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 \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 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\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, vtexpdfmark, textures, and dvipson. 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\[2006/08/16\]{hyperref}
\usepackage\[hyperref\]{setouterhbox}

Package order does not matter.

1.5 Example

\begin{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
\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}
\end{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 \LaTeX package.

2.1 Package start stuff

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

\begin{verbatim}
\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
\if\x\relax % plain-TeX, first loading
\else
    \def\empty{}
    \if\empty % LaTeX, first loading,
      \immediate\write-1{Package #1 Info: #2.}%
    \else
      \expandafter\ifx\csname PackageInfo\endcsname\relax
      \immediate\write-1{Package #1 Info: #2.}%
    \fi
    \PackageInfo{#1}{#2, stopped}%
    \immediate\write-1{Package #1 Info: #2, stopped}%
    \immediate\write-1{The package is already loaded}%
endgroup
\fi
\fi
\endgroup%
\end{verbatim}

Package identification:

\begin{verbatim}
\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\ifx\csname ProvidesPackage\endcsname\relax
\if\x\relax
    \immediate\write-1{Package: #1 #2}%
    \xdef#1{#2}%
\else
    \if\x\relax
      \immediate\write-1{Package: #1 #2}%
      \xdef#1{#2}%
    \fi
\fi
\endgroup
\end{verbatim}

\section{Plain-TeX Package: setouterhbox.sty

\iffalse
    \immediate\write-1{The package is already loaded}%
    \immediate\write-1{The package is already loaded}%
    \immediate\write-1{The package is already loaded}%
\fi

\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.

\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.

\def\setouterhboxRemove{\setouterhboxRemove
\setouterhbox
Remove all kern, glue, and penalty nodes; poor man’s version, if ε-TeX is not available
\def\setouterhboxRemove{% 
E \ifnum\lastnodetype<11 %
E \else
E \ifnum\lastnodetype>13 %
E \else
\unskip\unkern\unpenalty
E \expandafter\expandafter\expandafter\setouterhboxRemove
E \fi
E \fi
\fi
\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 \TeX is used.
\begin{verbatim}
\def\setouterhbox#1{% 
\begingroup
\def\setouterhboxNum{#1}%
\setbox0\vbox\begingroup
T \kern.123pt\relax % marker
T \kern0pt\relax % removed by \setouterhboxRemove
\begingroup
\everypar{}%
noindent
\endgroup
\endgroup
\end{verbatim}
\end{verbatim}
\endgroup
\endsetouterhbox
Most of the work is done in the end part, thus the heart of the method follows:
\begin{verbatim}
\def\endsetouterhbox{% 
\begin{verbatim}
\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
Supress underful \hbox warnings, is explicit line breaks are used.

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

Remove \rightskip, a penalty with -10000 is part of the previous line.
There was just one line that we have caught.

2.4 Environment support

Check \@currenenvir 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 @currenenvir\endcsname\setouterhboxCurr 
\aftergroup\setouterhboxLast#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 
\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 \-\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}}%
}
\ProcessOptions\relax
\setouterhboxAtEnd%
\end{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. 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

\footnotetext{\url{CTAN:pkg/setouterhbox}}
TDS. 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 .dtx chooses its action depending on the format:

- **plain \TeX{}:** Run docstrip and extract the files.
- **\LaTeX{}:** Generate the documentation.

If you insist on using \LaTeX{} for docstrip (really, 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 .dtx or the .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{<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.

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