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The ctable package.*

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Abstract The ctable package provides a ctable command for the typesetting of table and figure floats. You will not need to type the usual nested begin...end sequences, as ctable is a command, not an environment. ctable has only 4 arguments, but the optional first one may hold many *key=value* pairs and makes ctable very flexible and extensible. It uses Simon Fear's booktabs package for better vertical spacing around horizontal rules and it provides facilities for making table footnotes.

1 Purpose

The ctable package lets you easily typeset captioned table and figure floats with optional footnotes. Both caption and footnotes will normally be forced within the width of the table. If the width of the table is specified, then tabularx will be used to typeset it, and one or more X column specifiers should be specified. Otherwise tabular will be used.

This package defines the commands \ctable, \tnote and \tmark, as well as four \tabularnewline generating commands. The latter generate reasonable amounts of whitespace around horizontal rules and are also useful for tabulars outside this package.

Since the ctable package imports the array and booktabs packages, all commands from those packages are available as well.

Note that, in line with the comments that Simon Fear made describing his booktabs package, vertical rules for column separation can be produced with \ctable, but no provisions are made to have them make contact with horizontal rules.

2 Usage

The following describes the commands (emphasized in magenta) available in the ctable package:

*This document corresponds to ctable 1.10, dated 2007/08/17. The most recent version of this package can be found on CTAN, an experimental version is on the author's web site

\ctable is called with 4 arguments, of which the first is optional:

```
\ctable[options]       % key=value,...
       {coldefs}       % for \begin{tabular}
       {foottable}     % zero or more \tnote commands (see below)
       {table rows}    % rows for the table
```

Options are given as key=value pairs, separated by comma's. Extra comma's, including one behind the last pair, don't hurt. Arguments to option should be put between braces if they contain comma's or equals signs. Currently the following option keys have been defined:

`caption={...}`	table caption; the braces are needed only if your caption contains a comma or an equals sign.
`cap={...}`	for a short caption to go to the `\tableofcontents`.
`captionskip=...`	moves the caption relative to the table; the default is `0ex`, which puts captions at their default LaTeX positions: a top caption's baseline at `1ex` above the top rule position of the table and a bottom caption's baseline at `4ex` below the bottom rule position.
`mincapwidth=...`	sets the minimum width of the float. Without this option, the width is set to that of the tabular, and the caption and footnotes are typeset within that width. This may be a problem with very narrow tables; `mincapwidth` can then be used to give the float a minimum width. The tabular will be centered in it.
`pos=...`	float position, default: `tbp`.
`label=...`	for `\label`
`width=...`	tabularx will be used to typeset the table at the specified width — one or more `X` column specifiers must be provided.
`maxwidth=...`	like the *width* option, but any `X` column specifiers will be replaced with `l` if the resulting table width would thus stay within the specified maximum width. This is especially useful where the LaTeX source is generated by a script.
`center`	center the table in the available text width; this is the default.
`left`	left align the table in the available text width.
`right`	right align the table in the available text width.
`figure`	produce a figure float instead of a table float.

`botcap`	put the caption at the bottom of the float instead of on top of it.
`sideways`	rotate table or figure by 90 degrees anticlockwise and put it on a separate page. With the twoside option for the standard LaTeX document classes, rotation will be -90 on even pages. If you use this option, the `pos` option is not allowed.
`star`	use the starred versions of the `table` and `figure` environments, which place the float over two columns when the `twocolumn` option or the `\twocolumn` command is active.
`nosuper`	in the footnote table, typeset footnote markers on the line, instead of superscripted.
`framerule=...`	draw a frame around the table with the given rule thickness. The default is `0pt`, so that no frame will be seen.
`framesep=...`	set the distance between the frame and the table to the given dimension. The default is `0pt`.
`framefg=`*r g b*	set the foreground color of the frame (the rule color) to the given triplet of *rgb*-values. The values should be numbers between 0 and 1. The default is `0 0 0` (black).
`framebg=`*r g b*	set the background color of the frame (the color inside the frame) to the given triplet of *rgb*-values. The values should be numbers between 0 and 1. The default is `1 1 1` (white).

The footnotes are placed under the table, without a rule. You therefore probably will want to use the `\LL` (last line) command if you use footnotes.

`\tnote[label]{footnote text}` places [*label*] footnote text under the table. Can only be used in the `foottable` argument described above. The label is optional, the default label is a single *a*. For more detailed control, you can also replace this command with something like `labeltext&footnotetext\NN`.

`\tmark[label]` this command places the superscripted label in the table. It is equivalent with `$^{label}$`. The label is optional, the default label is a single *a*.

The newline generating commands are a combination of `\tabularnewline` and zero or one of `booktabs`' `\toprule`, `\midrule` or `\bottomrule`. These combinations have been made, and short names have been defined, because source texts for complex tables often become very crowded:

`\NN` (Normal Newline), generates just a normal new line. An optional `dimen` parameter

inserts extra vertical space under the line.

\FL (First Line), generates a new line and a thick rule with some extra space under it. An optional dimen parameter sets the line width; the default is 0.08em.

\ML (Middle Line), generates a new line and a thin rule with some extra space over and under it. An optional dimen parameter sets the line width; the default is 0.05em.

\LL (Last Line), generates a new line and a thick rule with some extra space over it. An optional dimen parameter sets the line width; the default is 0.08em.

These macros can be used outside \ctable constructs.

Finally, for completeness, here are some of booktabs' commands that may be useful:

\toprule[<wd>] where <wd> is the optional thickness of the rule.

\midrule[<wd>].

\bottomrule[<wd>].

\cmidrule[<wd>](<trim>){a-b} where <trim> can be r, l, or rl and the rule is drawn over columns a through b.

\morecmidrules must be used to separate two successive cmidrules.

\addlinespace[<wd>] inserts extra space between rows.

\specialrule{<wd>}{<abovespace>}{<belowspace>}.

See the booktabs documentation for details.

2.1 The width and maxwidth options

When LaTeX-sources containing tables are generated automatically by a script, it is often not known in advance what the maximum size of an l column will be. A good solution for this is to use an X specifier, typesetteing the table at the text width with the tabularx package. However, this will result in too much white space in cases where the column contains small texts only. This problem can be solved by using the maxwidth option instead of the width option. The X specifiers will then be replaced with l as long as the width of the resulting table stays with the specified maximum width.

3 Examples

Table 2 is an example taken from the related package threeparttable.sty by Donald Arseneau, with an extra footnote. It was typeset with:

```
\ctable[
   cap     = The Skewing Angles,
   caption = The Skewing Angles ($\beta$) for
             $\fam0 Mu(H)+X_2$ and $\fam0 Mu(H)+HX$~\tmark,
   label   = nowidth,
   pos     = b
]{rlcc}{
   \tnote{for the abstraction reaction,
          $\fam0 Mu+HX \rightarrow MuH+X$.}
   \tnote[b]{1 degree${} = \pi/180$ radians.}
   \tnote[c]{this is a particularly long note, showing that
             footnotes are set in raggedright mode as we don't like
             hyphenation in table footnotes.}
}{                                                                \FL
  &            & $\fam0 H(Mu)+F_2$     & $\fam0 H(Mu)+Cl_2$ \ML
  &$\beta$(H)  & $80.9^\circ$\tmark[b] & $83.2^\circ$       \NN
  &$\beta$(Mu) & $86.7^\circ$          & $87.7^\circ$       \LL
}
```

Table 2: The Skewing Angles (β) for $\mathrm{Mu(H)} + \mathrm{X_2}$ and $\mathrm{Mu(H)} + \mathrm{HX}$ [a]

	$\mathrm{H(Mu)} + \mathrm{F_2}$	$\mathrm{H(Mu)} + \mathrm{Cl_2}$
β(H)	80.9° [b]	83.2°
β(Mu)	86.7°	87.7°

[a] for the abstraction reaction, $\mathrm{Mu} + \mathrm{HX} \rightarrow \mathrm{MuH} + \mathrm{X}$.

[b] 1 degree $= \pi/180$ radians.

[c] this is a particularly long note, showing that footnotes are set in raggedright mode as we don't like hyphenation in table footnotes.

Table 3: Example with a specified width of 100mm

Example using tabularx			
Multicolumn entry!		THREE	FOUR
one	The width of this column depends on the width of the table.[a]	three	Column four will act in the same way as column two, with the same width.

[a] footnotes are placed under the table

Table 3 is an example with a width specification, taken from the `tabularx` documentation, with the vertical rules removed. By using the trimming parameters of the `booktabs` `\cmidrule` command, some of the horizontal splitting was regained. The `left` option left aligns the table. It was typeset with:

```
\ctable[
   caption = Example with a specified width of 100mm,
   label   = width,
   width   = 100mm,
   left
]{c>{\raggedright}Xc>{\raggedright}X}{
   \tnote{footnotes are placed under the table}
}{                                                          \FL
   \multicolumn{4}{c}{Example using tabularx}               \ML
   \multicolumn{2}{c}{Multicolumn entry!} & THREE & FOUR   \NN
       \cmidrule(r){1-2}\cmidrule(rl){3-3}\cmidrule(l){4-4}
   one&
   The width of this column depends on the width of the
       table.\tmark &
   three&
   Column four will act in the same way as
   column two, with the same width.                         \LL
}
```

Figures, even single ones, are always put in tabular cells. This is not particularly handy for single pictures, but it eases the construction of arrays of pictures, including subcaptions, delineation, and spacing. Figure 1 shows a figure that has been produced with the `\ctable` command, in combination with `\usepackage{carom}` it has been typeset with:

```
\ctable[
   figure,
   botcap,
   caption   = The di- and tri-bromobenzenes,
   label     = fig,
   pos       = h,
   framebg   = .53 .81 .92,
   framerule = 1pt,
   framesep  = 4ex,
]{ccc}{}{                      \NN
   \bzdrv{1==Br;2==Br}&
   \bzdrv{1==Br;3==Br}&
   \bzdrv{1==Br;4==Br}         \NN
   1,2 & 1,3 & 1,4             \NN[3ex]
   \bzdrv{1==Br;2==Br;3==Br}&
   \bzdrv{1==Br;2==Br;4==Br}&
   \bzdrv{1==Br;3==Br;5==Br}   \NN
   1,2,3 & 1,2,4 & 1,3,5
}
```

(The excessive whitespace at the left of the figure is caused by the bounding boxes generated by the `carom` package.)

4 Option examples

In the following, small examples will be shown illustrating the effect of options. In the left column the relevant part of the source is shown, in the right column you see the result. In most cases you see a standard example on a light yellow background, followed by one or more variations on a light blue background. Where necessary, the example will show boxes to indicate the page and the text body.

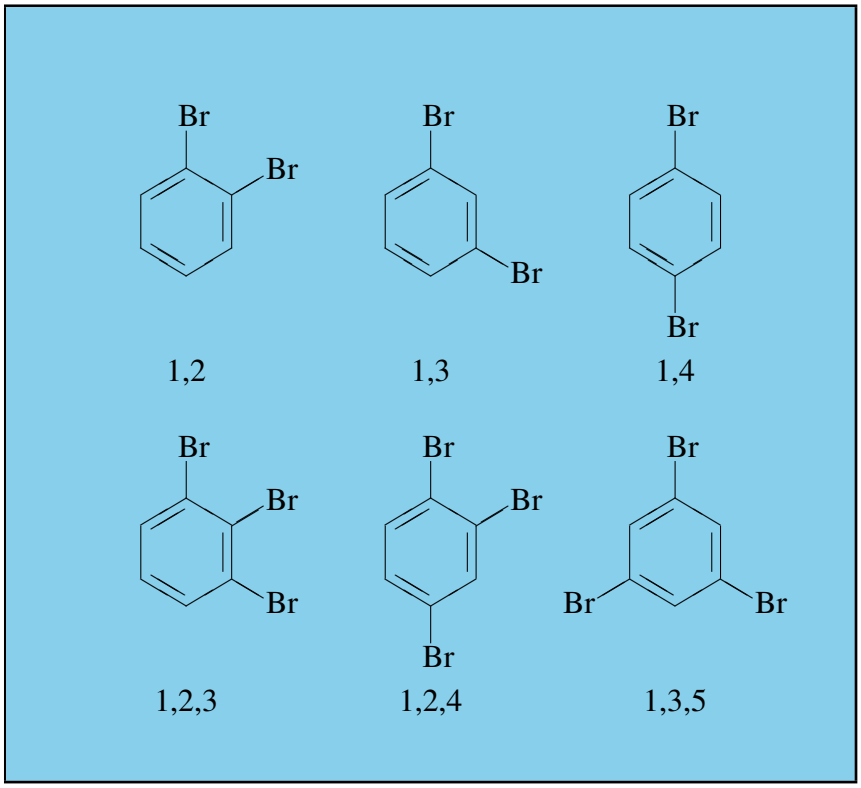


Figure 1: The di- and tri-bromobenzenes

4.1 `center, left, right`

These options align the float in the page; the default is `center`:

```
\ctable[
  caption = Centered,
]{c}{}{\FL Table's first row\LL}
```

Table 1: Centered

Table's first row

```
\ctable[
  caption = Left,
     left
]{c}{}{\FL Table's first row\LL}
```

Table 1: Left

Table's first row

```
\ctable[
  caption = Right,
     right
]{c}{}{\FL Table's first row\LL}
```

Table 1: Right

Table's first row

4.2 `mincapwidth`

`ctable` forces caption and footnotes to stay within the width of the table. Sometimes, however, tables are so narrow, that this is not really what you want. In such cases, use the `mincapwidth` option to give caption and footnotes some extra room:

```
\ctable[
  caption = a lengthy caption
]{c}{}{\FL row1\LL}
```

Ta-
ble 1: a
lengthy
caption

row1

```
\ctable[
mincapwidth = 55mm,
    caption = a lengthy caption
]{c}{}{\FL row1\LL}
```

Table 1: a lengthy caption

row1

You can set `mincapwidth` to a large value, say `\hsize`, if you want a one-line caption. Note, however, that this may influence the horizontal positioning of the table: values larger than `\hsize` will move a centered table out of the center, a value of `\hsize` will prevent the `left` and `right` options to do their work, because the table is already captured between the left and right margins.

4.3 `maxwidth`

When LaTeX-sources containing tables are generated automatically by a script, it is often not known in advance what the maximum size of an `l` column will be. A good solution for this is to use an `X` specifier, typesetting the table at the text width with the `tabularx` package. However, this will result in too much white space in cases where the column contains small texts only. This problem can be solved by using the maxwidth option instead of the width option. The `X` specifiers will then be replaced with `l` as long as the width of the resulting table stays with the specified maximum width.

```
\ctable[
  framerule = .1pt,
  maxwidth=3cm
]{lX}{}{\FL 1 & first row\LL}
```

1	first row

```
\ctable[
  framerule = .1pt,
  maxwidth=3cm
]{lX}{}{\FL 1 & test\LL}
```

1	test

4.4 `nosuper`

Footnote markers in `ctable` are typeset superscripted by default. Use the `nosuper` option to place them on the base line:

```
\ctable{c}{
  \tnote{First footnote}
  \tnote[b]{Second footnote}
}{\FL Table's\tmark\ first\tmark[b]\ row\LL}
```

Table's[a] first[b] row

[a] First footnote
[b] Second footnote

```
\ctable[nosuper]{c}{
  \tnote[a.]{First footnote}
  \tnote[b.]{Second footnote}
}{\FL Table's\tmark\ first\tmark[b]\ row\LL}
```

Table's[a] first[b] row

a. First footnote
b. Second footnote

4.5 `framerule`

The following examples show the use of frames and backgrounds. Every table is typeset by `ctable` with a frame around it, but the frame is, by default, drawn with a zero width line, and is therefore invisible. You can make it visible by either changing the linewidth to a positive value or by giving it a background color, which will be used to fill the frame.

Here is a simple table without a frame, followed by one with a red, `1pt` thick frame:

```
\ctable[
  caption = Frame,
]{c}{}{\FL Table's first row\LL}
```

Table 1: Frame

Table's first row

```
\ctable[
  caption = Frame,
  framerule = 2pt,
  framefg = .8 0 0
]{c}{}{\FL Table's first row\LL}
```

Table 1: Frame

Table's first row

As you see, the frame fits closely to the first (`\FL`) and last (`\LL`) table lines. This can be a reason to either remove those lines, or to introduce some whitespace between the frame and the table with the `framesep` option:

```
\ctable[
  caption = Frame,
  framerule = 1pt,
  framefg = .8 0 0,
  framesep=10pt
]{c}{}{\FL Table's first row\LL}
```

Table 1: Frame

Table's first row

And finally, we could also frame the table by giving it a, say, yellow backgound instead of a red frame line, or even do both:

```
\ctable[
  caption = Frame,
  framebg = 1 1 0,
  framesep=10pt
]{c}{}{\FL Table's first row\LL}
```

Table 1: Frame

Table's first row

```
\ctable[
  caption = Frame,
  framerule = 2pt,
  framesep = 5pt,
  framebg = 1 1 0,
  framefg = 1 0 0,
  framesep=10pt
]{c}{}{\FL Table's first row\LL}
```

Table 1: Frame

Table's first row

4.6 `captionskip`

The distance between a top caption's baseline and the table is `1ex`, but it can be varied with `captionskip`:

```
\ctable[
  caption = Caption,
]{c}{}{\FL Table's first row\LL}
```

Table 1: Caption

Table's first row

```
\ctable[
    caption =  Caption,
captionskip = 1ex,
]{c}{}{\FL Table's first row\LL}
```

Table 1: Caption

Table's first row

This works for bottom caption, too; the default distance between the baseline and the table is `4ex`, but `captionskip=-2ex` moves it up to `2ex`:

```
\ctable[
  caption = Caption,
   botcap
]{c}{}{\FL Table's first row\LL}
```

Table's first row

Table 1: Caption

```
\ctable[
    caption =  Caption,
captionskip = -2ex,
     botcap
]{c}{}{\FL Table's first row\LL}
```

Table's first row

Table 1: Caption

4.7 `sideways`

The `sideways` option creates a landscape table with its head pointing at the spine — when the documentclass' twoside option has been used, that is. The following examples show the effect of the `sideways` option, first on page one, then on page 2. Note that the `caption` option has not been used, so no caption appears:

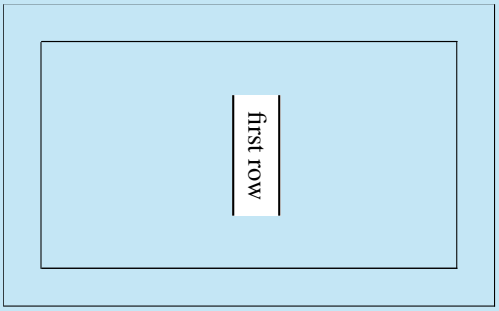
```
\ctable[
]{c}{}{\FL first row\LL}
```

first row

```
\ctable[
  sideways
]{c}{}{\FL first row\LL}
```

first row

```
\setcounter{page}{2}
\ctable[
  sideways
]{c}{}{\FL first row\LL}
```



4.8 `figure, botcap`

By default, `ctable` generates a table float, but with the `figure` option, a figure float is generated instead. The caption stays on top, so if you are accustomed to have bottom caption for your figures, you will probably also need the `botcap` option:

```
\ctable[caption = a table]{c}{
}{\FL Table's first row\LL}
```

Table 1: a table

Table's first row

```
\let\H\hsize
\ctable[
  caption = a figure,
  figure, botcap,
  width=.4\H,
]{@{}>{\H=.4\H}X>{\H=.6\H}X@{}}{}{\FL
  \includegraphics[width=\H]{penguin}&
  \includegraphics[width=\H]{lion}\LL
}
```

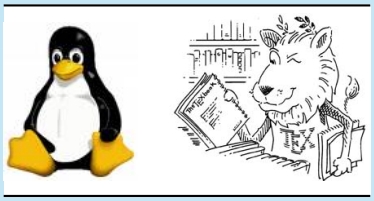


Figure 1: a figure