lutabulartools
some useful tabular tools (LuaLaTeX-based)

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lutabulartools is a package that contains a few useful macros to help with tables. Most functions require LuaLaTeX. This package redefines the `tabular` and `tabular*` environments. The following packages are loaded: `booktabs`, `multirow`, `makecell`, `xparse`, `array`, `xcolor`, `colortbl`, `luacode`, `penlight`.

1 Options

The author likes tables with left and right-most columns flush to the end. Since the `tabular` env is redefined in this, the author took the liberty to automatically pad the `tabular` cell spec with `{}` on each end. If you don’t want this, you can pass `notrim` to the package. Or, you can manually fix it in a `tabular` with `!{}` like so:

\begin{tabular}{!{c}!{}}
\toprule
Xyz
\bottomrule
\end{tabular}

2 `\MC` – Magic Cell

`\MC` (magic cell) combines the facilities of `\multirow` and `\multicolumn` from the `multirow` package, and `\makcell` from the titular package. With the help of LuaLaTeX, it takes an easy-to-use cell specification and employs said commands as required. `\MC` will not work properly if your table is only 1 column wide (you probably don’t need `\MC` in that case anyway...). Here is the usage:

`\MC * [cell spec] <cell format> (override multicolumn col) {contents}

* This will wrap the entire command in {}. This is necessary for `siunitx` single-column width columns. However, the `\MC` command attempts to detect this automatically.

[cell spec] Any letters placed in this argument are used for cell alignment. You can use one of three: “t”, “m”, “b” for top, middle, bottom (vertical alignment), or “l”, “c”, “r” for
horizontal alignment. By default, \MC will try to autodetect the horizontal alignment based on the current column. If it can’t, it will be left-aligned. The default vertical alignment is top. More on this in section ??.

This argument can also contain two integers, separated by a comma (if two are used). “C,R”, “C”, or “,R” are a valid inputs, where R=rows (int), and C=columns, (int). If you want a 1 column wide, multirow cell, you can pass “,R”. These numbers can be negative (positive numbers occupy columns to the right and rows below, and negative numbers occupy columns to the left and rows above). If no spec is passed, (argument empty), \MC acts like a makecell. Additionally, you can pass “+” in place of C (number of columns wide), and it will make the cell width fill until the end of the current row.

Examples:
“\MC [2,2]” means two columns wide, two rows tall.
“\MC [2,1]” or “\MC [2]” means two columns wide, one row tall.
“\MC [1,2]” or “\MC [,2]” means one column wide, two rows tall.
“\MC [+2]”, if placed in the first column, occupies the entire row and is two rows tall.
“\MC [+2]”, if placed in the second column, occupies the second column to the end of the table and is two rows tall.

In any of these examples, you can place the alignment letters anywhere. So, “\MC [l1,2b]” and “\MC [1,2 lb]” are both left-bottom aligned (spaces are ignored).

(override You may want to adjust the column specification of a multicolumn cell, multicolumn) for example, using \{0\{c\}} to remove padding between the cell.

\cell format You can place formatting like \bfseries here.

2.1 Defaults

The tabular[*] environment is re-defined to use Lua pattern matching to parse the column specification of the table. This is done to determine how many columns there are, and what the current column type is, even if specifications like r@{.}l*{3}{r} are used. If you have defined a column that expands many, you should register it with \setMCrepl {?}{??} where ? is your column and ?? is what it expands to. You can also specify default horizontal and vertical alignments (ie if alignment not passed to \MC ) for an arbitrary column by \setMChordef {?}{l|r|c} and \setMChordef {?}{t|m|b}, where ? is the column. To add a column that should be surrounded by brackets for \texttt{sunitx} purposes, do so with \addMCsicol{?}. S is included by default.
2.2 Examples

2.2.1 A good use for headers

\begin{tabular}{ l l l }
\toprule
A Decent Example \\
\midrule
Heading \\
\cmidrule{2-3}
Multi Line & A & B \\
\end{tabular}

2.2.2 A small example

\begin{tabular}{ l l l }
\toprule
A & Lttrs \\
B & \\
1 & A & B \\
\end{tabular}

2.2.3 A small bad example

Notice that the top-aligned p-column doesn’t play particularly well with the middle aligned MC

\begin{tabular}{ p{1cm} l }
\toprule
hello \\
world \\
\end{tabular}

2.2.4 If you insist on vertical lines

\begin{tabular}{|c|c|c|} 
\hline
1 & 2 & 3 \\
\hline
4 & MC[2,2cm](@{}c@{}|) % \\
\hline
& MC[2](r){} \hline%hacky fix \\
6 & 7 & 8 \\
\hline
\end{tabular}
### 2.2.5 A perhaps useful example

```latex
\begin{tabularx}{\linewidth}{S[table-format=2.1,table-alignment=left]X}
\toprule
\% err & ... \% ERROR, not wrap \\
\MC{Error,\%} & Comment \% MC helps \\
3.1 & \MC[,2]{multi-line comment}\\
10.1 & \\\n\MC[2c]{... ...} \\
\bottomrule
\end{tabularx}
```

### 2.2.6 A messy example

```latex
\begin{tabular}{|c|c|c|c|c|c|}
\toprule
\MC[2,2cm]<\ttfamily>{2,2cm} & \MC<\ttfamily>{2r} & 5 & \MC<\ttfamily>{,2b}\midrule
1 & 2 & \MC[2l]<\ttfamily{(\@{}l)} & 5 & 6666 \\
\cmidrule{3-4}
1 & \MC[+r]<\ttfamily>{+r} \\
\bottomrule
\end{tabular}
```
3 Some additional rules

This package also redefines the \texttt{booktabs} \texttt{midrule}.

\texttt{\textbackslash gmidrule} is a full gray midrule.

By taking advantage of knowing how many columns there are (if you chose to redefine \texttt{\texttt{\textbackslash tabular}}, you can specify individual column numbers (for a one column wide rule), or reference with respect to the last column (blank, $+1$, $+0$, or $+$ means last column, $+2$ means second last column, for example) or omit the last number.

\texttt{\textbackslash cmidrule} is a single partial rule, with the above features

\texttt{\textbackslash gcmidrule} is a single partial gray rule, with the above features

You can add multiple “\texttt{\textbackslash cmidrule}”’s with the \texttt{(g)cmidrules} command. Separate with a comma. You can apply global trimming of the rules with the “()” optional argument, and then override it for a specific rule by placing “r” or “1” with the span specification.

\texttt{\textbackslash gcmidrules} Can produce multiple, light gray partial rules

\texttt{\textbackslash cmidrules} Can produce multiple black partial rules.

Here’s an example:

\begin{table}[h]
\begin{tabular}{ccccccc}
1 & 2 & 3 & 4 & 5 & 6 & 7 \\
\midrule
1 & 2 & 3 & 4 & 5 & 6 & 7 \\
\midrule
1 & 2 & 3 & 4 & 5 & 6 & 7 \\
\midrule
1 & 2 & 3 & 4 & 5 & 6 & 7 \\
\midrule
1 & 2 & 3 & 4 & 5 & 6 & 7 \\
\end{tabular}
\end{table}
### 3.1 Midrule every $X\text{th}$ row

With this command, you can place a rule every $X$ rows. You can change the step size and what kind of midrule you prefer.

```latex
\def\midruleXstep{5}
\def\midruleXrule{\gmidrule}
```

To use, insert \texttt{@{\midruleX}} at the end of each row using the tabular column spec. Before you want counting to begin, you should apply \texttt{\resetmidruleX} to avoid header rows being counted. Use \texttt{\noalign{\resetmidruleX}} if you need place a rule on the same line or in a cell.

```latex
\begin{tabular}{rclc@{\midruleX}}
  \toprule
  Num & . & . & . \\
  \midrule
  \resetmidruleX % reset
  1 & & & \\
  2 & & & \\
  3 & & & \\
  4 & & & \\
  5 & & & \\
  6 & & & \\
  7 & & & \\
  8 & & & \\
  9 & & & \\
 10 & & & \\
 11 & & & \\
 12 & & & \\
 13 & & & \\
 14 & & & \\
 15 & & & \\
 16 & & & \\
 17 & & & \\
 18 & & & \\
 \resetmidruleX % no bottom rule
  12 & & & \\
\bottomrule
\end{tabular}
```

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