

Series de Tiempo

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Chapter 1

Tema de Interés

Uno de los primeros compromisos del curso consistió en elegir un tema de interés. En mi caso, elegí analizar los casos de dengue grave que se han presentado en la ciudad de Cali en el período 2017-2021, según los registros oficiales suministrados por la Secretaría de Salud Pública Municipal. La motivación principal de esta selección es que permitiría integrar los aprendizajes de este curso en los análisis que estoy realizando, junto a mis compañeros, en el marco del trabajo de grado de la Maestría en Ciencia de Datos.

Según los hallazgos preliminares que hemos realizado, los casos de dengue grave en Cali podrían ser explicados y quizá predichos, a través de un conjunto de variables de interés que pueden obtenerse de fuentes informales. En general, este problema es relevante porque le permitiría a los responsables del sistema de salud municipal asegurar la asignación oportuna de recursos para atender de forma oportuna y eficaz los brotes de dengue grave en la ciudad.

Desde la perspectiva técnica, el conjunto de datos de trabajo que hemos construido, el cual incluye variables meteorológicas, consta de información estructurada en el tiempo, y habilitaría la experimentación con todos los referentes técnicos y herramientas que se nos suministre en el desarrollo de la asignatura Análisis de Series de Tiempo. El efecto de sinergia es evidente, especialmente al considerar que hemos realizado un ejercicio de entendimiento del problema y exploración de dinámicas alrededor del mismo durante los últimos dos semestres.

Chapter 2

Análisis Exploratorio de Datos Inicial

xxx.

2.1 Primeras impresiones

```
library(readxl)

data <- read_excel("~/0. MCD/3/TS/unidad 2/data.xlsx", sheet = "220m")

data$date <- as.Date(data$date, format = "%d/%m/%Y")

class(data$date)
```

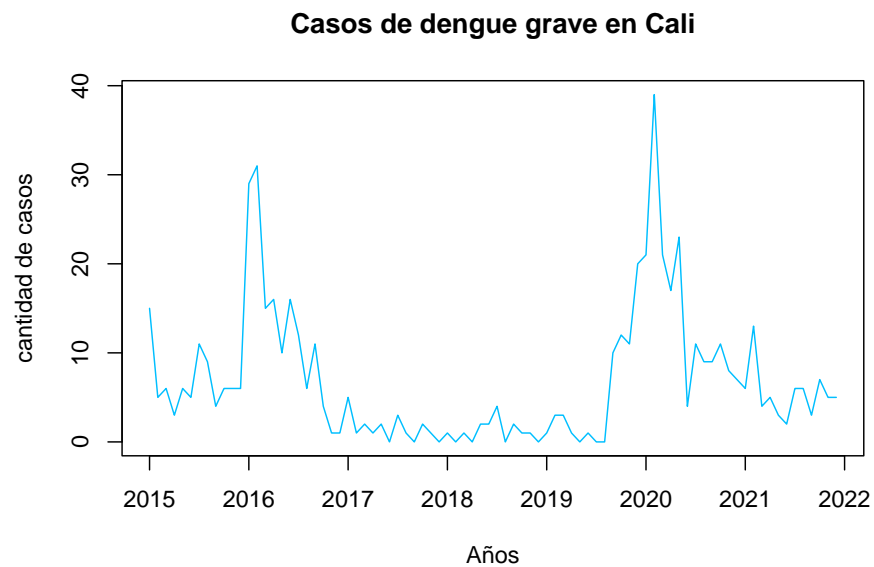
```
## [1] "Date"
```

```
data.ts <- ts(data$c220, start = c(2015,1), frequency=12)
```

```
data.ts
```

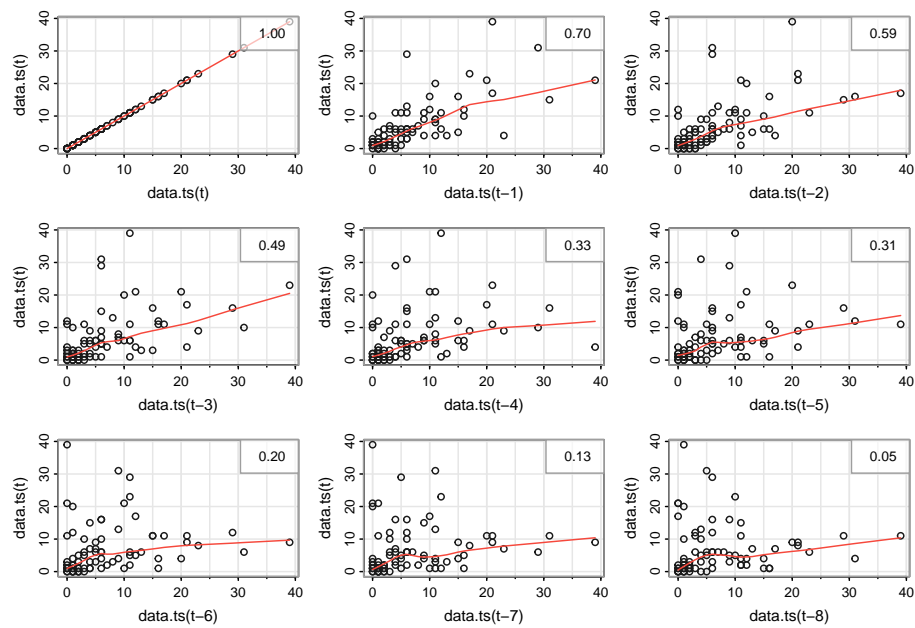
```
##      Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
## 2015  15   5   6   3   6   5  11   9   4   6   6   6
## 2016  29  31  15  16  10  16  12   6  11   4   1   1
## 2017   5   1   2   1   2   0   3   1   0   2   1   0
## 2018   1   0   1   0   2   2   4   0   2   1   1   0
## 2019   1   3   3   1   0   1   0   0  10  12  11  20
## 2020  21  39  21  17  23   4  11   9   9  11   8   7
## 2021   6  13   4   5   3   2   6   6   3   7   5   5
```

```
plot(data.ts, main=" ", ylab="cantidad de casos", col="deepskyblue", xlab="Años")  
title(main="Casos de dengue grave en Cali")
```



2.2 Promedio Móvil

```
astsa::lag2.plot(data.ts, data.ts, 8)  
#> [1] 8
```

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

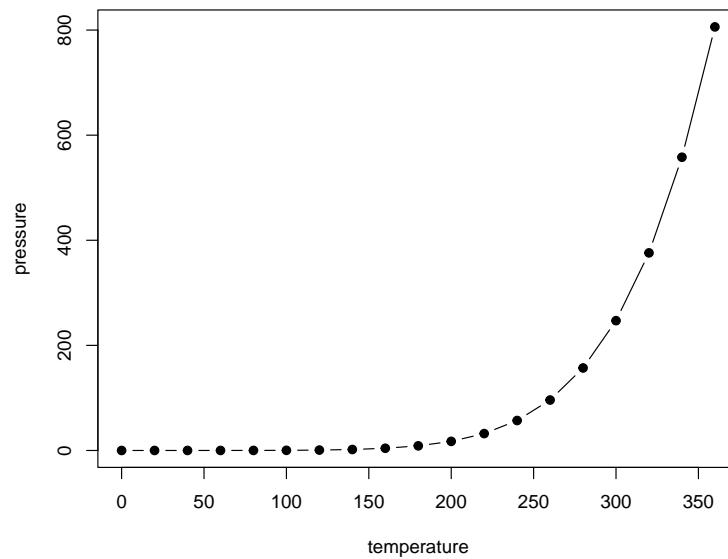


Figure 2.1: Here is a nice figure!

2.4 Estacionalidad

An unnumbered section

Chapters and sections are numbered by default. To un-number a heading, add a `{.unnumbered}` or the shorter `{-}` at the end of the heading, like in this section.

Chapter 3

Cross-references

Cross-references make it easier for your readers to find and link to elements in your book.

3.1 Chapters and sub-chapters

There are two steps to cross-reference any heading:

1. Label the heading: `# Hello world {#nice-label}`.
 - Leave the label off if you like the automated heading generated based on your heading title: for example, `# Hello world = # Hello world {#hello-world}`.
 - To label an un-numbered heading, use: `# Hello world {-#nice-label}` or `{# Hello world .unnumbered}`.
2. Next, reference the labeled heading anywhere in the text using `\@ref(nice-label)`; for example, please see Chapter 3.
 - If you prefer text as the link instead of a numbered reference use: any text you want can go here.

3.2 Captioned figures and tables

Figures and tables *with captions* can also be cross-referenced from elsewhere in your book using `\@ref(fig:chunk-label)` and `\@ref(tab:chunk-label)`, respectively.

See Figure 3.1.

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

Don't miss Table 3.1.

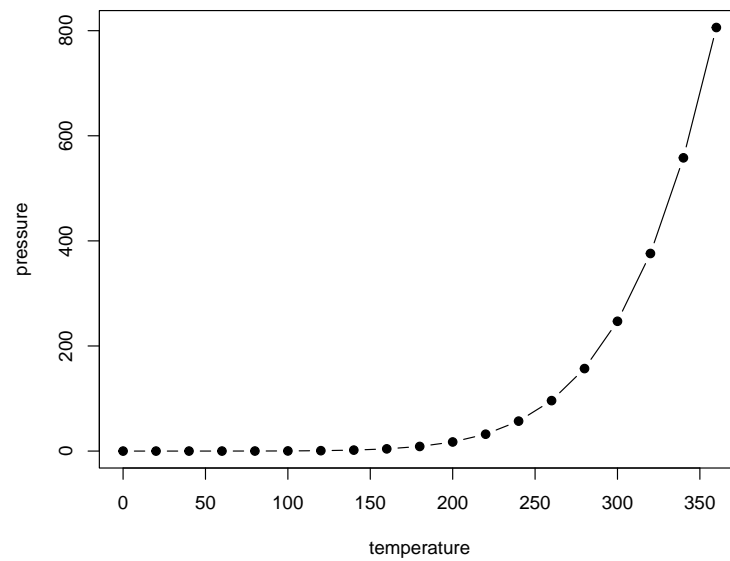


Figure 3.1: Here is a nice figure!

```
knitr::kable(  
  head(pressure, 10), caption = 'Here is a nice table!',  
  booktabs = TRUE  
)
```

Table 3.1: Here is a nice table!

temperature	pressure
0	0.0002
20	0.0012
40	0.0060
60	0.0300
80	0.0900
100	0.2700
120	0.7500
140	1.8500
160	4.2000
180	8.8000

Chapter 4

Parts

You can add parts to organize one or more book chapters together. Parts can be inserted at the top of an .Rmd file, before the first-level chapter heading in that same file.

Add a numbered part: `# (PART) Act one {-}` (followed by `# A chapter`)

Add an unnumbered part: `# (PART*) Act one {-}` (followed by `# A chapter`)

Add an appendix as a special kind of un-numbered part: `# (APPENDIX) Other stuff {-}` (followed by `# A chapter`). Chapters in an appendix are prepended with letters instead of numbers.

Chapter 5

Footnotes and citations

5.1 Footnotes

Footnotes are put inside the square brackets after a caret `^[]`. Like this one ¹.

5.2 Citations

Reference items in your bibliography file(s) using `@key`.

For example, we are using the **bookdown** package [Xie, 2023] (check out the last code chunk in `index.Rmd` to see how this citation key was added) in this sample book, which was built on top of R Markdown and **knitr** [Xie, 2015] (this citation was added manually in an external file `book.bib`). Note that the `.bib` files need to be listed in the `index.Rmd` with the YAML `bibliography` key.

The RStudio Visual Markdown Editor can also make it easier to insert citations: <https://rstudio.github.io/visual-markdown-editing/#/citations>

¹This is a footnote.

Chapter 6

Blocks

6.1 Equations

Here is an equation.

$$f(k) = \binom{n}{k} p^k (1-p)^{n-k} \quad (6.1)$$

You may refer to using `\@ref{eq:binom}`, like see Equation (6.1).

6.2 Theorems and proofs

Labeled theorems can be referenced in text using `\@ref{thm:tri}`, for example, check out this smart theorem 6.1.

Theorem 6.1. *For a right triangle, if c denotes the length of the hypotenuse and a and b denote the lengths of the **other** two sides, we have*

$$a^2 + b^2 = c^2$$

Read more here <https://bookdown.org/yihui/bookdown/markdown-extensions-by-bookdown.html>.

6.3 Callout blocks

The R Markdown Cookbook provides more help on how to use custom blocks to design your own callouts: <https://bookdown.org/yihui/rmarkdown-cookbook/custom-blocks.html>

Chapter 7

Sharing your book

7.1 Publishing

HTML books can be published online, see: <https://bookdown.org/yihui/bookdown/publishing.html>

7.2 404 pages

By default, users will be directed to a 404 page if they try to access a webpage that cannot be found. If you'd like to customize your 404 page instead of using the default, you may add either a `_404.Rmd` or `_404.md` file to your project root and use code and/or Markdown syntax.

7.3 Metadata for sharing

Bookdown HTML books will provide HTML metadata for social sharing on platforms like Twitter, Facebook, and LinkedIn, using information you provide in the `index.Rmd` YAML. To setup, set the `url` for your book and the path to your `cover-image` file. Your book's `title` and `description` are also used.

This `gitbook` uses the same social sharing data across all chapters in your book—all links shared will look the same.

Specify your book's source repository on GitHub using the `edit` key under the configuration options in the `_output.yml` file, which allows users to suggest an edit by linking to a chapter's source file.

Read more about the features of this output format here:

<https://pkgs.rstudio.com/bookdown/reference/gitbook.html>

Or use:

```
?bookdown::gitbook
```

Bibliography

Yihui Xie. *Dynamic Documents with R and knitr*. Chapman and Hall/CRC, Boca Raton, Florida, 2nd edition, 2015. URL <http://yihui.org/knitr/>. ISBN 978-1498716963.

Yihui Xie. *bookdown: Authoring Books and Technical Documents with R Markdown*, 2023. URL <https://CRAN.R-project.org/package=bookdown>. R package version 0.33.