The setouterhbox package

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Abstract

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

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*Please report any issues at 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 \texttt{\varepsilon-\TeX} that extends the tool set of a \TeX{} macro programmer. Especially useful \texttt{\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. \LaTeX: as usually:

\begin{verbatim}
\usepackage{setouterhbox}
\end{verbatim}

The package can also be included directly, thus plain \TeX{} users write:

\begin{verbatim}
\input setouterhbox.sty
\end{verbatim}

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: \texttt{\newsavebox\langle name\rangle}

plain \TeX{}: \texttt{\newbox\langle name\rangle}

Then \texttt{\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}{⟨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 \newsavebox{\testbox}
6 \setlength{\parindent}{0pt}
7 \setlength{\parskip}{2em}
8 \begin{document}
9 \raggedright
10 \url{http://this.is.a.very.long.host.name/followed/%
11 by/a/very_long_long_path.html}%
12 \sbox{\testbox}{
13 \url{http://this.is.a.very.long.host.name/followed/%
14 by/a/very_long_long_path.html}%
15 }%
16 \unhbox{\testbox}

3
2 Implementation

Internal macros are prefixed by \setouterhbox. \empty 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
\def\empty{}
\ifx\x\empty % \LaTeX, first loading, 
% variable is initialized, but \ProvidesPackage not yet seen
\else
\expandafter\ifx\csname PackageInfo\endcsname\relax
\def\x\#1#2{%
  \immediate\write-1{Package #1 Info: #2.}%
}%
\else
\def\x#1#2{%PackageInfo\#1, stopped}%
\fi
\x(setouterhbox){The package is already loaded}%
\aftergroup\endinput
\fi
\fi
\endgroup%

Package identification:
\begingroup\catcode61\catcode48\catcode32=10\relax%
\catcode13=5 % ^^M
\endlinechar=13 %
\catcode35=6 % #
\catcode39=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 \\
\immediate\write-1{Package: #3 #4}\
\xdef#1{#3}\
\fi \\
\ifx#1\@undefined \\
\xdef#1{#3}\
\fi \\
\ifx#1\relax \\
\xdef#1{#3}\
\fi \\
\expandafter\ifx\csname ver@setouterhbox.sty\endcsname\relax \\
\def\x#1#2[#3][#4]\endgroup \\
\immediate\write-1{Package: #3 #4}\
\xdef#1{#4}\
}\
\else \\
\def\x#1[#3][#4]\endgroup \\
\immediate\write-1{Package: #3 #4}\
\xdef#1{#3}\
\fi \\
\expandafter\ifx\csname ver@setouterhbox.sty\endcsname\relax \\
\ProvidesPackage{setouterhbox}\
\[2016/05/16 v1.8 Set hbox in outer horizontal mode (HO)\] \\
\begingroup\catcode61\catcode48\catcode32=10\relax \\
\catcode13=5 \^M \\
\endlinechar=13 \% \\
\catcode123=1 \% \\
\catcode125=2 \% \\
\catcode64=11 \% @ \\
\catcode123=1 \% \\
\catcode125=2 \% \\
\edef\setouterhboxAtEnd{\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% \\
\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% \\
\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% \\
\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% \\
\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%
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
\setouterhboxRemove
Remove all kern, glue, and penalty nodes; poor man's version, if \TeX is not available

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 \etex 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 automati-
cally get an environment setouterhbox if \LaTeX is used.
\def\setouterhbox#1{%
\begingroup
\def\setouterhboxNum{#1}%
\setbox0\vbox{\bgroup
T \kern.123pt\relax % marker
T \kern0pt\relax % removed by \setouterhboxRemove
\begingroup
\everypar{}%
\noindent
}
\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 underful \hbox warnings, is explicit line breaks are used.
\rightskip0pt plus 1fil\relax
\everypar{}
Ensure that there is a paragraph and prevents \endgraf from eating terminal
glue:
\kern0pt%
\endgraf
\setouterhbboxRemove
\ifnum\lastnodetype=1 %
\global\setbox\setouterhbboxBox=\lastbox
\loop
\setouterhbboxRemove
\ifnum\lastnodetype=1 %
\setbox0=\lastbox
\global\setbox\setouterhbboxBox=\hbox{%
\un hbox 0 %
Remove \rightskip, a penalty with -10000 is part of the previous line.
\unskip
\un hbox\setouterhbboxBox
\repeat
7
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
\}%
\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

\section{Option \texttt{hyperref}}
\begingroup
\def\x{LaTeX2e}%
\expandafter\endgroup
\ifx\x\fmtname
\DeclareOption{hyperref}{%
\long\def\Hy@setouterhbox#1#2{%
\setouterhbox{#1}#2\endsetouterhbox
}%
}
\else
\expandafter\setouterhboxAtEnd
\fi

\Hy@setouterhbox \Hy@setouterhbox is the internal hook that \texttt{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:\(^1\):


**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:pkg/tds). 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
```

3.3 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
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 TeX distribution (TeX Live, MiKTeX, ...) relies on file name databases, you must refresh these. For example, TeX Live users run texhash or mktexlsa:\(^1\)

\(^1\)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 \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


[2] David Kastrup, \texttt{news:comp.text.tex}, \textit{Re: ANN: outerhbox.sty – collect horizontal material, for unboxing into a paragraph}, \texttt{<85y855lx3.fsf@lola.goethe.zz>}, 7th October 2005. \url{https://groups.google.com/group/comp.text.tex/msg/7cf0a345ef932e52}


[4] Sebastian Rahtz, Heiko Oberdiek: \textit{The \texttt{hyperref} package}; 2006/08/16 v6.75c; \url{CTAN:pkg/hyperref}.

5 History

[2005/10/05 v1.0]
\begin{itemize}
   \item First version.
\end{itemize}

[2005/10/07 v1.1]
\begin{itemize}
   \item Option \texttt{hyperref} added.
\end{itemize}
[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.

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