The \texttt{setouterhbox} package

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Abstract

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

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*Please report any issues at \url{https://github.com/ho-tex/oberdiek/issues}
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 \TeX that extends the tool set of a \TeX macro programmer. Especially useful \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{⟨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 \texttt{lrbbox}.  The environment \texttt{setouterbbox} uses the same syntax and offers the same features, such as verbatim stuff inside:

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

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

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

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

Unwrapping.  The box material is ready for unwrapping:

\begin{unhbox}(box number)\end{unhbox}

1.4 Option \texttt{hyperref}

Package url uses math mode for typesetting urls.  Break points are inserted by \texttt{\binoppenalty} and \texttt{\relpenalty}.  Unhappily these break points are removed, if \texttt{hyperref} is used with option breaklinks and drivers that depend on \texttt{pdfmark}: \texttt{dvips}, \texttt{vtexpdfmark}, \texttt{textures}, and \texttt{dvipsone}.  Thus the option \texttt{hyperref} enables the method of this package to avoid the removal of \texttt{\relpenalty} and \texttt{\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 \texttt{hyperref}, because starting with this version the necessary hook is provided that package \texttt{setouterbbox} uses.

\begin{verbatim}
\usepackage[...]{hyperref}[2006/08/16]
\usepackage[hyperref]{setouterbbox}
\end{verbatim}

Package order does not matter.

1.5 Example

\begin{verbatim}
\documentclass[a5paper]{article}
\usepackage[url]{2005/06/27}
\usepackage{setouterbbox}
\newsavebox{\testbox}
\setlength{\parindent}{0pt}
\setlength{\parskip}{2em}
\begin{document}
\raggedright
\url{http://this.is.a.very.long.host.name/followed/%}
by/a/very_long_long_long_path.html}\
\sbox{\testbox}{%}\url{http://this.is.a.very.long.host.name/followed/%}
by/a/very_long_long_long_path.html}\%
\unhbox{\testbox}
\end{document}
\end{verbatim}
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 % ^^M
\endlinechar=13 %
\catcode35=6 % #
\catcode39=12 % '
\catcode44=12 % ,
\catcode45=12 % -
\catcode46=12 % .
\catcode58=12 % :
\catcode64=11 % @
\catcode123=1 % {
\catcode125=2 % }
\expandafter\let\expandafter\x\csname ver@setouterhbox.sty\endcsname
\ifx\x\relax % plain-\TeX{}, first loading
\else
\expandafter\ifx\csname PackageInfo\endcsname\relax
\def\x#1#2{\immediate\write-1{\PackageInfo{#1}{#2.}}}
\else
\def\x#1#2{\PackageInfo{#1}{#2, stopped}}
\fi
\x{setouterhbox}{The package is already loaded}
\aftergroup\endinput
\fi
\endgroup%

Package identification:
\begingroup\catcode61\catcode48\catcode32=10\relax%
\catcode13=5 % ^^M
\endlinechar=13 %
\catcode35=6 % #
\catcode39=12 % '
\catcode44=12 % ,
\catcode40=12 % ( 
\catcode41=12 % )
\catcode44=12 % ,
\catcode45=12 % -
\catcode46=12 % .
\catcode47=12 % /
\catcode58=12 % :
\catcode64=11 % @
\catcode91=12 % [ 
\catcode93=12 % ]
\catcode123=1 % {
\catcode125=2 % }
\expandafter\ifx\csname ProvidesPackage\endcsname\relax
\def\x#1#2#3[#4]{\endgroup
\immediate\write-1{Package: #3 #4}\
\xdef#1{#4}\
}\else
\def\x#1#2[#3]{\endgroup
#2[#3]\
\ifx#1\@undefined
\xdef#1{#3}\
\fi
\ifx#1\relax
\xdef#1{#3}\
\fi
\fi
\expandafter\x\csname ver@setouterhbox.sty\endcsname
\ProvidesPackage{setouterhbox}[
[2016/05/16 v1.8 Set hbox in outer horizontal mode (HD)]
\begingroup\catcode61\catcode48\catcode32=10\relax%
\catcode13=5 % "^M
\endlinechar=13 %
\catcode123=1 % {
\catcode125=2 % }
\catcode64=11 % @
\def\x/endgroup
\expandafter\edef\csname setouterhboxAtEnd\endcsname{%
\endlinechar=the/endlinechar\relax
\catcode13=the/catcode13\relax
\catcode32=the/catcode32\relax
\catcode35=the/catcode35\relax
\catcode61=the/catcode61\relax
\catcode64=the/catcode64\relax
\catcode123=the/catcode123\relax
\catcode125=the/catcode125\relax
}\]
\edef\setouterhboxAtEnd{%
\x/endgroup
\edef\csname setouterhboxAtEnd\endcsname{%
\endlinechar=the/endlinechar\relax
\catcode13=the/catcode13\relax
\catcode32=the/catcode32\relax
\catcode35=the/catcode35\relax
\catcode61=the/catcode61\relax
\catcode64=the/catcode64\relax
\catcode123=the/catcode123\relax
\catcode125=the/catcode125\relax
}
\edef\setouterhboxAtEnd{%


2.2 Interface macros

\texttt{\setouterhboxBox}\hspace{1em} The method requires a global box assignment. To be on the safe side, a new box register is allocated for this global box assignment.

\texttt{\setouterhboxFailure}\hspace{1em} Error message for both plain \TeX{} and \LaTeX{}

2.3 Main part

ee\TeX{} provides much better means for checking error conditions. Thus lines marked by "E" are executed if e\TeX{} is available, otherwise the lines marked by "T" are used.

\texttt{\setouterhboxRemove}\hspace{1em} Remove all kern, glue, and penalty nodes; poor man's version, if e-\TeX{} is not available


\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, be-
cause 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.
\def\setouterhbox#1{%
  \begingroup
  \def\setouterhboxNum{#1}%
  \setbox0\vbox\bgroup
  \kern.123pt% marker
  \kern0pt% removed by \setouterhboxRemove
  \begingroup
    \everypar{}
    \noindent
  \endgroup
} \endsetouterhbox

Most of the work is done in the end part, thus the heart of the method follows:
\def\endsetouterhbox{%
  \endgroup
  Omit the first pass to get the penalties of the second pass.
  \pretolerance-1 %
  We don’t want a third pass with \emergencystretch.
  \tolerance10000 %
  \hsize\maxdimen

  Line is not underfull:
  \parfillskip 0pt plus 1filll\relax
  \leftskip0pt\relax

  Suppress underfull \hbox warnings, is explicit line breaks are used.
  \rightskip0pt plus 1fill\relax
  \everypar{}

  Ensure that there is a paragraph and prevents \endgraf from eating terminal
glue:
  \kern0pt%
  \endgraf
  \setouterhboxRemove
  \ifnum\lastnodetype=1 %
  \global\setbox\setouterhboxBox\lastbox
  \loop
  \setouterhboxRemove
  \ifnum\lastnodetype=1 %
  \setbox0=\lastbox
  \ifnum\lastnodetype=1 %
  \global\setbox\setouterhboxBox=\hbox{%
  \unhbox0 %

Remove \rightskip, a penalty with -10000 is part of the previous line.
\unskip
\unskip
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{...}.
\def\setouterhboxCurr{setouterhbox}
\def\setouterhboxLast#1{%
\setbox#1\hbox{%
\unhbox\setouterhboxBox
\unskip % remove \rightskip glue
\unskip % remove \parfillskip glue
\unpenalty % remove paragraph ending \penalty 10000
\unkern % remove explicit kern inserted above
}%
}
\setouterhboxFinish #1 is an explicit number.
\def\setouterhboxFinish#1{%
\begingroup\expandafter\expandafter\expandafter\endgroup
\expandafter\ifx\csname @currenvir\endcsname\setouterhboxCurr
\aftergroup\setouterhboxLast
\aftergroup{%
\setouterhboxAfter #1\NIL
\aftergroup}%
\else
\setouterhboxLast{#1}%
\fi
}
\setouterhboxAfter #1 is an explicit number.
\def\setouterhboxAfter#1#2\NIL{%\aftergroup#1%
\ifx\#2\%
\else
\setouterhboxReturnAfterFi{%
\setouterhboxAfter#2\NIL
\aftergroup}%
\fi
}
\setouterhboxReturnAfterFi A utility macro to get tail recursion.
\long\def\setouterhboxReturnAfterFi#1\fi{%\fi#1}
Restore catcodes we have need to distinguish between the implementation with
and without ε-\TeX.
\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
}%
}
3 Installation

3.1 Download

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

\texttt{CTAN:macros/latex/contrib/oberdiek/setouterhbox.dtx} The source file.


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.

\texttt{CTAN:install/macros/latex/contrib/oberdiek.tds.zip}

\textit{TDS} refers to the standard “A Directory Structure for \TeX\ Files” (\texttt{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):

\begin{verbatim}
unzip oberdiek.tds.zip -d ~/texmf
\end{verbatim}

3.3 Package installation

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

\begin{verbatim}
tex setouterhbox.dtx
\end{verbatim}

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

\begin{verbatim}
setouterhbox.sty \rightarrow tex/generic/oberdiek/setouterhbox.sty
setouterhbox.pdf \rightarrow doc/latex/oberdiek/setouterhbox.pdf
setouterhbox-example.tex \rightarrow doc/latex/oberdiek/setouterhbox-example.tex
setouterhbox.dtx \rightarrow source/latex/oberdiek/setouterhbox.dtx
\end{verbatim}

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}.

\footnote{CTAN:pkg/setouterhbox}
3.5 Some details for the interested

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

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

\textbf{\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.

\textbf{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 pdf\LaTeX:

\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

[1] Damian Menscher, \texttt{news:comp.text.tex}, overlong lines in List of Figures, <dh058t$qbd$1@news.ks.uiuc.edu>, 23rd September 2005. \url{https://groups.google.com/group/comp.text.tex/msg/79648d4cf1f8bc13}

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


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

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