There was just one line that we have caught.
183          \else
184          \setouterhboxFailure{%
185          Something is wrong%
186          }{%
187          After fetching the line there is more unexpected stuff.%
188 E          \MessageBreak
189 E          (\string\lastnodetype: \number\lastnodetype, expected: -1)%
190          }%
191          \fi
192 E          \egroup
193 \expandafter\endgroup
194 \expandafter\setouterhboxFinish\expandafter{%
195 \number\setouterhboxNum
196 }%
197 }

```

## 2.3 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{...}.

```

198 \def\setouterhboxCurr{\setouterhbox}
199 \def\setouterhboxLast#1{%
200 \setbox#1\hbox{%
201 \unhbox\setouterhboxBox
202 \unskip % remove \rightskip glue
203 \unskip % remove \parfillskip glue
204 \unpenalty % remove paragraph ending \penalty 10000
205 \unkern % remove explicit kern inserted above
206 }%
207 }

```

\setouterhboxFinish #1 is an explicit number.

```

208 \def\setouterhboxFinish#1{%
209 \begingroup\expandafter\expandafter\expandafter\endgroup
210 \expandafter\ifx\csname @currenvir\endcsname\setouterhboxCurr
211 \aftergroup\setouterhboxLast
212 \aftergroup{%
213 \setouterhboxAfter #1\NIL
214 \aftergroup}%
215 \else
216 \setouterhboxLast{#1}%
217 \fi
218 }

```

\setouterhboxAfter #1 is an explicit number.

```

219 \def\setouterhboxAfter#1#2\NIL{%
220 \aftergroup#1%
221 \ifx\#2\%
222 \else
223 \setouterhboxReturnAfterFi{%
224 \setouterhboxAfter#2\NIL
225 }%
226 \fi
227 }

```

\setouterhboxReturnAfterFi A utility macro to get tail recursion.

```

228 \long\def\setouterhboxReturnAfterFi#1\fi{\fi#1}

```

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

```
229 \catcode69=11\relax % E
230 \catcode84=11\relax % T
```

## 2.4 Option hyperref

```
231 \begingroup
232   \def\x{LaTeX2e}%
233 \expandafter\endgroup
234 \ifx\x\fmtname
235 \else
236   \expandafter\endinput
237 \fi
```

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

```
238 \DeclareOption{hyperref}{%
239   \long\def\Hy@setouterhbox#1#2{%
240     \setouterhbox{#1}#2\endsetouterhbox
241   }%
242 }

243 \ProcessOptions\relax
244 \</package>
```

## 3 Installation

### 3.1 Download

**Package.** This package is available on CTAN<sup>1</sup>:

[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:macros/latex/contrib/oberdiek/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.

### 3.2 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/
```

---

<sup>1</sup><http://ftp.ctan.org/tex-archive/>



### 3.3 Package installation

**Unpacking.** The `.dtx` file is a self-extracting `docstrip` archive. The files are extracted by running the `.dtx` through plain- $\text{\TeX}$ :

```
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
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`.

### 3.4 Refresh file name databases

If your  $\text{\TeX}$  distribution (`te $\text{\TeX}$` , `mik $\text{\TeX}$` , ...) relies on file name databases, you must refresh these. For example, `te $\text{\TeX}$`  users run `texhash` or `mktextlsr`.

### 3.5 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  $\text{\LaTeX}$ .** The `.dtx` chooses its action depending on the format:

**plain- $\text{\TeX}$ :** Run `docstrip` and extract the files.

**$\text{\LaTeX}$ :** Generate the documentation.

If you insist on using  $\text{\LaTeX}$  for `docstrip` (really, `docstrip` does not need  $\text{\LaTeX}$ ), 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 `pdf $\text{\LaTeX}$` :

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

## 4 References

- [1] Damian Menscher, [news:comp.text.tex](mailto:news:comp.text.tex), *overlong lines in List of Figures*, [dh058t\\$qbd\\$1@news.ks.uiuc.edu](mailto:dh058t$qbd$1@news.ks.uiuc.edu), 23rd September 2005. <http://groups.google.com/group/comp.text.tex/msg/79648d4cf1f8bc13>
- [2] David Kastrup, [news:comp.text.tex](mailto:news:comp.text.tex), *Re: ANN: outerhbox.sty – collect horizontal material, for unboxing into a paragraph*, [85y8551rx3.fsf@lola.goethe.zz](mailto:85y8551rx3.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/](http://CTAN:macros/latex/contrib/hyperref/).

## 5 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.

## 6 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.

### Symbols

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