

Document title

Subtitle

Author name(s)

August 31, 2022

Abstract

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1 Introduction

Configure the YAML header including the following elements:

- **title:** Title
- **subtitle:** Subtitle; remove option completely, if you don't need a subtitle.
- **author:** Character of single or multiple author(s)
- **header_left:** A running title as left header; remove option to leave blank.
- **header_right:** A second right header (e.g. authors); remove option to leave blank.
- **date:** The date; by default `\date`, will populate the date automatically.
- **fontsize:** Font size for body text; choose between 10pt, 11pt (default), and 12pt.
- **linkcolor, filecolor, citecolor, urlcolor:** Specify here colors for internal links, external links, citation links, and linked URLs, respectively, if you don't want the default colors; use options allowed by `xcolor`, including the `dvipsnames`, `svgnames`, and `x11names` lists.
- **german:** If option is set to `true`, the table and figure caption as well as the abstract and reference header will be in German; default is `false` (i.e., English).
- **bibliography:** A path to the bibliography file(s) to use for references (BibTeX *.bib* file). This template uses the bibliography-related package **natbib**. The current file 'references.bib' in the 'bib/' folder includes 3 dummy references; either insert your references into this file or replace the file with your own.
- **bibliographystyle:** The style is provided in the `bibstyle.bst` file, which adopts the **SAGE Harvard** reference style. Just leave the file as it is.
- **abstract:** Write here your abstract or remove option if you don't want to include an abstract.
- **output:** The nested fields for the output field are based on the arguments of the output function. Since `UHHformats::pdf_simple` is based on `rmarkdown::pdf_document`, see its help page for more options. Current default settings are
 - `number_sections: TRUE`
 - `highlight: "kate"`
 - `font = "Helvetica"`
 - `citation_package: "natbib"`
 - `latex_engine: "xelatex"`
- **header_includes:** Here you can add additional \LaTeX code to include in the header, before the `\begin{document}` statement.

- If you want to add additional LaTeX code to include before the `\end{document}` statement use the field `include_after`.

If you are associated with the UHH you can also use the University's own font "TheSansUHH". In that case replace `font = "Helvetica"` with `font = "TheSansUHH"`. To use another font, simply use the setting "other" and replace the 'font_XXX.ttf' files in the working directory with your own files. Please note, that you have to name these files exactly as the template font files.

2 Methods

2.1 R Markdown syntax vs LaTeX syntax

As with any .Rmd file you can write the entire report in the R Markdown syntax. However, if you are familiar with LaTeX you can also mix both:

2.1.1 R Markdown subsection

This is a dummy text to show you how to write in **bold** and in *italics*.

2.1.2 LaTeX subsection

This is a dummy text to show you that you can also write in **bold** and in *italics* with LaTeX.

2.2 Cross-referencing within the report

To cross-reference figures or tables you have to have a:

- **caption to your figure (or table):**
 - NOTE: figures without a caption will be included directly as images and will therefore not be a numbered figure
- **labeled code chunk:** this provides the identifier for referencing the figure or table generated by the chunk.

Cross-references within the text can then be made using the standard LaTeX syntax `\@ref{type:label}`, where label is the chunk label and type is the environment being referenced (e.g. tab, fig, or eq). Examples are given in the sections below (e.g. in [R Markdown table](#)).

To cross-reference sections simply put the section header in square brackets, e.g. [R output](#) via `[R output]`.

2.3 Mathematics

Use mathematics as usual with the dollar sign `$`; either in inline mode with one dollar sign, e.g. $E = mc^2$, or in display mode with two:

$$E = mc^2$$

Important to note: do not leave a space between the `$` and your mathematical notation.

Alternatively, you can use \LaTeX for more control, e.g. for setting equation numbers that can be cross-referenced:

$$\bar{X} = \frac{\sum_{i=1}^n X_i}{n} \tag{1}$$

You may refer to this equation using `\ref{eq:label}`, e.g., see Equation [1](#)

3 Results

3.1 R output

R output is typically shown in the monospace font (here an example with the `mtcars` dataset in the subfolder `data/`):

```
##      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
```

3.2 Tables

3.2.1 R Markdown table

Table 1 is a R Markdown table including a caption (note: the table number is automatically assigned) and label for cross-referencing:

Table 1: Your Caption

A	New	Table
left-aligned	center-aligned	right-aligned
\$123	\$456	\$789
<i>italics</i>	strikethrough	boldface

3.2.2 Tables generated with R

3.2.2.1 Using the *knitr* and *kableExtra* packages Table 2 is an example when using `knitr::kable()` to generate the table and *kableExtra* functions to modify it:

Table 2: A table produced with knitr and kableextra

	Group 5				Group 6	
	Group 1		Group 2		Group 3	Group 4
	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

Note:

Your comments go here.

3.2.2.2 The *xtable* package Another useful package for tables for PDF output is *xtable*. The following code will produce an example table if the *xtable* package is installed. Note that you

need to add the chunk option `results = "asis"` inside `{r}` otherwise the PDF will contain the \LaTeX code of the table!

Table 3: A table made with xtable

	mpg	cyl	disp	hp	drat	wt
Mazda RX4	21.00	6	160.00	110	3.90	2.62
Mazda RX4 Wag	21.00	6	160.00	110	3.90	2.88
Datsun 710	22.80	4	108.00	93	3.85	2.32
Hornet 4 Drive	21.40	6	258.00	110	3.08	3.21
Hornet Sportabout	18.70	8	360.00	175	3.15	3.44

3.3 Figures

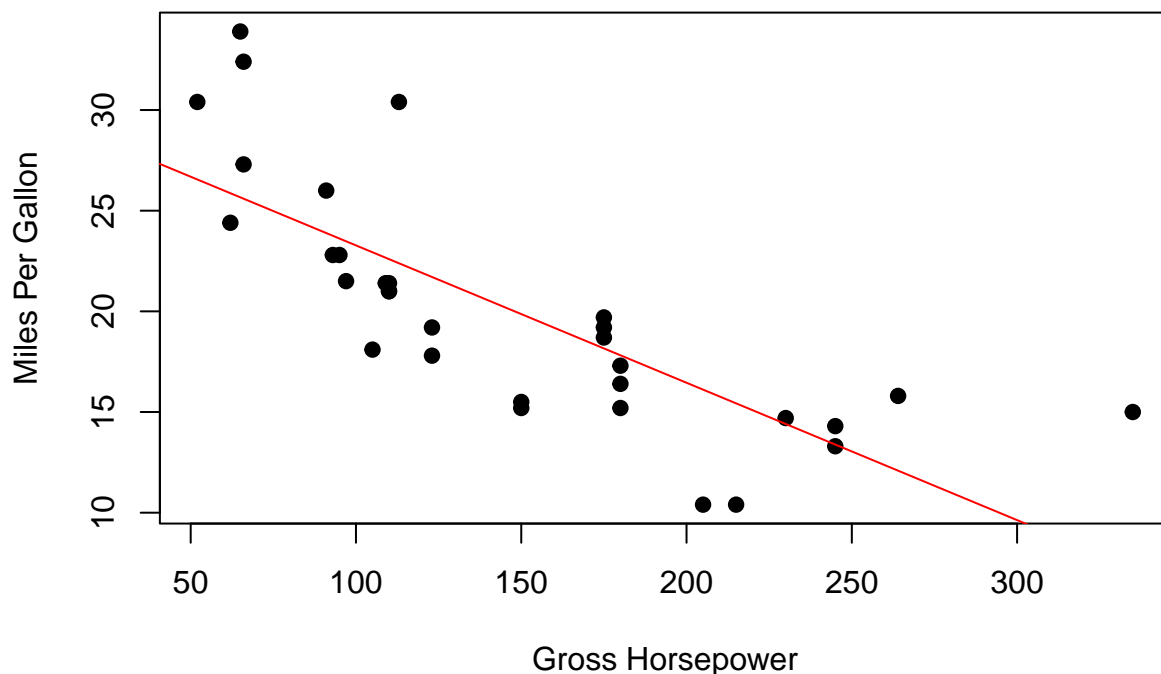


Figure 1: Relationship between horsepower and fuel economy

Figures are supported from R code and can be referenced (see Figure 1) by including the `\label{}` tag in the `fig.cap` attribute of the R chunk: `fig.cap = "Relationship between horsepower and fuel economy\\label{fig:base-ref}"`. It is a quirky hack at the moment, see [here](#).

Figure 2 shows a boxplot with just half the width and centered:

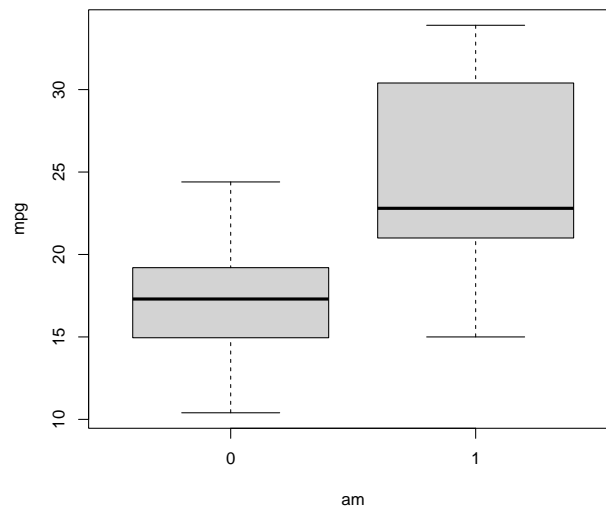


Figure 2: Fuel differences between transmission types (0 = automatic, 1 = manual)

4 Discussion

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5 Adding citations and bibliography

Link a `.bib` document via the YAML header and the bibliography will be printed at the very end (as usual). The default bibliography style is provided in the `bib.bst` file (do not delete), which adopts the **SAGE Harvard** reference style.

References can be cited directly within the document using the R Markdown equivalent of the \LaTeX citation system `[@key]`, where key is the citation key in the first line of the entry in the `.bib` file. Example: (Taylor and Green, 1937). To cite multiple entries, separate the keys by semicolons (e.g., (Knupp, 1999; Kamm, 2000)).

There is also the package `citr`, which I highly recommend: `citr` provides functions and an RStudio add-in to search a BibTeX-file to create and insert formatted Markdown citations into the current document. If you are using the reference manager **Zotero** the add-in can access your reference database directly.

5.1 Software

If you want to include a paragraph on the software used, here is some example text/code to get the current R and package versions. The code to create a separate bibliography file named 'packages.bib' with all package references has already been added at the beginning of this script (code chunk 'generate-package-refs').

All analyses were performed using the statistical software R (version 4.1.2) ([R Core Team, 2021](#)). This report, including tables and figures, was generated using the packages 'rmarkdown' (version 2.14) ([Allaire et al., 2022](#)), 'knitr' (version 1.39) ([Xie, 2022](#)), 'kableExtra' (version 1.3.4) ([Zhu, 2021](#)), 'xtable' (version 1.8.4) ([Dahl et al., 2019](#)), and 'tidyverse' (version 1.3.1) ([Wickham, 2021](#))

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