Math 245 Notes

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Contents

Getting Started

This manual is designed to provide students in Math 245 (Applied Regression Analysis) with supplemental notes and examples. If you

Chapter 1

Review

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 **??**.

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 1.1. Similarly, you can reference tables generated from `knitr::kable()`, e.g., see Table 1.1.

```
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).

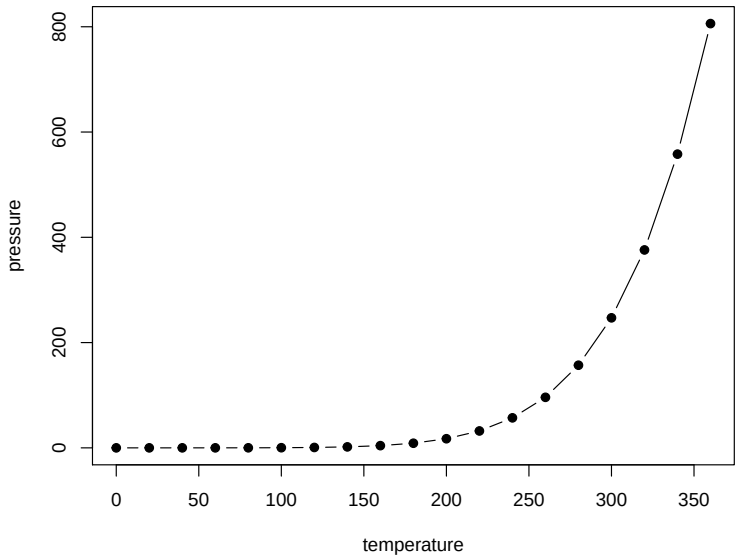

Figure 1.1: Here is a nice figure!

Table 1.1: 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 2

Simple Linear Regression

Chapter 3

Multiple Regression

Chapter 4

Logistic Regression

Chapter 5

Poisson Regression

Appendix A

R review

A.1 R and Rstudio

R is a free professional statistical software that is available for use on windows, mac and linux computers. R is a popular tool for researchers from many fields so acquiring basic R skills from Math 215/245 will be beneficial for this course and career plans!

RStudio is a free software that provides a user-friendly interface with R. We will be running R through RStudio in our stats classes.

R can be more challenging to learn than other software (like Excel, SPSS, etc) because analyzes are done using written commands rather than using a drop down (point-and-click) menu. But R is very powerful because of the huge variety of statistical methods that it supports (due to the addition of free user contributed packages) and the user's ability to customize their experience (graphics, new functions, data manipulation, etc). Because R is based on written commands that can be recorded in a variety of ways, it is easy for a user to reproduce, re-do or continue analyzes that were started at a different point in time. This is much harder to do when you are using a bunch of drop-down menu commands to run your analysis!

Appendix B

Math review

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 0.11.