

R language

Emanuel Huber

März 01, 2018

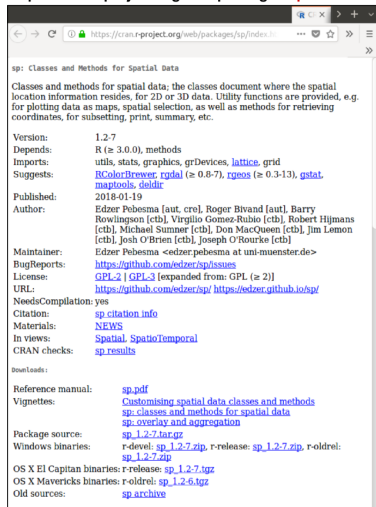
R packages

Package documentation

Here example of a package documentation page:

<https://cran.r-project.org/web/packages/sp/index.html>

<https://cran.r-project.org/web/packages/sp/index.html>



The screenshot shows a web browser displaying the CRAN package page for 'sp'. The page title is 'sp: Classes and Methods for Spatial Data'. The main text describes the package's purpose: 'Classes and methods for spatial data; the classes document where the spatial location information resides, for 2D or 3D data. Utility functions are provided, e.g. for plotting data as maps, spatial selection, as well as methods for retrieving coordinates, for subsetting, print, summary, etc.'

Metadata fields include:

- Version: 1.2-7
- Depends: R (≥ 3.0.0), methods
- Imports: utils, stats, graphics, grDevices, [lattice](#), [grid](#)
- Suggests: [RColorBrewer](#), [rgdal](#) (≥ 0.8-7), [rgeos](#) (≥ 0.3-13), [gstat](#), [maptools](#), [deldir](#)
- Published: 2018-01-19
- Author: Edzer Pebesma [aut, cre], Roger Bivand [aut], Barry Rowlingson [ctb], Virgilio Gomez-Rubio [ctb], Robert Hijmans [ctb], Michael Sumner [ctb], Don MacQueen [ctb], Jim Lemon [ctb], Josh O'Brien [ctb], Joseph O'Rourke [ctb]
- Maintainer: Edzer Pebesma <edzer.pebesma@uni-muenster.de>
- BugReports: <https://github.com/edzer/sp/issues>
- License: [GPL-2](#) | [GPL-3](#) [expanded from: GPL (≥ 2)]
- URL: <https://github.com/edzer/sp/> <https://edzer.github.io/sp/>
- NeedsCompilation: yes
- Citation: [sp.citation.info](#)
- Materials: [NEWS](#)
- In views: [Spatial](#), [SpatioTemporal](#)
- CRAN checks: [sp.results](#)

Download links:

- Reference manual: [sp.pdf](#)
- Vignettes: [Customising spatial data classes and methods](#), [sp: classes and methods for spatial data](#), [sp: overlay and aggregation](#)
- Package source: [sp_1.2-7.tar.gz](#)
- Windows binaries: r-devel: [sp_1.2-7.zip](#), r-release: [sp_1.2-7.zip](#), r-oldrel: [sp_1.2-7.zip](#)
- OS X El Capitan binaries: r-release: [sp_1.2-7.tgz](#)
- OS X Mavericks binaries: r-oldrel: [sp_1.2-6.tgz](#)
- Old sources: [sp.archive](#)

Package - Reference manual

<https://cran.r-project.org/web/packages/sp/index.html>

A screenshot of a web browser displaying the CRAN page for the 'sp' package. The browser's address bar shows the URL 'https://cran.r-project.org/web/packages/sp/index.html'. The page content is organized into sections: 'Classes and Methods for Spatial Data', 'Classes and methods for spatial data:', 'Version:', 'Depends:', 'Imports:', 'Suggests:', 'Published:', 'Author:', 'Maintainer:', 'BugReports:', 'License:', 'URL:', 'NeedsCompilation:', 'Citation:', 'Materials:', 'In views:', 'CRAN checks:', 'Download:', 'Reference manual:', 'Vignettes:', 'Package source:', 'Windows binaries:', 'OS X El Capitan binaries:', 'OS X Mavericks binaries:', and 'Old sources:'. Each section contains specific information about the package, including version numbers, dependencies, authors, and links to documentation and source code. The 'sp' package is highlighted in red in the original image.



A screenshot of a web browser displaying the CRAN (Comprehensive R Archive Network) page for the 'sp' package. The browser's address bar shows the URL 'https://cran.r-project.org/web/packages/sp/'. A large, semi-transparent red watermark with the text 'reference manual' is overlaid diagonally across the page. The page content includes the package name 'Package 'sp'', the version 'Version 1.2-7', and the title 'Title: Classes and Methods for Spatial Data'. Below the title, it lists 'Depends: R (>= 3.0.0), methods' and 'Imports: utils, stats, graphics, rOpenJ, lattice, grid'. The 'Description' section states: 'data, the classes document where the spatial location information resides, for 2D or 3D data. Utility functions are provided, e.g. for plotting data on maps, spatial selection, as well as methods for converting coordinates, for subsetting, print, summary, etc.' The 'License' is 'GPL (>= 2)'. The 'URL' is 'https://github.com/edzer/sf#https://edzer.github.io/sf/'. The 'BugReports' field points to 'https://github.com/edzer/sf/issues'. The 'Collate' field lists the source files: 'logcolumns.R', 'AAA.R', 'Class-CRS.R', 'CRS-methods.R', 'Class-Spatial.R', 'Spatial-methods.R', 'projected.R', 'Class-SpatialPoints.R', 'SpatialPolygons.R', 'SpatialPolygonsDataFrame.R', 'SpatialPointsDataFrame.R', 'Class-SpatialPointsDataFrame.R', 'SpatialMultiPoints-methods.R', 'Class-SpatialMultiPointsDataFrame.R', 'SpatialMultiPointsDataFrame-methods.R', 'Class-CRS/Ellipsoid.R', 'Class-SpatialGrid.R', 'Class-SpatialGridDataFrame.R', 'Class-SpatialIndex.R', 'SpatialLines-methods.R', 'Class-SpatialIndexDataFrame.R', 'SpatialIndexDataFrame-methods.R', 'Class-SpatialPolygons.R', 'Class-SpatialPolygonsDataFrame.R', 'Class-SpatialPolygonsDataFrame-methods.R', 'SpatialPolygonsDataFrame-methods.R', 'GridTopology-methods.R', 'SpatialGrid-methods.R', 'SpatialGridDataFrame-methods.R', 'SpatialPolygonsInteriors.R', 'point.in.polygons.R', 'SpatialPolygonsDisplayMethods.R', 'arvorize.R', 'point.in.raster.R', 'isobline.R', 'maptools.R', 'select.spatial.R', 'gridded.R', 'as.isobline.R', 'spatial.R', 'conv.R', 'summary.R', 'convert.R', 'draw.R', 'gradients.R', 'options.R', 'read.R', 'readGDAL.R', 'chords.R', 'loadmeasures.R', 'conv.measures.R', 'surface.bivariate.R', 'spOptions.R', 'subset.R', 'disaggregate.R', 'wq', 'wv', 'wv2.R', 'merge.R', 'aggregate.R'.

Package - Reference vignette

<https://cran.r-project.org/web/packages/sp/index.html>

sp: Classes and Methods for Spatial Data

Classes and methods for spatial data; the classes document where the spatial location information resides, for 2D or 3D data. Utility functions are provided, e.g. for plotting data as maps, spatial selection, as well as methods for retrieving coordinates, for subsetting, print, summary, etc.

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In views: [Spatial](#), [SpatioTemporal](#)
CRAN checks: [sp results](#)

Downloads:

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[sp: classes and methods for spatial data](#)
[sp: overlay and aggregation](#)

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vignette

Customising spatial data classes and methods¹
Edzer Pebesma²
Feb 2008

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Although the classes defined in the *sp* package cover many needs, they do not go far beyond the most typical GIS data models. In applied research, it often happens that customized classes would suit the actual data coming from the instruments better. Since R4 classes have mechanisms for inheritance, it may be attractive to build on the *sp* classes, so as to utilize their methods where appropriate. Here, we will demonstrate a range of different settings in which *sp* classes can be extended. Naturally, this is only useful for researchers with specific and clear needs, as our goal is to show how (relatively) easy it may be to prototype classes extending *sp* classes for specific purposes.

¹This vignette is based on [Chapter 12](#) of the first edition of Pebesma, R. G., Edzesma, E., and Gomez-Rubio, V. (2004) *Spatial Spatial Data Analysis with R*, Springer-Verlag, New York. It was revised from the second edition (2008) to accommodate changes in the language, and to make available in this form with the understanding of the publishers. It has been updated to the R4.0.0 version of the software, e.g. using `new()`.

² Institute for GeoInformation, University of Münster, Winkler Strasse 33A, 48150 Münster, Germany; edzer.pebesma@uni-muenster.de

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Package - Package source

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sp

Name

- [build](#)
- [data](#)
- [demo](#)
- [inst](#)
- [man](#)
- [R](#)
- [src](#)
- [tests](#)
- [vignettes](#)
- [DESCRIPTION](#)
- [MD5](#)
- [NAMESPACE](#)

package source

Package - Install packages hosted on CRAN

<https://cran.r-project.org/web/packages/sp/index.html>

sp: Classes and Methods for Spatial Data

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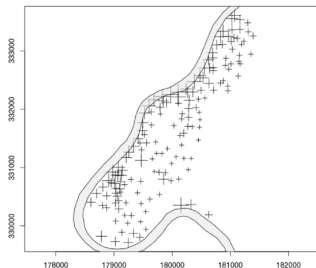
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Old sources: [sp archive](#)

```
install.packages("sp")  
library("sp")  
  
demo(meuse, ask = FALSE, echo = FALSE)  
  
plot(meuse, cex = sqrt(meuse$zinc)/12, axes = TRUE)  
plot(meuse.riv, add = TRUE, col = grey(.9, alpha = .5))
```



Package - Install packages hosted on github

```
if(!require("devtools")) install.packages("devtools")  
devtools::install_github("emanuelhuber/RGPR")
```


Help!

Getting help

- ▶ get help on the function `plot()`:

```
help(plot)
```

or

```
?plot
```

- ▶ get help on general terms

```
??regression
```

- ▶ `?? library(help = "base")` See [getting help with R](#)
- ▶ Google: “**R** **Cran** how to extract rows data.frame”

R language

R language

[Official documentation](#)

Main differences to MATLAB

- ▶ `x <- x + 10` instead of `x = x + 10`
- ▶ Matrices A: `A[1, 3]` instead of `A(1, 3)`
- ▶ comments with `#` instead of `%`
- ▶ no need for `;`
- ▶ R is more structured: use `{` in the loop

```
for(i in 1:10){  
  # my code here  
}
```

[Matlab - R](#)

Exotic stuff

Namespace

`packageName::functionName()`

Pipe `%>%`

```
third(second(first(x)))  
first(x) %>% second %>% third
```

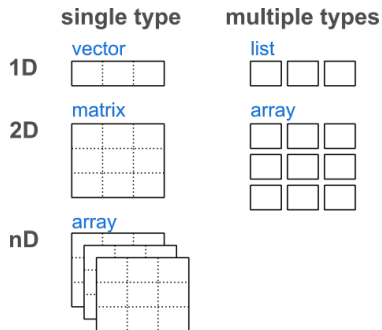
Basic object types

`typeof()???`

- ▶ numeric: `e24`, `-150.5`, `pi` `is.numeric()`
- ▶ integer: `1L`, `-54L`, `0L` `is.integer()`
- ▶ complex: `???` `is.complex()`
- ▶ character: `"AUG"`, `"13.12"`, `"www.google.ch"` `is.character()`
- ▶ boolean (logical): `TRUE`, `FALSE` `is.logical()`
- ▶ `NA`, `Inf`, `NULL`

check

Object classes



- ▶ numeric, matrix, list, data.frame
- ▶ S3 classes: example regression
- ▶ S4 classes [tutorial](#)
 - ▶ date and time [good tutorial](#)
 - ▶ spatial data raster/sf

Functions to understand your data

- ▶ `str()`
- ▶ `class()`
- ▶ `unclass()`
- ▶ `typeof()`
- ▶ `names()` `colnames()`, `rownames()`
- ▶ `dim()`, `length()`
- ▶ S4: `isS4()`, `getSlots()`, `slotNames()`
- ▶ `attributes()`

```
methods(class = "sf")
```

show example from `?approx`

Conversion

Basic object types

- ▶ `as.character()`
- ▶ `as.integer()`
- ▶ `as.numeric()`
- ▶ `as.logical()`
- ▶ `as.complex()`
- ▶ `as.matrix()`
- ▶ `as.data.frame()`
- ▶ `as.list()`

conversion class sf to sp: `as(x, "Spatial")`