

The ctable package*

for use with L^AT_EX2e

Wybo Dekker
wybo@servalys.nl

2003/10/03

Contents

1 Purpose	1
2 Usage	2
2.1 The width and maxwidth options	3
3 Examples	3
3.1 Tables	3
3.2 Figures	4
4 Implementation	5

List of Tables

1 The Skewing Angles	3
2 Example with a specified width of 100mm	4

List of Figures

1 The di- and tri-bromobenzenes	5
---	---

1 Purpose

The ctable package lets you easily typeset centered, captioned table and figure floats with optional footnotes. Both caption and footnotes will 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 the X column specifier can be used. 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.

*This file has version number v1.5, dated 2003/10/03.

2 Usage

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

```
\ctable[options]      % key=value,...
      {coldefs}        % for \begin{tabular}
      {foottable}      % zero or more \tnote commands (see below)
      {table lines}    % lines 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. Currently the following option keys have been defined:

```
caption={...}  table caption; the braces are needed only if your caption contains a
                comma
cap={...}      for a short caption to go to the \tableofcontents
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.

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
rotate        rotate table or figure by 90 degrees anticlockwise and put it on a sepa-
                rate page. 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
```

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

Table 1: The Skewing Angles (β) for $\text{Mu}(\text{H}) + \text{X}_2$ and $\text{Mu}(\text{H}) + \text{HX}$ ^a

	H(Mu) + F ₂	H(Mu) + Cl ₂
$\beta(\text{H})$	80.9° ^b	83.2°
$\beta(\text{Mu})$	86.7°	87.7°

^a for the abstraction reaction,
 $\text{Mu} + \text{HX} \rightarrow \text{MuH} + \text{X}$.

^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.

`\midrule` `\midrule[<wd>]`
`\bottomrule` `\bottomrule[<wd>]`
`\cmidrule` `\cmidrule[<wd>](<trim>){a-b}` where <trim> can be r, l, or rl and the rule is drawn over columns a through b
`\morecmidrules` `\morecmidrules` must be used to separate two successive cmidrules
`\addlinespace` `\addlinespace[<wd>]` inserts extra space between rows
`\specialrule` `\specialrule{<wd>}{<abovespace>}{<belowspace>}`
 See the booktabs documentation for details.

2.1 The width and maxwidth options

When L^AT_EX-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.

3 Examples

3.1 Tables

Table 1 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
               $\text{Mu}(\text{H}) + \text{X}_2$  and  $\text{Mu}(\text{H}) + \text{HX}$ ~\tmark,
      label    = tab:nowidth,
    ]
\rlcc
\tnote{for the abstraction reaction,
       $\text{Mu} + \text{HX} \rightarrow \text{MuH} + \text{X}$ .}
\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) & $80.9^\circ\textmark[b]$ & $83.2^\circ$
\NN
&$\beta$(\mu) & $86.7^\circ$ & $87.7^\circ$
\LL
}

```

Table 2 is an example with a width specification, taken from the `tabularx` documentation, with the vertical rules removed, and typeset with:

```

\ctable[caption = Example with a specified width of 100mm,
width = 100mm,
pos = b,
label = tab:width,
]
{<{\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
\ML
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
}

```

3.2 Figures

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 sub-captions, 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[caption=The di- and tri-bromobenzenes,
botcap,
figure,

```

Table 2: 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

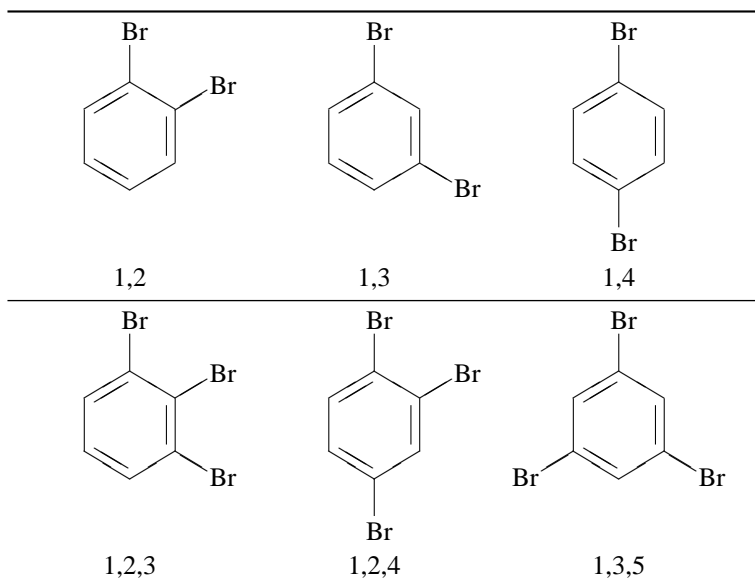


Figure 1: The di- and tri-bromobenzenes

```

]{}ccc}{}{
\bzdrv{1==Br;2==Br}&
\bzdrv{1==Br;3==Br}&
\bzdrv{1==Br;4==Br}
1,2 & 1,3 & 1,4
\bzdrv{1==Br;2==Br;3==Br}&
\bzdrv{1==Br;2==Br;4==Br}&
\bzdrv{1==Br;3==Br;5==Br}
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 Implementation

```

1 <*package>
2 \RequirePackage{keyval,array,tabularx,booktabs,rotating}
3 \def\NN{\tabularnewline}
4 \def\FL{\toprule}
5 \def\ML{\NN\midrule}
6 \def\LL{\NN\bottomrule}
7 \newdimen\@ctblwidth\@ctblwidth=0pt
8 \newdimen\@ctblmaxwidth\@ctblmaxwidth=0pt
9 \newdimen\@ctblw % the final width

```

Allocate box registers so that we can determine the widths of the tables

```

10 \newbox\ctbl@tabelx % the width with X columns
11 \newbox\ctbl@tabel % the width where X is replaced with 1
12 \newbox\ctbl@t % the final box will become one of the two above

```

Option setting commands from keyval. The table position (here, top, bottom, page) gets a special treatment, since \LaTeX does not expand commands there. So instead of putting things like `tbp` in a command like `\@ctblbegin` we put `\begin{table}[tbp]` in it.

```

13 \define@key{ctbl}{caption} {\def\@ctblcaption {#1}}
14 \define@key{ctbl}{cap}      {\def\@ctblcap      {#1}}
15 \define@key{ctbl}{label}    {\def\@ctbllabel    {#1}}
16 \define@key{ctbl}{pos}      {\def\@ctblpos      {#1}}
17                             {\def\@ctblbegin{\@ctblbeg[#1]}}
18 \define@key{ctbl}{width}     {\@ctblwidth       =#1}
19 \define@key{ctbl}{maxwidth} {\@ctblmaxwidth     =#1}
20 \define@key{ctbl}{botcap} [] {\def\@ctblbotcap  {1}}
21 \define@key{ctbl}{rotate} [] {\def\@ctblrotate {sideways}}
22 \define@key{ctbl}{figure} [] {\def\@ctbltaborfig{figure}}
23 \define@key{ctbl}{star}     [] {\def\@ctblstarred {*}}

```

a caption will only be generated if the *caption* option was used:

```

24 \def\@ctblCaption{
25   \ifx\@ctblcap\empty\let\@ctblcap\@ctblcaption\fi
26   \ifx\@ctblcaption\empty\else
27     \caption[\@ctblcap]{\label{\@ctbllabel}\@ctblcaption}
28   \fi
29 }
30 \newcommand{\tnote}[2][a]{%
31   \hbox{\@textsuperscript{\normalfont\textit{#1}}}&#2\NN}
32 \newcommand{\tmark}[1][a]{%
33   \hbox{\@textsuperscript{\normalfont\textit{#1}}}}
34 \newcommand{\ctable}[4][] {
35   \def\@ctbltaborfig{table}
36   \def\@ctblrotate {}
37   \def\@ctblpos {}
38   \def\@ctblcaption {}
39   \def\@ctblcap {}
40   \def\@ctbllabel {}
41   \def\@ctblbeg {\begin{\@ctblrotate\@ctbltaborfig\@ctblstarred}}
42   \def\@ctblbegin {\@ctblbeg}
43   \def\@ctblend {\end{\@ctblrotate\@ctbltaborfig\@ctblstarred}}
44   \def\@ctblbotcap {}
45   \def\@ctblstarred {}
46   \setkeys{ctbl}{#1}

```

It makes no sense to use *width* together with *maxwidth* or *pos* together with *rotate*

```

47   \ifdim\@ctblwidth=0pt\else
48     \ifdim\@ctblmaxwidth=0pt\else
49       \PackageError{ctable}{
50         You may not use the width and maxwidth options together}{%
51         Use either width or maxwidth}
52     \fi
53   \fi
54   \ifx\@ctblpos\empty\else
55     \ifx\@ctblrotate\empty\else
56       \PackageError{ctable}{
57         You may not use the pos and rotate options together}{%
58         Rotated tables and figures are always typeset on a separate page}
59     \fi
60   \fi
61   \newcolumnntype{Y}{X}

```

save the table contents in a box, so we can determine its width, one box will contain the table typeset with the tabular environment:

```
62 \sbox\ctbl@tabel{%
63     \newcolumnntype{X}{1}%
64     \begin{tabular}{#2}
65         #4
66     \end{tabular}
67 }
```

the other will get the table typeset with the tabularx environment:

```
68
69 \sbox\ctbl@tabelx{%
70     \newcolumnntype{X}{Y}%
71     \begin{tabularx}{\ifdim\@ctblwidth>0pt\@ctblwidth\else\@ctblmaxwidth\fi}{#2}
72         #4
73     \end{tabularx}
74 }
```

if no *maxwidth* was given:

```
75 \ifdim\@ctblmaxwidth=0pt
```

and also no *width*:

```
76 \ifdim\@ctblwidth=0pt
```

then use the tabular environment:

```
77 \sbox{\ctbl@t}{\usebox\ctbl@tabel}
78 \else
```

if width was given: use the tabularx environment

```
79 \sbox{\ctbl@t}{\usebox\ctbl@tabelx}
80 \fi
81 \else
```

with the *maxwidth* option, we check if the table, typeset with the tabular environment would get too wide:

```
82 \ifdim\wd\ctbl@tabel>\@ctblmaxwidth
```

if so, we use the tabularx environment:

```
83 \sbox{\ctbl@t}{\usebox\ctbl@tabelx}
84 \else
```

but if within limits, we use the tabular environment:

```
85 \sbox{\ctbl@t}{\usebox\ctbl@tabel}
86 \fi
87 \fi
```

the `\ctbl@t` box now contains the table as we want to typeset it; determine its width:

```
88 \@ctblw=\wd\ctbl@t
```

\@ctblbegin is now defined as something like \begin{table}[tbp].

```
89 \@ctblbegin
90   \begin{center}
91     \begin{minipage}{\@ctblw}
92       \ifx\@ctblbotcap\empty\@ctblCaption\vspace{2ex}\fi
93       \usebox\ctbl@t % insert the tabular
94       \def\@ctblfootnotes{\#3}
95       \ifx\#3\empty\else % append footnotes, if any
96         \\
97         \begin{tabularx}{\@ctblw}{r@{\,}>{\footnotesize\raggedright}X}
98           \#3
99         \end{tabularx}
100       \fi
101       \ifx\@ctblbotcap\empty\else\@ctblCaption\fi
102     \end{minipage}
103   \end{center}
104 \@ctblend
105 }
106 \end{package}
```