An introduction to Statistical Modelling using GLMs

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Contents

Chapter 1

Course Information

This is a *sample* book written in **Markdown**. You can use anything that Pandoc's Markdown supports, e.g., a math equation $a^2 + b^2 = c^2$.

The **bookdown** package can be installed from CRAN or Github:

```
install.packages("bookdown")
# or the development version
# devtools::install_github("rstudio/bookdown")
```

Remember each Rmd file contains one and only one chapter, and a chapter is defined by the first-level heading `#`.

To compile this example to PDF, you need XeLaTeX. You are recommended to install TinyTeX (which includes XeLaTeX): https://yihui.name/tinytex/.

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.

2.1 Figures and Tables

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.

You can also do a text reference for a figure which is useful if you want special characters;

```
par(mar = c(4, 4, .1, .1))
plot(pressure, type = 'b', pch = 19, col=2)
```

Here i am referencing 2.2.

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

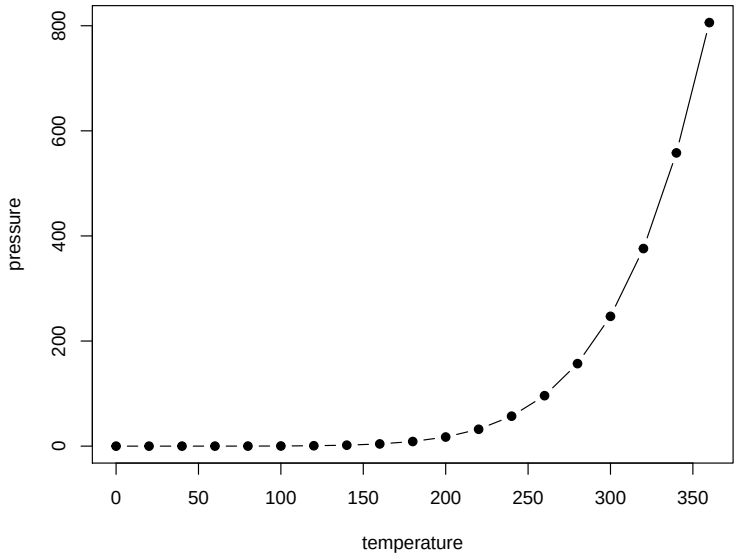


Figure 2.1: Here is a nice figure!

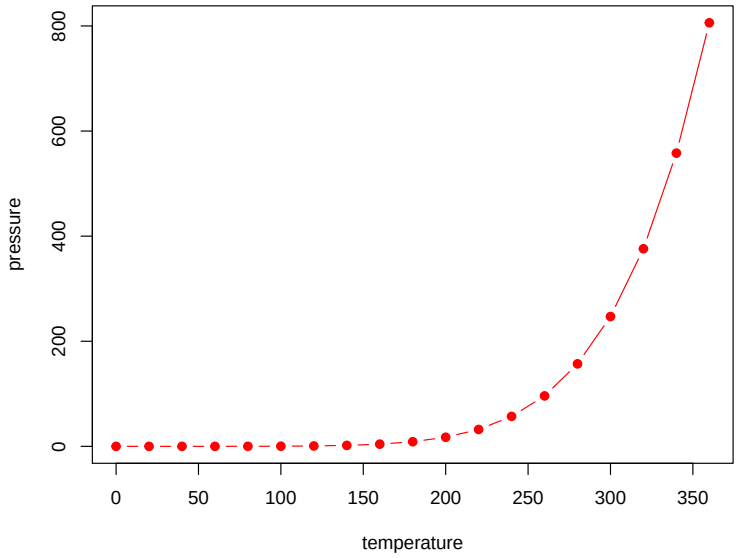
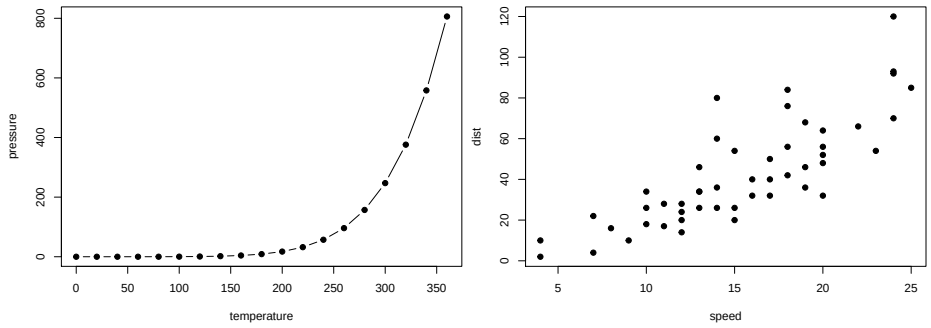


Figure 2.2: Define a text reference **here** with some math symbols like θ.

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




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

Reference this table using Table 2.1

You can write citations, too. For example, we are using the **bookdown** package

(Xie, 2020) in this sample book, which was built on top of R Markdown and **knitr** (Xie, 2015).

2.2 Equations:

$$f\left(k\right)=\binom{n}{k}p^{k}\left(1-p\right)^{n-k} \tag{2.1}$$

You may refer to it using (2.1), e.g., see Equation (2.1).

Please make sure equations without labels are not numbered by either using the equation* environment or adding or to your equations. The same rules apply to other math environments, such as eqnarray, gather, align, and so on (e.g., you can use the align* environment).

$$\begin{aligned} g(X_n) &= g(\theta) + g'(\tilde{\theta})(X_n - \theta) \\ \sqrt{n}[g(X_n) - g(\theta)] &= g'\left(\tilde{\theta}\right)\sqrt{n}[X_n - \theta] \end{aligned}$$

use split to have multiple lines with one equation reference

$$\begin{aligned} \text{Var}(\hat{\beta}) &= \text{Var}((X'X)^{-1}X'y) \\ &= (X'X)^{-1}X'\text{Var}(y)((X'X)^{-1}X')' \\ &= (X'X)^{-1}X'\text{Var}(y)X(X'X)^{-1} \\ &= (X'X)^{-1}X'\sigma^2 IX(X'X)^{-1} \\ &= (X'X)^{-1}\sigma^2 \end{aligned}$$

there are also 'example' and 'exercise' environments (labelled with exm and exr respectively)

Example 2.1 (how to do an example)**.** for this example, we show nothing

Example 2.2 (how to do a second example)**.** for this example, we show something

these environments can be changed using the css file CSS class being the environment name, e.g., `<div class="lemma"></div>`

Chapter 3

Literature

Here is a review of existing methods.

Chapter 4

Methods

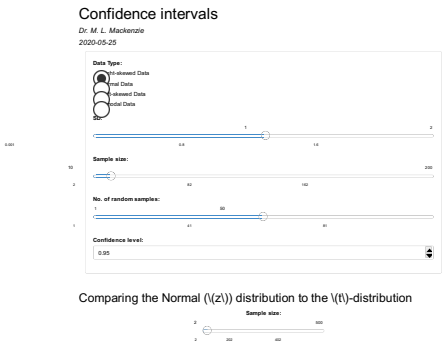
We describe our methods in this chapter.

We showed some examples in the introduction (Chapter 2)

You can also reference specific sections by giving them a label `{#sectionname}`

And you can add words to the index such as GLM

4.1 Shiny app


Confidence intervals
Dr. M. L. Mackenzie
2020-05-25
Data Type:
Right-skewed Data
Normal Data
Left-skewed Data
Normal Data
Sigma:
Sample size:
No. of random samples:
Confidence level:
0.95
Comparing the Normal (\(z\)) distribution to the \(t\)-distribution
Sample size:

you can use a shiny app embedded in the notes Figure **??**.

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.

If you want to split the book by sections, so each html page is a section you can use split_by=‘section’ in the YAML header.

```
output:
   bookdown::gitbook:
    lib_dir: "book_assets"
    config:
      sharing: null
    split_by: section
```

Appendix A

first appendix

Bibliography

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

Xie, Y. (2020). *bookdown: Authoring Books and Technical Documents with R Markdown*. R package version 0.19.

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