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 implicite penalties \texttt{\binoppenalty} and \texttt{\relpenalty}. This packages tries to put stuff into an \texttt{\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 \texttt{breaklinks} hyperref sets the links as usual, put them in a box and write the link data with box dimensions into the appropriate \texttt{\special{}}. 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 \texttt{comp.text.tex} where Damian Menscher has started the thread, see \cite{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 \texttt{comp.text.tex}, \cite{2}) remembered an old article of Michael Downes (\cite{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:

\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{}: \begin{verbatim}
\newsavebox{\langle name\rangle}
\end{verbatim}

plain \TeX{}: \begin{verbatim}
\newbox\langle name\rangle
\end{verbatim}

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 \texttt{lrbox}. The environment \texttt{setouterhbox} uses the same syntax and offers the same features, such as verbatim stuff inside:

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

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

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

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

Unwrapping. The box material is ready for unwrapping:

\begin{verbatim}
\unhbox⟨box number⟩
\end{verbatim}

1.4 Option hyperref

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

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

Package order does not matter.

1.5 Example

\begin{verbatim}
(*example*)
\documentclass[a5paper]{article}
\usepackage[url]{2005/06/27}
\usepackage{setouterhbox}
\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

\begin{verbatim}
(*package)

Prevent reloading more than one, necessary for plain \TeX{}: Reload check, especially if the package is not used with \LaTeX{}.
\begin{group}
\catcode61=10 \catcode48=10 \catcode32=10 \relax
\catcode13=5 \relax
\endlinechar=13 \relax
\catcode35=6 \relax
\catcode39=12 \relax
\catcode44=12 \relax
\catcode45=12 \relax
\catcode46=12 \relax
\catcode58=12 \relax
\catcode64=11 \relax
\expandafter\let\expandafter\x\csname ver@setouterhbox.sty\endcsname
\ifx\x\relax % plain-\TeX{}, first loading
\else
\expandafter\ifx\csname PackageInfo\endcsname\relax
\let\x#1#2={%\PackageInfo{#1}{#2, stopped}}\relax
\else
\expandafter\ifx\csname PackageInfo\endcsname\relax
\immediate\write-1{Package #1 Info: #2.}\relax
\else
\fi
\fi
\x{setouterhbox}{The package is already loaded}\relax
\aftergroup\endinput
\else
\def\empty{}\relax
\if\x\empty % LaTeX, first loading, \% variable is initialized, but \ProvidesPackage not yet seen
\else
\expandafter\ifx\csname PackageInfo\endcsname\relax
\immediate\write-1{Package #1 Info: #2.}\relax
\else
\fi
\fi
\x{setouterhbox}{The package is already loaded}\relax
\aftergroup\endinput
\else
\fi
\endgroup
\end{verbatim}

Package identification:
\begin{verbatim}
\begin{group}
\catcode61=10 \catcode48=10 \catcode32=10 \relax
\catcode13=5 \relax
\endlinechar=13 \relax
\catcode35=6 \relax
\catcode39=12 \relax
\catcode44=12 \relax
\end{verbatim}

\end{document}
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.

2.3 Main part

e\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.

\setouterhboxRemove

Remove all kern, glue, and penalty nodes; poor man’s version, if ε-\TeX is not available
Passing the box contents by macro parameter would prevent catcode changes in the box contents like by \verb. Also \begingroup 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.

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

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

We don’t want a third pass with \emergencystretch.

Line is not underfull:

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

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

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

Check \currenvir for the case that \setouterbbox was called as environment. Then the box assignment must be put after the \egroup 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 e\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
\aftergroup}\
}
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

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, MiK\TeX{}, \ldots) relies on file name databases, you must refresh these. For example, \TeX{} Live users run texhash or mktexlsr.
3.5 Some details for the interested

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

\begin{itemize}
  \item \texttt{plain\ TeX}: Run \texttt{docstrip} and extract the files.
  \item \texttt{\LaTeX}: Generate the documentation.
\end{itemize}

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}
lodex \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{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


[2] David Kastrup, \texttt{news:comp.text.tex}, \textit{Re: ANN: outerhbox.sty – collect horizontal material, for unboxing into a paragraph}, \texttt{<85y8551rx3.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}
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
\aftergroup 59, 270, 271, 273, 279
\begin 11, 23
\csname 44, 51, 80, 96, 106, 146, 152, 156, 269
\documentclass 2
\dp 239
\DeclareOption 297
\endgraf 183, 299
\endinput 59, 143
\empty 47, 48
\end 26, 29
\endcsname 44, 51, 80, 96, 106, 146, 152, 156, 269
\endlinechar 180, 191
\endsetouterhbox 183
\everypar 180, 191
\fmtname 293
\hbox 201, 222, 259

[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.