The hhline package*

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Abstract

`\hhline` produces a line like `\hline`, or a double line like `\hline\hline`, except for its interaction with vertical lines.

1 Introduction

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

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

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

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

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

An example using most of these features is:

```
\begin{tabular}{||cc||c|c||}
\hhline{|t:==:t:==:t|}
a&b&c&d\\
\hhline{|:==:|~|~||}
1&2&3&4\\
\hhline{#==#~|=#}
i&j&k&l\\
\hhline{||--||--||}
w&x&y&z\\
\hhline{|b:==:b:==:b|}
\end{tabular}
```

a	b	c	d
1	2	3	4
i	j	k	l
w	x	y	z

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The lines produced by LaTeX's `\hline` consist of a single (TeX primitive) `\hrule`. The lines produced by `\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 `\arrayrulewidth` may help to reduce the effect.

2 The Macros

```
1 ⟨*package⟩
```

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

```
2 \def\HH@box#1#2{\vbox{%
3   \hrule \@height \arrayrulewidth \@width #1
4   \vskip \doublerulesep
5   \hrule \@height \arrayrulewidth \@width #2}}
```

`\HH@add` Build up the preamble in the register `\toks@`.

```
6 \def\HH@add#1{\toks@\expandafter{\the\toks@#1}}
```

`\HH@xexpast` `\HH@xexnoop` We 'borrow' the version of `\@xexpast` from Mittelbach's array.sty, as this allows `#` to appear in the argument list.

```
7 \def\HH@xexpast#1*#2#3#4\@@{%
8    \@tempcnta #2
9    \toks@={#1}\@temptokena={#3}%
10   \let\the@toksz\relax \let\the@toks\relax
11   \def\@tempa{\the@toksz}%
12   \ifnum\@tempcnta >0 \@whilenum\@tempcnta >0\do
13     {\edef\@tempa{\@tempa\the@toks}\advance \@tempcnta \m@ne}%
14       \let \@tempb \HH@xexpast \else
15       \let \@tempb \HH@xexnoop \fi
16   \def\the@toksz{\the\toks@}\def\the@toks{\the\@temptokena}%
17   \edef\@tempa{\@tempa}%
18   \expandafter \@tempb \@tempa #4\@@}
19
20 \def\HH@xexnoop#1\@@{}
```

`\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 `#`).

```
21 \def\hhline#1{\omit\@firstamptrue\@tempswafalse
```

Put two rules of width `\doublerulesep` in `\box1`

```
22 \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.

```
23   \xdef\@tempc{\ifx\extrarowheight\HH@undef\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.

```
\HH@xexpast\relax#1*0x\@@\toks@{}\expandafter\HH@let\@tempa‘}
```

\HH@let Discard the last token, look at the next one.

```
\def\HH@let#1{\futurelet\@tempb\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 next token is ‘, stop the loop and put the lines into this row of the alignment.

```
  \ifx\@tempb‘\def\next##1{\the\toks@\cr}\else\let\next\HH@let
```

|, add a vertical rule (across either a double or single hline).

```
  \ifx\@tempb|\if@tempswa\HH@add{\hskip\doublerulesep}\fi\@tempswatrue
          \HH@add{\@tempc\vline\@tempc}\else
```

:, add a broken vertical rule (across a double hline).

```
  \ifx\@tempb:\if@tempswa\HH@add{\hskip\doublerulesep}\fi\@tempswatrue
      \HH@add{\@tempc\HH@box\arrayrulewidth\arrayrulewidth\@tempc}\else
```

#, add a double hline segment between two vlines.

```
  \ifx\@tempb##\if@tempswa\HH@add{\hskip\doublerulesep}\fi\@tempswatrue
        \HH@add{\@tempc\vline\@tempc\copy\@ne\@tempc\vline\@tempc}\else
```

~, A column with no hline (this gives an effect similar to \cline).

```
  \ifx\@tempb~\@tempswafalse
          \if@firstamp\@firstampfalse\else\HH@add{&\omit}\fi
             \HH@add{\hfil}\else
```

-, add a single hline across the column.

```
  \ifx\@tempb-\@tempswafalse
          \if@firstamp\@firstampfalse\else\HH@add{&\omit}\fi
             \HH@add{\leaders\hrule\@height\arrayrulewidth\hfil}\else
```

=, add a double hline across the column.

```
  \ifx\@tempb=\@tempswafalse
       \if@firstamp\@firstampfalse\else\HH@add{&\omit}\fi
```

Put in as many copies of \box1 as possible with \leaders, this may leave gaps at the ends, so put an extra box at each end, overlapping the \leaders.

```
       \HH@add
          {\rlap{\copy\@ne}\leaders\copy\@ne\hfil\llap{\copy\@ne}}\else
```

t, add the top half of a double hline segment, in a \rlap so that it may be used with b.

```
  \ifx\@tempb t\HH@add{\rlap{\HH@box\doublerulesep\z@}}\else
```

b, add the bottom half of a double hline segment in a \rlap so that it may be used with t.

```
  \ifx\@tempb b\HH@add{\rlap{\HH@box\z@\doublerulesep}}\else
```

Otherwise ignore the token, with a warning.

```
  \PackageWarning{hhline}%
      {\meaning\@tempb\space ignored in \noexpand\hhline argument%
       \MessageBreak}%
  \fi\fi\fi\fi\fi\fi\fi\fi\fi
```

Go around the loop again.

```
  \next}
```

⟨/package⟩