

# Tables (PDF output)

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Here we will explore the functions that we can use to generate well-formatted tables when the output is a pdf document.

## **knitr**

*knitr* package includes a handy *kable()* function that produces simple tables:

|                   | mpg  | cyl | disp | hp  | drat | wt    | qsec  | vs | am | gear | carb |
|-------------------|------|-----|------|-----|------|-------|-------|----|----|------|------|
| Mazda RX4         | 21.0 | 6   | 160  | 110 | 3.90 | 2.620 | 16.46 | 0  | 1  | 4    | 4    |
| Mazda RX4 Wag     | 21.0 | 6   | 160  | 110 | 3.90 | 2.875 | 17.02 | 0  | 1  | 4    | 4    |
| Datsun 710        | 22.8 | 4   | 108  | 93  | 3.85 | 2.320 | 18.61 | 1  | 1  | 4    | 1    |
| Hornet 4 Drive    | 21.4 | 6   | 258  | 110 | 3.08 | 3.215 | 19.44 | 1  | 0  | 3    | 1    |
| Hornet Sportabout | 18.7 | 8   | 360  | 175 | 3.15 | 3.440 | 17.02 | 0  | 0  | 3    | 2    |
| Valiant           | 18.1 | 6   | 225  | 105 | 2.76 | 3.460 | 20.22 | 1  | 0  | 3    | 1    |

## pander

*pander* package is a relatively simple to use package. It can produce well-formatted tables for the outputs of `summary()` function for the datasets and models:

| mpg           | cyl           | disp          | hp            |
|---------------|---------------|---------------|---------------|
| Min. :10.40   | Min. :4.000   | Min. : 71.1   | Min. : 52.0   |
| 1st Qu.:15.43 | 1st Qu.:4.000 | 1st Qu.:120.8 | 1st Qu.: 96.5 |
| Median :19.20 | Median :6.000 | Median :196.3 | Median :123.0 |
| Mean :20.09   | Mean :6.188   | Mean :230.7   | Mean :146.7   |
| 3rd Qu.:22.80 | 3rd Qu.:8.000 | 3rd Qu.:326.0 | 3rd Qu.:180.0 |
| Max. :33.90   | Max. :8.000   | Max. :472.0   | Max. :335.0   |

|                    | Estimate | Std. Error | t value | Pr(> t )  |
|--------------------|----------|------------|---------|-----------|
| <b>(Intercept)</b> | 37.88    | 2.074      | 18.27   | 8.369e-18 |
| <b>cyl</b>         | -2.876   | 0.3224     | -8.92   | 6.113e-10 |

Table 3: Fitting linear model: mpg ~ cyl

| Observations | Residual Std. Error | $R^2$  | Adjusted $R^2$ |
|--------------|---------------------|--------|----------------|
| 32           | 3.206               | 0.7262 | 0.7171         |

## kableExtra

*kableExtra* package extends functionality of the *kable* package.

|                   | mpg  | cyl | disp | hp  | drat | wt    |
|-------------------|------|-----|------|-----|------|-------|
| Mazda RX4         | 21.0 | 6   | 160  | 110 | 3.90 | 2.620 |
| Mazda RX4 Wag     | 21.0 | 6   | 160  | 110 | 3.90 | 2.875 |
| Datsun 710        | 22.8 | 4   | 108  | 93  | 3.85 | 2.320 |
| Hornet 4 Drive    | 21.4 | 6   | 258  | 110 | 3.08 | 3.215 |
| Hornet Sportabout | 18.7 | 8   | 360  | 175 | 3.15 | 3.440 |

To make the output to look more like an HTML output:

|                   | mpg  | cyl | disp | hp  | drat | wt    |
|-------------------|------|-----|------|-----|------|-------|
| Mazda RX4         | 21.0 | 6   | 160  | 110 | 3.90 | 2.620 |
| Mazda RX4 Wag     | 21.0 | 6   | 160  | 110 | 3.90 | 2.875 |
| Datsun 710        | 22.8 | 4   | 108  | 93  | 3.85 | 2.320 |
| Hornet 4 Drive    | 21.4 | 6   | 258  | 110 | 3.08 | 3.215 |
| Hornet Sportabout | 18.7 | 8   | 360  | 175 | 3.15 | 3.440 |

*kable\_styling()* in LaTeX uses the same syntax and structure as in HTML. However, instead of `bootstrap_options`, we should specify `latex_options` instead:

|                   | mpg  | cyl | disp | hp  | drat | wt    |
|-------------------|------|-----|------|-----|------|-------|
| Mazda RX4         | 21.0 | 6   | 160  | 110 | 3.90 | 2.620 |
| Mazda RX4 Wag     | 21.0 | 6   | 160  | 110 | 3.90 | 2.875 |
| Datsun 710        | 22.8 | 4   | 108  | 93  | 3.85 | 2.320 |
| Hornet 4 Drive    | 21.4 | 6   | 258  | 110 | 3.08 | 3.215 |
| Hornet Sportabout | 18.7 | 8   | 360  | 175 | 3.15 | 3.440 |

We want to make sure the table is placed in the position where we want it to be. Notice, how the previous 2 tables  
To force this behavior - use “`hold_position`” option ( a stronger version is “`HOLD_position`”):

|                   | mpg  | cyl | disp | hp  | drat | wt    |
|-------------------|------|-----|------|-----|------|-------|
| Mazda RX4         | 21.0 | 6   | 160  | 110 | 3.90 | 2.620 |
| Mazda RX4 Wag     | 21.0 | 6   | 160  | 110 | 3.90 | 2.875 |
| Datsun 710        | 22.8 | 4   | 108  | 93  | 3.85 | 2.320 |
| Hornet 4 Drive    | 21.4 | 6   | 258  | 110 | 3.08 | 3.215 |
| Hornet Sportabout | 18.7 | 8   | 360  | 175 | 3.15 | 3.440 |

If the table is long, use `repeat_header` value for `latex_options` to insure that the table header is repeated if the table is split between multiple pages.

## kable\_styling

`kable_styling()` allows us to control the table width and position: `kable_styling(full_width = T)` or `kable_styling(position = "center")`.

See “Notebook\_2\_Tables\_HTML.Rmd” for more options for this function.

## column\_spec

This function can be used to format specific columns, e.g:

|                          | mpg  | cyl | disp | hp  | drat | wt    |
|--------------------------|------|-----|------|-----|------|-------|
| <b>Mazda RX4</b>         | 21.0 | 6   | 160  | 110 | 3.90 | 2.620 |
| <b>Mazda RX4 Wag</b>     | 21.0 | 6   | 160  | 110 | 3.90 | 2.875 |
| <b>Datsun 710</b>        | 22.8 | 4   | 108  | 93  | 3.85 | 2.320 |
| <b>Hornet 4 Drive</b>    | 21.4 | 6   | 258  | 110 | 3.08 | 3.215 |
| <b>Hornet Sportabout</b> | 18.7 | 8   | 360  | 175 | 3.15 | 3.440 |

We can also use a *conditional* formatting for the values in a column based on a value of another variable:

|                          | mpg  | cyl | disp | hp  | drat | wt    |
|--------------------------|------|-----|------|-----|------|-------|
| <b>Mazda RX4</b>         | 21.0 | 6   | 160  | 110 | 3.90 | 2.620 |
| <b>Mazda RX4 Wag</b>     | 21.0 | 6   | 160  | 110 | 3.90 | 2.875 |
| <b>Datsun 710</b>        | 22.8 | 4   | 108  | 93  | 3.85 | 2.320 |
| <b>Hornet 4 Drive</b>    | 21.4 | 6   | 258  | 110 | 3.08 | 3.215 |
| <b>Hornet Sportabout</b> | 18.7 | 8   | 360  | 175 | 3.15 | 3.440 |

## Grouped Columns

For the cases when table columns are grouped, we can use `add_header_above()` function. The value that follows the name of the group, indicates how many columns are included in this group:

|                          | Group 1 |     |      | Group 2 |      |       |
|--------------------------|---------|-----|------|---------|------|-------|
|                          | mpg     | cyl | disp | hp      | drat | wt    |
| <b>Mazda RX4</b>         | 21.0    | 6   | 160  | 110     | 3.90 | 2.620 |
| <b>Mazda RX4 Wag</b>     | 21.0    | 6   | 160  | 110     | 3.90 | 2.875 |
| <b>Datsun 710</b>        | 22.8    | 4   | 108  | 93      | 3.85 | 2.320 |
| <b>Hornet 4 Drive</b>    | 21.4    | 6   | 258  | 110     | 3.08 | 3.215 |
| <b>Hornet Sportabout</b> | 18.7    | 8   | 360  | 175     | 3.15 | 3.440 |

## Grouped Rows

We can group rows using `*pack_rows()` function:

|                          | mpg  | cyl | disp  | hp  | drat | wt    |
|--------------------------|------|-----|-------|-----|------|-------|
| <b>Mazda RX4</b>         | 21.0 | 6   | 160.0 | 110 | 3.90 | 2.620 |
| <b>Mazda RX4 Wag</b>     | 21.0 | 6   | 160.0 | 110 | 3.90 | 2.875 |
| <b>Datsun 710</b>        | 22.8 | 4   | 108.0 | 93  | 3.85 | 2.320 |
| <b>Group 1</b>           |      |     |       |     |      |       |
| <b>Hornet 4 Drive</b>    | 21.4 | 6   | 258.0 | 110 | 3.08 | 3.215 |
| <b>Hornet Sportabout</b> | 18.7 | 8   | 360.0 | 175 | 3.15 | 3.440 |
| <b>Valiant</b>           | 18.1 | 6   | 225.0 | 105 | 2.76 | 3.460 |
| <b>Duster 360</b>        | 14.3 | 8   | 360.0 | 245 | 3.21 | 3.570 |
| <b>Group 2</b>           |      |     |       |     |      |       |
| <b>Merc 240D</b>         | 24.4 | 4   | 146.7 | 62  | 3.69 | 3.190 |
| <b>Merc 230</b>          | 22.8 | 4   | 140.8 | 95  | 3.92 | 3.150 |
| <b>Merc 280</b>          | 19.2 | 6   | 167.6 | 123 | 3.92 | 3.440 |

For more examples see [Create Awesome LaTeX Table with knitr::kable and kableExtra](#)