

Ferramentas computacionais para Análise geográfica: Uma introdução ao R

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Sobre o R



“R is a free software environment for statistical computing and graphics.”

Ambiente de Trabalho



<https://www.r-project.org/>



<https://posit.co/download/rstudio-desktop/>

R como Calculadora

`2 + 3`

`4.5 * 2e1`

`6 / (4 - 1)`

`2 / 0`

`0 / 0`

`NA`

Vetores

1:10

1:10 + 3

1:10 * 2

1:10 / (4 - 1)

0:10 / 0

Variáveis

`x = 2:7`

`x <- 2:7`

`2:7 -> x`

`x`

`y = 3:8`

`x + y`

`y = x`

`y = y + 1`

`x`

Funções

`class(1)`

`c(1, 3, 5, 6)`

`?rep`

`rep(2, 5)`

`rep(2:3, length.out=9)`

`rep(2:3, ea=3)`

Pacotes e Task Views



CRAN

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Contributed Packages

Available Packages

Currently, the CRAN package repository features 19427 available packages.

[Table of available packages, sorted by date of publication](#)

[Table of available packages, sorted by name](#)

[CRAN Task Views](#) aim to provide some guidance which packages on CRAN are relevant for tasks related to a certain topic. They provide tools to automatically install all packages from each view. Currently, 43 views are available.

Installation of Packages

Please type `help("INSTALL")` or `help("install.packages")` in R for information on how to install packages from this repository. The manual [R Installation and Administration](#) (also contained in the R base sources) explains the process in detail.

Package Check Results

All packages are tested regularly on machines running [Debian GNU/Linux](#), [Fedora](#), macOS (formerly OS X) and Windows.

The results are summarized in the [check summary](#) (some [timings](#) are also available).

Writing Your Own Packages

The manual [Writing R Extensions](#) (also contained in the R base sources) explains how to write new packages and how to contribute them to CRAN.

Repository Policies

The manual [CRAN Repository Policy \[PDF\]](#) describes the policies in place for the CRAN package repository.

Task View Spatial

CRAN Task View: Analysis of Spatial Data

- Maintainer:** Roger Bivand, Jakub Nowosad
- Contact:** Roger.Bivand at nhh.no, nowosad.jakub at gmail.com
- Version:** 2023-03-22
- URL:** <https://CRAN.R-project.org/view=Spatial>
- Source:** <https://github.com/cran-task-views/Spatial/>
- Contributions:** Suggestions and improvements for this task view are very welcome and can be made through issues or pull requests on GitHub or via e-mail to the maintainer address. For further details see the [Contributing guide](#).
- Citation:** Roger Bivand, Jakub Nowosad (2023). CRAN Task View: Analysis of Spatial Data. Version 2023-03-22. URL <https://CRAN.R-project.org/view=Spatial>.
- Installation:** The packages from this task view can be installed automatically using the [ctv](#) package. For example, `ctv::install.views("Spatial", coreOnly = TRUE)` installs all the core packages or `ctv::update.views("Spatial")` installs all packages that are not yet installed and up-to-date. See the [CRAN Task View Initiative](#) for more details.

Base R includes many functions that can be used for reading, visualising, and analysing spatial data. The focus in this view is on “geographical” spatial data, where observations can be identified with geographical locations, and where additional information about these locations may be retrieved if the location is recorded with care.

Base R functions are complemented by contributed packages provided as source packages, and as ready-to-run binary packages for Windows and macOS (Intel 64-bit and Apple Silicon arm64 architectures). Information about source installs of packages using software external to R may be found at the end of this page. This task view covers the current status of contributed packages available from CRAN.

The contributed packages address two broad areas: moving spatial data into and out of R including coordinate transformation, and analysing spatial data in R. Because the contributed packages constitute an evolving ecosystem, there are several points of entry for users looking for help and information. Two informal organisations curate websites: [r-spatial](#) with a hyphen, and [rspatial](#) without. R-spatial is more generally geo-informatics based, grew from the legacy [sp](#) package and is now clearly aligned with the modern [sf](#) and [stars](#) packages. Rspatial has grown from the [raster](#) package, now moving towards the modern [terra](#) package. It is also worth noting the wealth of online book projects, which may be helpful for users seeking an introduction, including [Geocomputation with R](#).

Instalando Pacotes

```
install.packages("devtools")
```

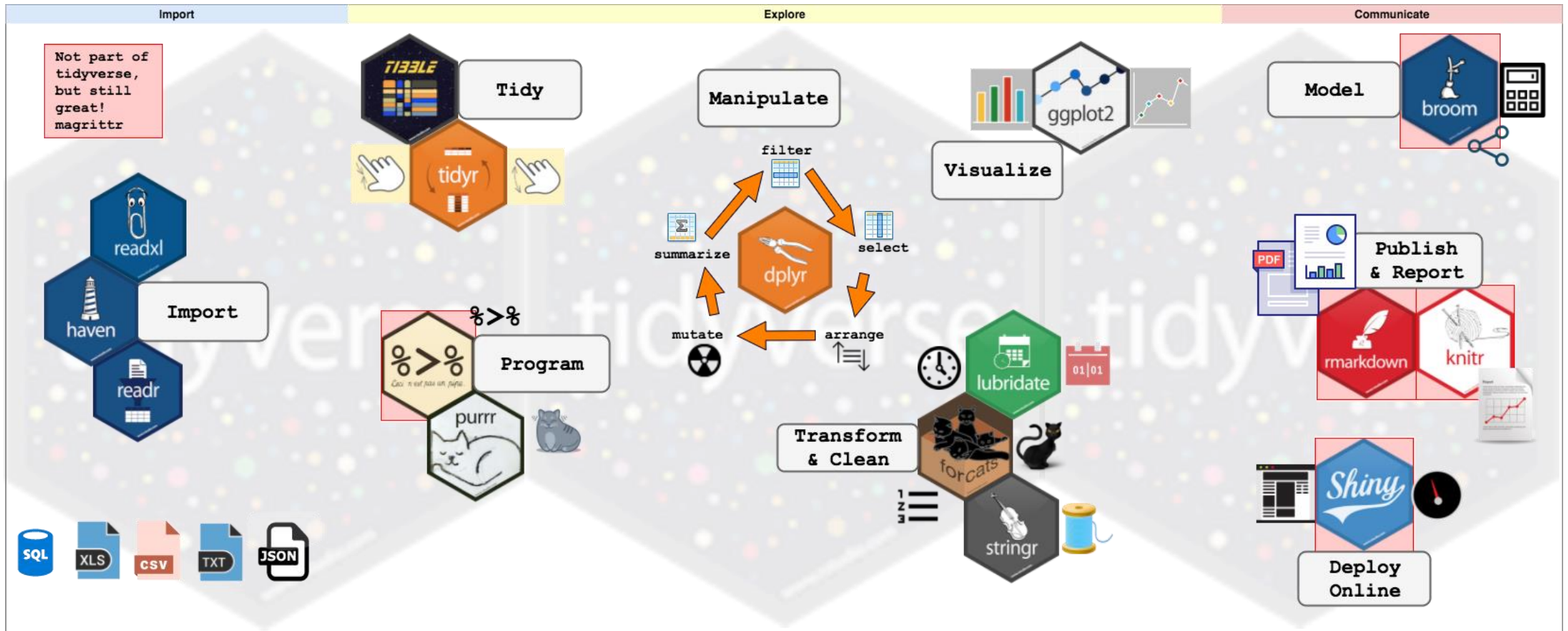
```
require(devtools)
```

```
install_github("e-sensing/sitsdata")
```

```
# OU
```

```
devtools::install_github("e-sensing/sitsdata")
```

Tidyverse



```
install.packages("tidyverse")
```

tibble

`cars`

```
cars <- tibble::as_tibble(cars)
```

```
cars %>%
```

```
  dplyr::filter(speed > 20) %>%
```

```
  dplyr::mutate(time = dist / speed) %>%
```

```
  dplyr::arrange(desc(time))
```

```
cars %>%
```

```
  dplyr::mutate(speed = floor(speed / 10)) %>%
```

```
  dplyr::group_by(speed) %>%
```

```
  dplyr::count()
```

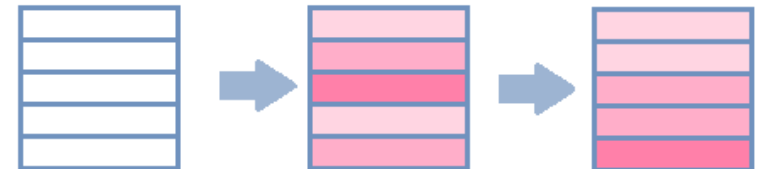
select



filter



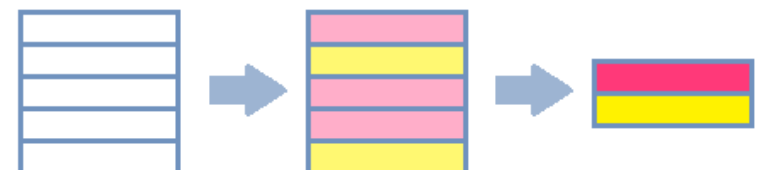
arrange



mutate

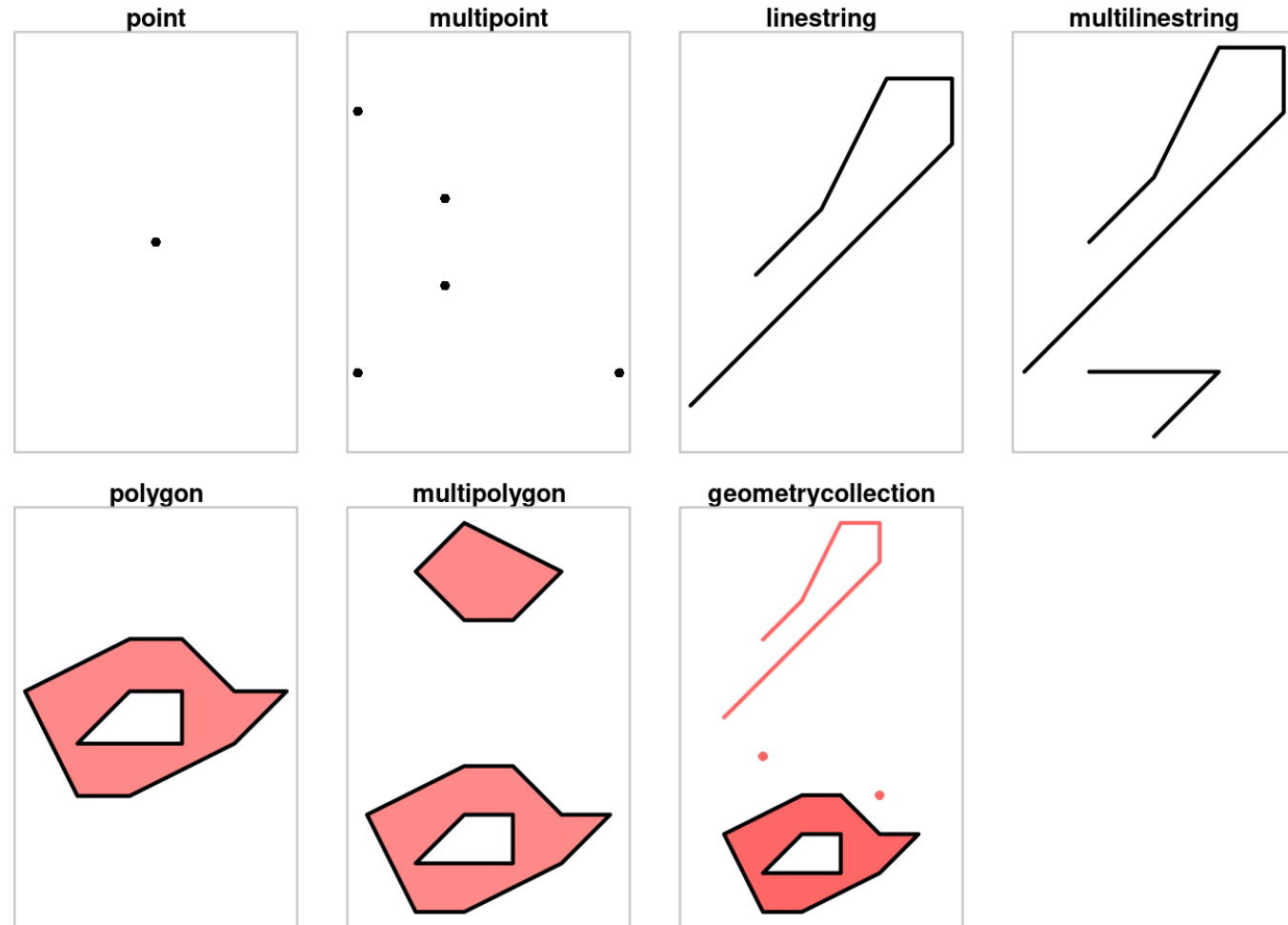


summarise



sf (simple feature)

- Define tipos espaciais para o R (usa tibble)
- Entrada e saída de dados
- Operações espaciais
- Interface para pacotes de análise estatística



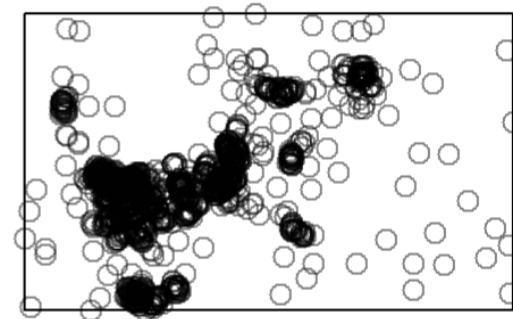
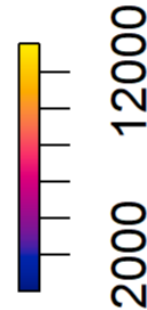
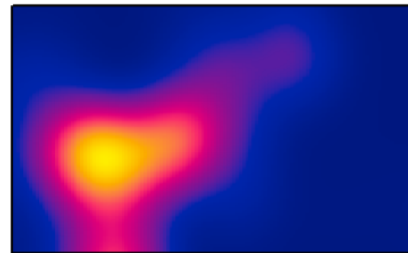
Quais setores censitários urbanos de Brasília tem mais escolas?

```
install.packages("geobr")
require(magrittr)
census <- geobr::read_census_tract(code_tract="DF", year=2010) %>%
  dplyr::filter(zone == "URBANO") %>%
  dplyr::select(code_tract)
schoolsdf <- geobr::read_schools() %>%
  dplyr::filter(abbrev_state == "DF")
plot(sf::st_geometry(census))
plot(sf::st_geometry(schoolsdf), add=T)
within <- sf::st_within(schoolsdf, census) %>%
  as.data.frame() %>%
  tibble::as_tibble() %>%
  dplyr::group_by(col.id) %>%
  dplyr::count()
census$col.id <- as.numeric(rownames(census))
census <- dplyr::left_join(census, within, by = "col.id") %>%
  tidyr::replace_na(list(n = 0)) %>%
  dplyr::arrange(desc(n))

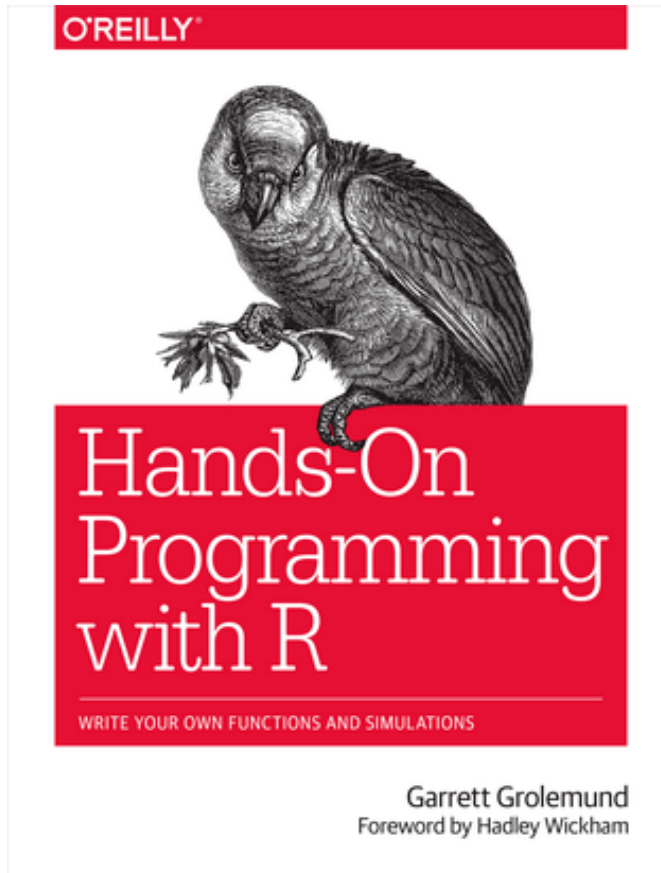
sf::write_sf(census, "resultado.shp")
mydata <- sf::read_sf("resultado.shp")
```

Estimativa de densidade - Kernel

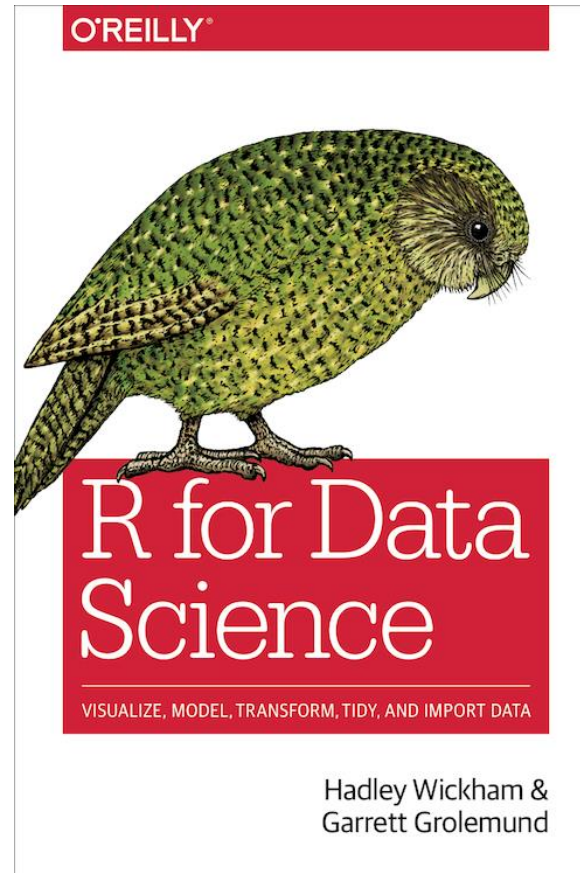
```
install.packages("spatstat")  
install.packages("stars")  
coords <- sf::st_coordinates(schoolsdf) %>%  
  na.omit()  
myppp <- spatstat::as.ppp(coords, sf::st_bbox(schoolsdf))  
den1 <- stats::density(myppp)  
par(mfrow = c(1, 2))  
plot(den1)  
plot(myppp)  
s1 <- stars::st_as_stars(den1)  
stars::write_stars(s1, "myraster.tif")
```



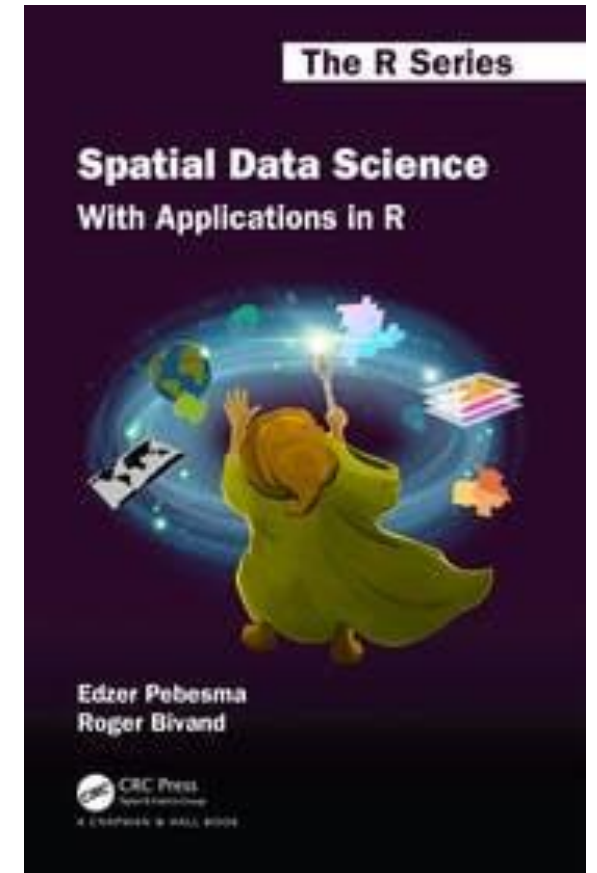
Livros de R



<https://rstudio-education.github.io/hopr/>



<https://r4ds.had.co.nz/index.html>



<https://r-spatial.org/book/>