The \texttt{setouterhbox} package

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2016/05/16 v1.8

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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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 \v-\TeX that extends the tool set of a \TeX macro programmer. Especially useful \v-\TeX was in this package for detecting and dealing with errorneous 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⟩}\ldots\end{setouterhbox}

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

\begin{setouterhbox}{⟨box number⟩}\ldots\end{setouterhbox}

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

```latex
\begin{document}
\raggedright
\url{http://this.is.a.very.long.host.name/followed/%}
\by/a/very_long_long_path.html}\%
\unhbox\testbox
\begin{setouterhbox}{\testbox}\%
\url{http://this.is.a.very.long.host.name/followed/%}
\by/a/very_long_long_path.html}\%
\end{setouterhbox}
\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 % ^^M
\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
\ifx\x\empty % LaTeX, first loading,
% variable is initialized, but \ProvidesPackage not yet seen
\else
\expandafter\ifx\csname PackageInfo\endcsname\relax
\x#1#2{%
\immediate\write-1{Package #1 Info: #2.}%
}%
\else
\def\empty{}
\fi
\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 % '
\catcode40=12 % (
\catcode41=12 % )
\catcode44=12 % ,
\catcode45=12 % -
\catcode46=12 % .
\catcode58=12 % :
\catcode64=11 % @
\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\fi
\expandafter\x\csname ver@setouterhbox.sty\endcsname
\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 %
\catcode35=6 % #
\catcode64=11 % @
\catcode123=1 % {
\catcode125=2 % }
\def\TMP@EnsureCode#1#2{\
\edef\setouterhboxAtEnd{\setouterhboxAtEnd\catcode#1=\the\catcode#1\relax\
\catcode#1=#2\relax}
}\TMP@EnsureCode{40}{12}% (
\TMP@EnsureCode{41}{12}% )
\TMP@EnsureCode{44}{12}% ,
\TMP@EnsureCode{45}{12}% -
\TMP@EnsureCode{46}{12}% .
\TMP@EnsureCode{47}{12}% /
\TMP@EnsureCode{50}{12}% :
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 \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,
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:

```latex
\begin{verbatim}
\def\endsetouterhbox{% 
  \endgroup 
  \pretolerance-1 \%
  \tolerance10000 \%
  \hsize\maxdimen

  Line is not underfull:
  \parfillskip 0pt plus 1fill\relax
  \leftskip0pt\relax
  \ Suppress underful \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

  E \ifnum\lastnodetype=1 %
  E \global\setbox\setouterhboxBox\lastbox
  E \loop
  E \setouterhboxRemove
  E \ifnum\lastnodetype=1 %
  E \setbox0=\lastbox
  E \global\setbox\setouterhboxBox=\hbox{%
  E \unhbox0 %
  Remove \rightskip, a penalty with -10000 is part of the previous line.
  E \else
  E \setouterhboxFailure{%
  E Something is wrong%
  E }%
  E \MessageBreak
  E (\string\lastnodetype: \number\lastnodetype, expected: 1)%
  E }%
  E \fi
  E \setouterhboxRemove
  E \ifcase\dvoid0 1\else\fi
  E \global\setbox\setouterhboxBox=\hbox{%
  E \unhbox0 %

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

  E \unskip
  E \unskip
\end{verbatim}
```

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 1fill\relax
\leftskip0pt\relax
Suppress underful \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:
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}}
\def\setouterhboxFinish#1{\begingroup\expandafter\expandafter\expandafter\endgroup\expandafter\ifx\csname @currenvir\endcsname\setouterhboxCurr\aftergroup\setouterhboxLast#1\NIL\aftergroup}
\setouterhboxAfter \#1 is an explicit number.

```latex
\setouterhboxReturnAfterFi
```

A utility macro to get tail recursion.

```latex
\long\def\setouterhboxReturnAfterFi#1\fi{\fi#1}
```

Restore catcodes we have need to distinguish between the implementation with and without \texttt{\varepsilon-\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
```

\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}}
```

```
\ProcessOptions\relax
\setouterhboxAtEnd\relax
EOF\setouterhboxAtEnd\relax
```

### 3 Test

#### 3.1 Catcode checks for loading

```
\catcode`\{=1 \%\catcode`\}=2 \%\catcode`\#=6 \%\catcode`\@=11 \%
\expandafter\ifx\csname count@\endcsname\relax\countdef\count@=255 \%
\fi\expandafter\ifx\csname @gobble\endcsname\relax\long\def\@gobble#1{}\%
\fi\expandafter\ifx\csname @firstofone\endcsname\relax\long\def\@firstofone#1{#1}\%
\fi\expandafter\ifx\csname loop\endcsname\relax\expandafter\@firstofone\else\fi
```

```
\expandafter\if\csname csname count@\endcsname\relax\countdef\count@=255 \%
\fi\expandafter\if\csname csname @gobble\endcsname\relax\long\def\@gobble#1{}\%
\fi\expandafter\if\csname csname @firstofone\endcsname\relax\long\def\@firstofone#1{#1}\%
\fi\expandafter\if\csname csname loop\endcsname\relax\expandafter\if\csname csname @firstofone\endcsname\relax\expandafter\if\csname csname loop\endcsname\relax\expandafter\if\csname csname @firstofone\endcsname\relax\expandafter\if\csname csname \endcsname\relax\expandafter\if\csname csname \endcsname\relax\expandafter\if\csname csname \endcsname\relax\expandafter\if\csname csname \endcsname\relax\expandafter\if\csname csname \endcsname\relax\expandafter\if\csname csname \endcsname\relax\expandafter\if\csname csname \endcsname\relax\expandafter\if\csname csname \endcsname\relax\expandafter\if\csname csname \endcsname\relax\expandafter\if\csname csname \endcsname\relax\expandafter\if\csname csname \endcsname\relax\expandafter\if\csname csname \endcsname\relax\expandafter\if\csname csname \endcsname\relax
```
\catcode`\%=14 \%
\LoadCommand
\RangeCatcodeCheck{0}{36}{15}\
\RangeCatcodeCheck{37}{37}{14}\
\RangeCatcodeCheck{38}{47}{15}\
\RangeCatcodeCheck{48}{57}{12}\
\RangeCatcodeCheck{58}{63}{15}\
\RangeCatcodeCheck{64}{64}{12}\
\RangeCatcodeCheck{65}{90}{11}\
\RangeCatcodeCheck{91}{91}{15}\
\RangeCatcodeCheck{92}{92}{0}\
\RangeCatcodeCheck{93}{96}{15}\
\RangeCatcodeCheck{97}{122}{11}\
\RangeCatcodeCheck{123}{255}{15}\
\RestoreCatcodes
\}
\Test
\csname @@end\endcsname
\end
⟨/test1⟩

3.2 Test with package url
⟨*test2⟩
\nofiles
\documentclass[a5paper]{article}
\usepackage[2005/06/27]{url}
\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}
\begin{setouterhbox}{\testbox}\url{http://this.is.a.very.long.host.name/followed/%by/a/very_long_long_path.html}\end{setouterhbox}
\unhbox{\testbox}
\end{document}
⟨/test2⟩

4 Installation

4.1 Download
Package. This package is available on CTAN:\n

\url{http://ctan.org/pkg/setouterhbox}
4.2 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
```

Script installation. Check the directory TDS:scripts/oberdiek/ for scripts that need further installation steps. Package attachfile2 comes with the Perl script pdfatfi.pl that should be installed in such a way that it can be called as pdfatfi. Example (linux):

```
chmod +x scripts/oberdiek/pdfatfi.pl
cp scripts/oberdiek/pdfatfi.pl /usr/local/bin/
```

4.3 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
test/setouterhbox-test1.tex → doc/latex/oberdiek/test/setouterhbox-test1.tex
test/setouterhbox-test2.tex → doc/latex/oberdiek/test/setouterhbox-test2.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.

4.4 Refresh file name databases

If your \TeX distribution (\TeX, \LaTeX, ...) relies on file name databases, you must refresh these. For example, \TeX users run texhash or mktexlar.

4.5 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:

```
latex \let\install=y\input{setouterhbox.dtx}
```

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 ltxdoc.cfg. For instance, put this line into this file, if you want to have A4 as paper format:

\PassOptionsToClass{a4paper}{article}

An example follows how to generate the documentation with pdflATEX:

pdflatex setouterhbox.dtx
makeindex -s gind.ist setouterhbox.idx
pdflatex setouterhbox.dtx
makeindex -s gind.ist setouterhbox.idx
pdflatex setouterhbox.dtx

5 Catalogue

The following XML file can be used as source for the TeX Catalogue. The elements caption and description are imported from the original XML file from the Catalogue. The name of the XML file in the Catalogue is setouterhbox.xml.

6 References


7 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.

8 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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