

# Fundamentals of Spatial Analysis in R

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# Chapter 1

## Prerequisites

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.

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 (Xie, 2019) in this sample book, which was built on top of R Markdown and **knitr** (Xie, 2015).

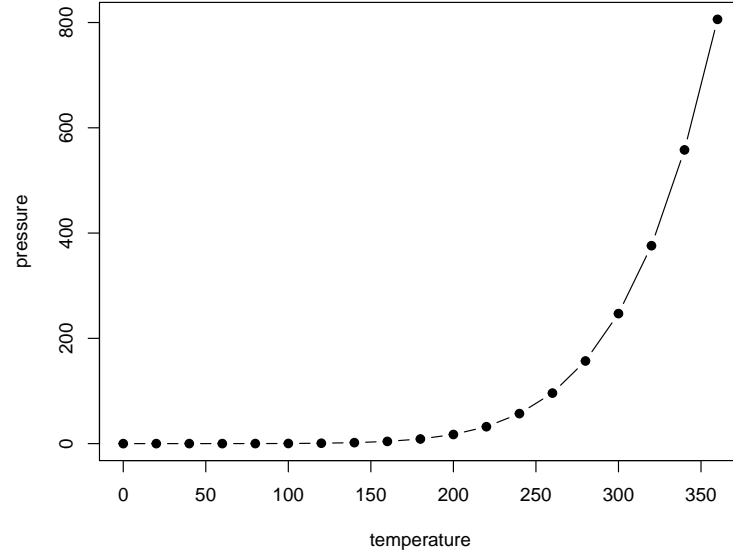


Figure 2.1: Here is a nice figure!

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.





# References

## 6.0.1 General R / R Spatial Resources

- R Spatial - Spatial Data Science with R
- Geocomputation with R
- R Spatial Task View
- Spatial Data Science - Pebesma and Bivand
- Spatial Data Science Course- Prof. Adam Wilson
- Introduction to Mapping and Spatial Analysis with R
- Google R Style Guide
- Advanced R by Hadley Wickham
- Data Camp Spatial Data with R Track
- FOSS4G2019 R for Geospatial Processing

## 6.0.2 R sp Resources

- Bivand, R. S., Pebesma, E. J., & Gómez-Rubio, V. (2008). **Applied spatial data analysis with R**. New York: Springer.
- Classes and Methods for Spatial Data: the sp package
- Classes and Methods for Spatial Data: the sp package

## 6.0.3 R Simple Features Resources

- Simple Features for R
- Spatial Data in R: New Directions
- sp-sf Migration
- An Exploration of Simple Features for R
- Simple Features: Building Spatial Data Pipelines in R
- Tidy spatial data in R: using dplyr, tidyr, and ggplot2 with sf

## 6.0.4 R Raster Resources

- Wageningen University **Intro to Raster**
- Wageningen University **Advanced Raster Analysis**
- **The Visual Raster Cheat Sheet GitHub Repo**

- **RasterVis**
- **stars** - spatiotemporal arrays

### 6.0.5 R Mapping Resources

- **mapview**
- **Leaflet for R**
- **tmap**
- Zev Ross **Creating beautiful demographic maps in R with the tidycensus and tmap packages**
- Geocomputation with R: **Making maps with R**
- Ryan Peek: **Mapping in R**

# Bibliography

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

Xie, Y. (2019). *bookdown: Authoring Books and Technical Documents with R Markdown*. R package version 0.14.