

R, Rstudio, and ggplot2

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Contents

1	R	5
1.1	Why R?	5
1.2	Installing R	5
1.3	Installing RStudio	5
1.4	Cheat Sheets for R	6
2	Introduction	7
3	Literature	9
4	Methods	11
5	Applications	13
5.1	Example one	13
5.2	Example two	13
6	Final Words	15

Chapter 1

R

1.1 Why R?

- R is a **free** open source software.
- R is a language designed especially for **statistical analysis**. Many statistical methods are first implemented in R.
- R provides many tools for publication-quality **data visualization** (e.g., `ggplot2`).
- R provides many tools for **data processing (or data wrangling)** (e.g., `dplyr`, `tidyr`). Data come from diverse sources these days (e.g., microarray, EEG, fMRI, eyetrackers, facebook, twitter, many sensors, ...).

1.2 Installing R

- You can download and install a **base distribution and packages (base R)** from the official R website: <https://www.r-project.org>.
- About 14,000 packages **extend** the base R

1.3 Installing RStudio

- RStudio is an integrated development environment (IDE) for R.
- You can download and install the RStudio from the RStudio website: <https://www.rstudio.com>.

1.4 Cheat Sheets for R

- RStudio provides cheat sheets for R: <https://www.rstudio.com/resources/cheatsheets/>.

Chapter 2

Introduction

You can label chapter and section titles using `{#label}` after them, e.g., we can reference Chapter 2. If you do not manually label them, there will be automatic labels anyway, e.g., Chapter 4.

Figures and tables with captions will be placed in `figure` and `table` environments, respectively.

```
par(mar = c(4, 4, .1, .1))
plot(pressure, type = 'b', pch = 19)
```

Reference a figure by its code chunk label with the `fig:` prefix, e.g., see Figure 2.1. Similarly, you can reference tables generated from `knitr::kable()`, e.g., see Table 2.1.

```
knitr::kable(
  head(iris, 20), caption = 'Here is a nice table!',
  booktabs = TRUE
)
```

You can write citations, too. For example, we are using the **bookdown** package (?) in this sample book, which was built on top of R Markdown and **knitr** (Xie, 2015).

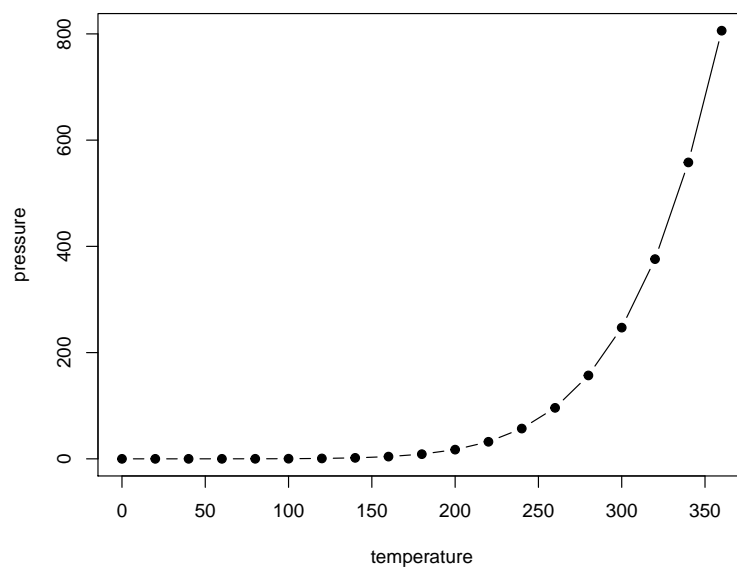


Figure 2.1: Here is a nice figure!

Table 2.1: Here is a nice table!

Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
5.1	3.5	1.4	0.2	setosa
4.9	3.0	1.4	0.2	setosa
4.7	3.2	1.3	0.2	setosa
4.6	3.1	1.5	0.2	setosa
5.0	3.6	1.4	0.2	setosa
5.4	3.9	1.7	0.4	setosa
4.6	3.4	1.4	0.3	setosa
5.0	3.4	1.5	0.2	setosa
4.4	2.9	1.4	0.2	setosa
4.9	3.1	1.5	0.1	setosa
5.4	3.7	1.5	0.2	setosa
4.8	3.4	1.6	0.2	setosa
4.8	3.0	1.4	0.1	setosa
4.3	3.0	1.1	0.1	setosa
5.8	4.0	1.2	0.2	setosa
5.7	4.4	1.5	0.4	setosa
5.4	3.9	1.3	0.4	setosa
5.1	3.5	1.4	0.3	setosa
5.7	3.8	1.7	0.3	setosa
5.1	3.8	1.5	0.3	setosa

Chapter 3

Literature

Here is a review of existing methods.

Chapter 4

Methods

We describe our methods in this chapter.

Chapter 5

Applications

Some *significant* applications are demonstrated in this chapter.

5.1 Example one

5.2 Example two

Chapter 6

Final Words

We have finished a nice book.

Bibliography

Xie, Y. (2015). *Dynamic Documents with R and knitr*. Chapman and Hall/CRC, Boca Raton, Florida, 2nd edition. ISBN 978-1498716963.