The \texttt{hhline} package\textsuperscript{*}

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Abstract

\texttt{\textbackslash hhline} produces a line like \texttt{\textbackslash hline}, or a double line like \texttt{\textbackslash hline\textbackslash hline}, except for its interaction with vertical lines.

1 Introduction

The argument to \texttt{\textbackslash hhline} is similar to the preamble of an \texttt{array} or \texttt{tabular}. It consists of a list of tokens with the following meanings:

\begin{itemize}
  \item \texttt{=} A double hline the width of a column.
  \item \texttt{-} A single hline the width of a column.
  \item \texttt{~} A column with no hline.
  \item \texttt{|} A vline which ‘cuts’ through a double (or single) hline.
  \item \texttt{:} A vline which is broken by a double hline.
  \item \texttt{#} A double hline segment between two vlines.
  \item \texttt{t} The top half of a double hline segment.
  \item \texttt{b} The bottom half of a double hline segment.
  \item \texttt{*} \texttt{\{3\}==\#} expands to \texttt{==\#==\#==\#}, as in the \texttt{*}-form for the preamble.
\end{itemize}

If a double vline is specified (\texttt{||} or \texttt{::}) then the hlines produced by \texttt{\textbackslash hhline} are broken. To obtain the effect of an hline ‘cutting through’ the double vline, use a \texttt{#} or omit the vline specifiers, depending on whether or not you wish the double vline to break.

The tokens \texttt{t} and \texttt{b} must be used between two vertical rules. \texttt{\textbackslash t:|} produces the same lines as \texttt{#}, but is much less efficient. The main use for these are to make constructions like \texttt{\textbackslash t:|} (top left corner) and \texttt{\textbackslash :b|} (bottom right corner).

If \texttt{\textbackslash hhline} is used to make a single hline, then the argument should only contain the tokens \texttt{-}, \texttt{~} and \texttt{|} (and \texttt{*}-expressions).

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An example using most of these features is:

\begin{tabular}{||cc||c|c||}
\hline
a&b&c&d \\
\hline
1&2&3&4 \\
\hline
i&j&k&l \\
\hline
w&x&y&z \\
\hline
\end{tabular}

The lines produced by L\TeX's \texttt{\hline} consist of a single (\TeX primitive) \texttt{\hrule}. The lines produced by \texttt{\hhline} are made up of lots of small line segments. \TeX will place these very accurately in the .dvi file, but the program that you use to print the .dvi file may not line up these segments exactly. (A similar problem can occur with diagonal lines in the picture environment.)

If this effect causes a problem, you could try a different driver program, or if this is not possible, increasing \texttt{\arrayrulewidth} may help to reduce the effect.

\section{The Macros}

\HH@box Makes a box containing a double hline segment. The most common case, both rules of length \texttt{\doublerulesep} will be stored in \texttt{\box1}, this is not initialised until \texttt{\hhline} is called as the user may change the parameters \texttt{\doublerulesep} and \texttt{\arrayrulewidth}. The two arguments to \texttt{\HH@box} are the widths (ie lengths) of the top and bottom rules.

\def\HH@box#1#2{\vbox{\hrule \@height \arrayrulewidth \@width #1 \vskip \doublerulesep \hrule \@height \arrayrulewidth \@width #2}}

\HH@add Build up the preamble in the register \texttt{\toks0}.

\def\HH@add#1{\toks0\expandafter{\the\toks0#1}}

\HH@xexpast We ‘borrow’ the version of \texttt{@xexpast} from Mittelbach’s array.sty, as this allows # to appear in the argument list.

\def\HH@xexpast#1*#2#3#4\@@{\@tempcnta #2 \toks0={#1}\@temptokena={#3} \let\the@toksz\relax \let\the@toks\relax \def\@tempa{\the@toksz} \ifnum\@tempcnta >0 \@whilenum\@tempcnta >0\do \edef\@tempa{\@tempa\the@toks} \advance\@tempcnta \m@ne \fi \let\@tempb\HH@xexpast \else \let\@tempb\HH@xenoop \fi

\HH@xenoop # to appear in the argument list.
\hhline Use a simplified version of \@mkpream to break apart the argument to \hhline. Actually it is oversimplified, It assumes that the vertical rules are at the end of the column. If you were to specify c|@{xx}| in the array argument, then \hhline would not be able to access the first vertical rule. (It ought to have an @ option, and add \leaders up to the width of a box containing the @-expression. We use a loop made with \futurelet rather than \@tfor so that we can use # to denote the crossing of a double hline with a double vline. \if@firstamp is true in the first column and false otherwise. \if@tempswa is true if the previous entry was a vline (;, | or #).

\hhline1\omit\firstamptrue\tempswafalse
Put two rules of width \doublerulesep in \box1
\global\setbox\@ne\HH@box\doublerulesep\doublerulesep
If Mittelbach’s array.sty is loaded, we do not need the negative \hskip’s around vertical rules.
\def\tempc{\ifx\extrarowheight\HH@undefined\hskip-.5\arrayrulewidth\fi}
Now expand the *-forms and add dummy tokens ( \relax and ‘ ) to either end of the token list. Call \HH@let to start processing the token list.
\def\tempa{\if@firstamp\firstampfalse\else\HH@add{&\omit}\fi}
\def\tempb{\if\tempswa\HH@add{\hskip\doublerulesep}\fi\tempswatrue\HH@add{\@tempc\vline\@tempc}\else\HH@add{\@tempc\HH@box\arrayrulewidth\arrayrulewidth\@tempc}\else\HH@add{\@tempc\vline\@tempc\copy\@ne\@tempc\vline\@tempc}\else\HH@add{\hfil}\else
\HH@loop

\HH@let Discard the last token, look at the next one.
\def\HH@let1{\futurelet\tempa\HH@loop}
\HH@loop The main loop. Note we use \ifx rather than \if in version 2 as the new token ~ is active.
\def\HH@loop{\if\tempa
If next token is ‘, stop the loop and put the lines into this row of the alignment.
\def\tempb{\def\next\tempa{\the\toks0\cr}\else\let\next\HH@let}
|, add a vertical rule (across either a double or single hline).
\def\tempc{\ifx\extrarowheight\HH@undefined\hskip-.5\arrayrulewidth\fi}
Now expand the *-forms and add dummy tokens ( \relax and ‘ ) to either end of the token list. Call \HH@let to start processing the token list.
\def\tempa{\if@firstamp\firstampfalse\else\HH@add{&\omit}\fi}
\def\tempb{\if\tempswa\HH@add{\hskip\doublerulesep}\fi\tempswatrue\HH@add{\@tempc\vline\@tempc}\else
\HH@add{\@tempc\HH@box\arrayrulewidth\arrayrulewidth\@tempc}\else
\HH@add{\@tempc\vline\@tempc\copy\@ne\@tempc\vline\@tempc}\else\HH@add{\hfil}\else

-, add a single hline across the column.
37 \ifx\@tempb-\@tempsvafalse
38 \if@firstamp\@firstampfalse\else\HH@add{&\omit}\fi
39 \HH@add{\leaders\hrule\@height\arrayrulewidth\hfil}\else
=, add a double hline across the column.
40 \ifx\@tempb=\@tempsvafalse
41 \if@firstamp\@firstampfalse\else\HH@add{&\omit}\fi
42 \HH@add{\rlap{\copy\@ne}\leaders\copy\@one\hfil\llap{\copy\@one}}\else
43 \ifx\@tempb t\HH@add{\rlap{\HH@box\doublerulesep\z@}}\else
44 \ifx\@tempb b\HH@add{\rlap{\HH@box\z@\doublerulesep}}\else
b, add the bottom half of a double hline segment in a \rlap so that it may be used with t.
45 \ifx\@tempb \@sptoken\let\next\HH@spacelet\else
46 \ifx\@tempb\@sptoken\let\next\HH@spacelet\else
47 \PackageWarning{hhline}{space ignored in \noexpand\hhline argument%}
48 \MessageBreak\
49 \fi\fi\fi\fi\fi\fi\fi\fi\fi\fi\fi
50 \fi\fi\fi\fi\fi\fi\fi\fi
51 \fi\fi\fi
\HH@spacelet Helper macro to gobble a space token and continue the loop.
52 \lowercase{\def\HH@spacelet}{\futurelet\@tempb \HH@loop}
53 (/package)