The **setouterhbox** package

Heiko Oberdiek*

2016/05/16 v1.8

Abstract

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

Contents

1 Documentation ................................................. 2
  1.1 Introduction ............................................. 2
  1.2 Acknowledgement ......................................... 2
  1.3 Usage ...................................................... 2
  1.4 Option **hyperref** .................................. 3
  1.5 Example .................................................. 3

2 Implementation ............................................... 3
  2.1 Package start stuff ................................... 3
  2.2 Interface macros ....................................... 5
  2.3 Main part ............................................... 6
  2.4 Environment support .................................. 8
  2.5 Option **hyperref** .................................. 9

3 Installation .................................................. 9
  3.1 Download ............................................... 9
  3.2 Bundle installation .................................... 9
  3.3 Package installation ................................... 9
  3.4 Refresh file name databases ........................... 10
  3.5 Some details for the interested ................. 10

4 References .................................................. 10

5 History ..................................................... 11

6 Index ......................................................... 11

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 \epsilon\TeX that extends the tool set of a \TeX macro programmer. Especially useful \epsilon\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. \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\langle name\rangle

plain \TeX: \newbox\langle name\rangle

Then \langle name\rangle 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}{\langle box number\rangle}...\end{setouterhbox}

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

\setouterhbox{\langle box number\rangle}...\endsetouterhbox

In both cases the material is put into an \hbox and assigned to the given box, denoted by \langle box number\rangle. Note the assignment is local, the same way \lrbox behaves.
Unwrapping. The box material is ready for unwrapping:

\unhbox\langle box number \rangle

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, vutexpdfmark, 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

\begin{document}
\raggedright
\url{http://this.is.a.very.long.host.name/followed/by/a/very_long_long_long_path.html}\
\setbox\testbox{\url{http://this.is.a.very.long.host.name/followed/by/a/very_long_long_long_path.html}}\
\unhbox\testbox\
\begin{setouterhbox}{\testbox}\
\url{http://this.is.a.very.long.host.name/followed/by/a/very_long_long_long_path.html}\
\end{setouterhbox}\
\unhbox\testbox
\end{document}

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

\begingroup\catcode61\catcode48\catcode32=10\relax%
\catcode13=5 \catcode4=10 \catcode1=13 
\catcode35=6 \catcode13=5 
\catcode39=12 \catcode44=12 
\catcode45=12 \catcode46=12 
\catcode48=12 
\catcode64=11 \catcode123=1 
\catcode125=2 
\expandafter\let\expandafter\x\csname ver@setouterhbox.sty\endcsname
\ifx\x\relax % plain-TeX, first loading
\else
  \empty{}
  \ifx\empty \LaTeX, first loading, 
    \PackageInfo{setouterhbox}{The package is already loaded}
  \else
    \expandafter\let\expandafter\x\csname PackageInfo\endcsname
    \ifx\x\relax
      \def\x#1#2#3\[#4\]{
        \immediate\write-1{Package: #3 #4}\
        \xdef#1{#4}\}
    \else
      \def\x#1#2\[#3\]{
        \PackageInfo{#1}{#3, stopped}}\%
    \fi
    \x{setouterhbox}
  \fi
\aftergroup\endinput%
\endgroup%

Package identification:

\begingroup\catcode61\catcode48\catcode32=10\relax%
\catcode13=5 \catcode4=10 \catcode1=13 
\catcode35=6 \catcode13=5 
\catcode39=12 \catcode44=12 
\catcode45=12 \catcode46=12 
\catcode48=12 
\catcode64=11 \catcode123=1 
\catcode125=2 
\expandafter\ifx\csname ProvidesPackage\endcsname
\def\x#1#2#3\[#4\]{
  \immediate\write-1{Package: #3 #4}\
  \xdef#1{#4}\}
\else
  \def\x#1#2\[#3\]{
    \PackageInfo{#1}{#3}}\%
\fi
\x{setouterhbox}
\aftergroup\endinput%
\endgroup%
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.
\setouterhboxFailure Error message for both plain \TeX{} and \LaTeX{}
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.

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

\setouterhbox Passing the box contents by macro parameter would prevent catcode changes in the box contents like by \verb. Also \verb and \verb 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 \TeX is used.

\endsetouterhbox Most of the work is done in the end part, thus the heart of the method follows:
Line is not underfull:
188 \parfillskip 0pt plus 1filll\relax
189 \leftskip\relax
Suppress underful \hbox warnings, is explicit line breaks are used.
190 \rightskip 0pt plus 1filll
191 \everypar{}%
Ensure that there is a paragraph and prevents \endgraf from eating terminal glue:
192 \kern0pt%
193 \endgraf
194 \setouterhboxRemove
195 E \ifnum\lastnodetype=1 %
196 E \global\setbox\setouterhboxBox=\lastbox
197 E \loop
198 E \setouterhboxRemove
199 E \ifnum\lastnodetype=1 %
200 E \setbox0=\lastbox
201 E \global\setbox\setouterhboxBox=\hbox{%
202 E \unhbox0 %
Remove \rightskip, a penalty with -10000 is part of the previous line.
203 E \unskip
204 E \unhbox\setouterhboxBox
205 E )%
206 E \repeat
207 E \else
208 E \setouterhboxFailure{%
209 E Something is wrong%
210 E )%
211 E Could not find expected line.%
212 E \MessageBreak
213 E (string\lastnodetype: \number\lastnodetype, expected: 1)%
214 E )%
215 E \fi
216 E \setouterhboxRemove
217 T \global\setbox\setouterhboxBox=\lastbox
218 T \loop
219 T \setouterhboxRemove
220 T \setbox0=\lastbox
221 T \ifcase\ifvoid0 \else0\fi
222 T \global\setbox\setouterhboxBox=\hbox{%
223 T \unhbox0 %
Remove \rightskip, a penalty with -10000 is part of the previous line.
224 T \unskip
225 T \unhbox\setouterhboxBox
226 T )%
227 T \repeat
228 T \ifdim.123pt=\lastkern
229 T \else
230 T \setouterhboxFailure{%
231 T Something is wrong%
232 T )%
233 T Unexpected stuff was detected before the line.%
234 T )%
235 T \fi
236 T \egroup
237 T \ifcase \ifnum\wd0=0 \else 1\fi
238 T \ifdim\ht0=.123pt \else 1\fi
239 T \ifdim\dp0=0 \else 1\fi
240 T 0 %
241 E \ifnum\lastnodetype=-1 %
There was just one line that we have caught.

\else
  \setouterhboxFailure(%
    \sbox\lastouterhboxBox{
      \unhbox\setouterhboxBox
      \unskip % remove \rightskip glue
      \unskip % remove \parfillskip glue
      \unpenalty % remove paragraph ending \penalty 10000
      \unkern % remove explicit kern inserted above
    }

\fi
\egroup
\expandafter\endgroup
\expandafter\setouterhboxFinish\expandafter{\number\setouterhboxNum}
%
}

\setouterhboxFinish
#1 is an explicit number.

\long\def\setouterhboxFinish#1\fi{\fi#1}

\setouterhboxAfter
#1 is an explicit number.

\setouterhboxReturnAfterFi
A utility macro to get tail recursion.

\catcode69=11\relax % E
\catcode84=11\relax % T
2.5 Option hyperref

\begingroup
\def\x{LaTeX2e}\expandafter\endgroup
\ifx\x\fmtname\else
\expandafter\setouterhboxAtEnd\fi%
\Hy@setouterhbox
\Hy@setouterhbox is the internal hook that \hyperref uses since 2006/02/12 v6.75a.

\DeclareOption{hyperref}{\long\def\Hy@setouterhbox#1#2{\setouterhbox{#1}#2\endsetouterhbox}}%
\processOptions\relax
\setouterhboxAtEnd%
⟨/package⟩

3 Installation

3.1 Download

Package. This package is available on CTAN:\footnote{CTAN:pkg/setouterhbox}


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

\textit{TDS} refers to the standard “A Directory Structure for \TeX Files” (CTAN:pkg/tds). Directories with \texttt{texmf} in their name are usually organized this way.

3.2 Bundle installation

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

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

3.3 Package installation

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

```
tex setouterhbox.dtx
```
Now the different files must be moved into the different directories in your installation TDS tree (also known as \texttt{texmf} tree):

- \texttt{setouterhbox.sty} → \texttt{tex/generic/oberdiek/setouterhbox.sty}
- \texttt{setouterhbox.pdf} → \texttt{doc/latex/oberdiek/setouterhbox.pdf}
- \texttt{setouterhbox-example.tex} → \texttt{doc/latex/oberdiek/setouterhbox-example.tex}
- \texttt{setouterhbox.dtx} → \texttt{source/latex/oberdiek/setouterhbox.dtx}

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

3.4 Refresh file name databases

If your \TeX\ distribution (\TeX\ Live, MiK\TeX, ...) relies on file name databases, you must refresh these. For example, \TeX\ Live users run \texttt{texhash} or \texttt{mktexlsr}.

3.5 Some details for the interested

Unpacking with \LaTeX. The \texttt{.dtx} chooses its action depending on the format:

plain \TeX: Run \texttt{docstrip} and extract the files.

\LaTeX: Generate the documentation.

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

\begin{verbatim}
latex \let\install=y\input{setouterhbox.dtx}
\end{verbatim}

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

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

\begin{verbatim}
\PassOptionsToClass{a4paper}{article}
\end{verbatim}

An example follows how to generate the documentation with \texttt{pdflatex}:

\begin{verbatim}
pdflatex setouterhbox.dtx
makeindex -s gind.ist setouterhbox.idx
pdflatex setouterhbox.dtx
makeindex -s gind.ist setouterhbox.idx
pdflatex setouterhbox.dtx
\end{verbatim}

4 References


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.

[2007/09/09 v1.7]
• Catcode section added.

[2016/05/16 v1.8]
• Documentation updates.

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; plain numbers refer to the code lines where the entry is used.

Symbols
\@undefined ....................... 88
\ \ .......................... 280

A\aftergroup .... 59, 270, 271, 273, 279\csname .................. 44,
\catcode .............. 32, 33, 35,
\dp .......................... 239

B\begin ....................... 11, 23

C\documentclass .............. 2
\DeclareOption .................. 297