R Reference book

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Chapter 1

Introduction

R Reference Book

A collection of useful R knowledge

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This book contains a not final and constantely growing collection of useful R knowledge. R is a free software environment for statistical computing and graphics. The book is written in RMarkdown with bookdown.

Chapter 2

Plots

2.1 Graphical parameters `par()`

2.1.1 Set graphical parameters

Change global option

```
par(xlog = T)
```

change for local plot

```
plot(..., xlog = T)
```

When parameters are set, their previous values are returned in an invisible named list. Such a list can be passed as an argument to par to restore the parameter values.

```
opar <- par(xlog = T)
plot(...)
par(opar)
```

reset default

```
dev.off()
```

check current parameter

```
par("xlog")
```

```
#> [1] FALSE
```

The parameters are defined for the currently active device

- Normally the Rstudio plot panel
- If `png()` or `pdf()` opend => only within this document
- `dev.off()` closes device and reset `par()`
  - If `png()` or `pdf()` the same par are active as they were before the device `png()` or `pdf()` was opend
  - If Rstudio panel ~ the default par are active

2.1.2 Default

```
par()
```

```
#> $xlog
#> [1] FALSE
#>
#> $ylog
#> [1] FALSE
#>
#> $adj
#> [1] 0.5
#>
#> $ann
#> [1] TRUE
#>
#> $ask
#> [1] FALSE
#>
#> $bg
#> [1] "transparent"
#>
#> $bty
#> [1] "o"
#>
#> $cex
#> [1] 1
#>
#> $cex.axis
#> [1] 1
#>
#> $cex.lab
#> [1] 1
#>
#> $cex.main
#> [1] 1.2
#>
#> $cex.sub
#> [1] 1
#>
#> $cin
#> [1] 0.15 0.20
#>
#> $col
#> [1] "black"
#>
#> $col.axis
#> [1] "black"
#>
#> $col.lab
#> [1] "black"
#>
#> $col.main
```

```
#> [1] "black"
#>
#> $col.sub
#> [1] "black"
#>
#> $cra
#> [1] 10.8 14.4
#>
#> $crt
#> [1] 0
#>
#> $csi
#> [1] 0.2
#>
#> $cxy
#> [1] 0.02851711 0.07518797
#>
#> $din
#> [1] 6.5 4.5
#>
#> $err
#> [1] 0
#>
#> $family
#> [1] ""
#>
#> $fg
#> [1] "black"
#>
#> $fig
#> [1] 0 1 0 1
#>
#> $fin
#> [1] 6.5 4.5
#>
#> $font
#> [1] 1
#>
#> $font.axis
#> [1] 1
#>
#> $font.lab
#> [1] 1
#>
#> $font.main
#> [1] 2
#>
#> $font.sub
#> [1] 1
#>
#> $lab
#> [1] 5 5 7
#>
#> $las
```

```
#> [1] 0
#>
#> $lend
#> [1] "round"
#>
#> $lheight
#> [1] 1
#>
#> $ljoin
#> [1] "round"
#>
#> $lmitre
#> [1] 10
#>
#> $lty
#> [1] "solid"
#>
#> $lwd
#> [1] 1
#>
#> $mai
#> [1] 1.02 0.82 0.82 0.42
#>
#> $mar
#> [1] 5.1 4.1 4.1 2.1
#>
#> $mex
#> [1] 1
#>
#> $mfcol
#> [1] 1 1
#>
#> $mfg
#> [1] 1 1 1 1
#>
#> $mfrow
#> [1] 1 1
#>
#> $mgp
#> [1] 3 1 0
#>
#> $mkh
#> [1] 0.001
#>
#> $new
#> [1] FALSE
#>
#> $oma
#> [1] 0 0 0 0
#>
#> $omd
#> [1] 0 1 0 1
#>
#> $omi
```

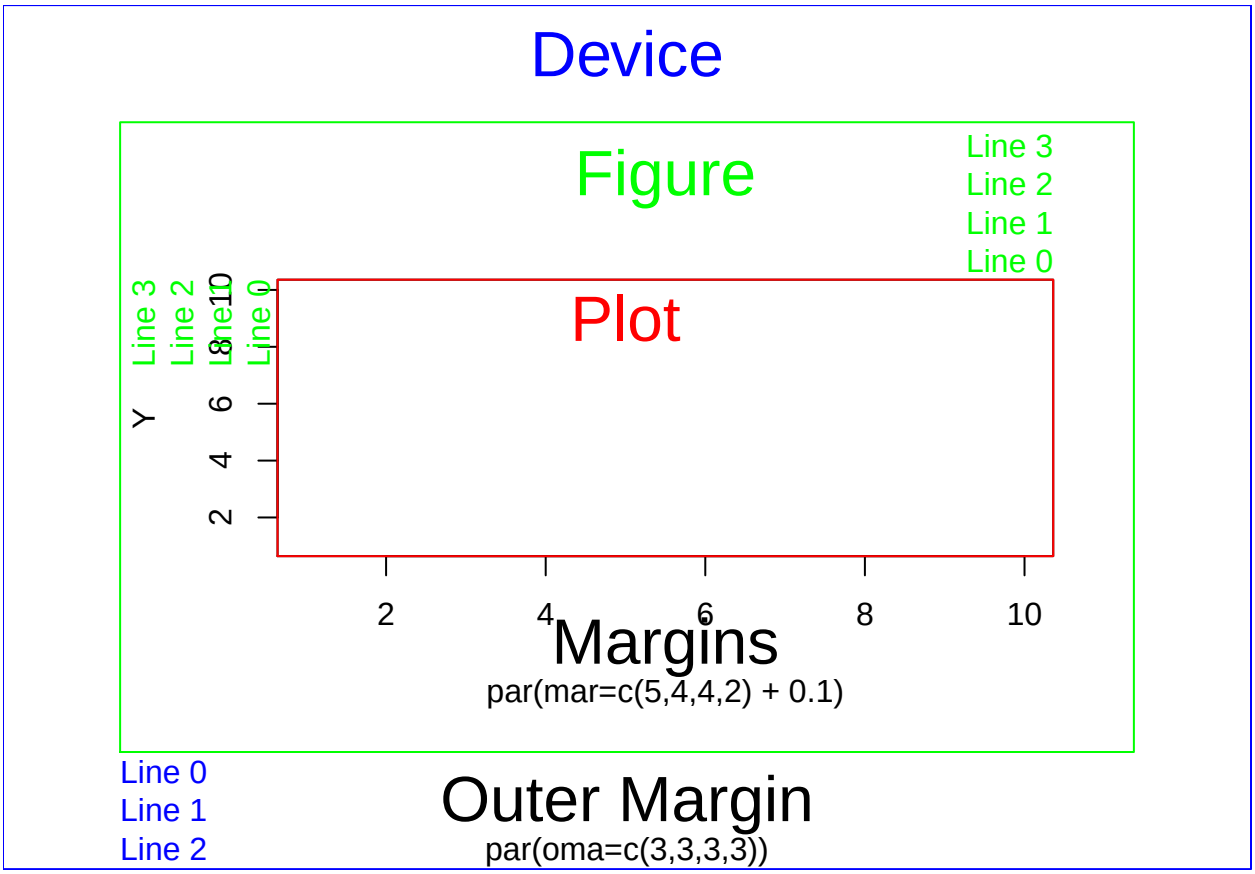
```
#> [1] 0 0 0 0
#>
#> $page
#> [1] TRUE
#>
#> $pch
#> [1] 1
#>
#> $pin
#> [1] 5.26 2.66
#>
#> $plt
#> [1] 0.1261538 0.9353846 0.2266667 0.8177778
#>
#> $ps
#> [1] 12
#>
#> $pty
#> [1] "m"
#>
#> $smo
#> [1] 1
#>
#> $srt
#> [1] 0
#>
#> $tck
#> [1] NA
#>
#> $tcl
#> [1] -0.5
#>
#> $usr
#> [1] 0 1 0 1
#>
#> $xaxp
#> [1] 0 1 5
#>
#> $xaxs
#> [1] "r"
#>
#> $xaxt
#> [1] "s"
#>
#> $xpd
#> [1] FALSE
#>
#> $yaxp
#> [1] 0 1 5
#>
#> $yaxs
#> [1] "r"
#>
#> $yaxt
```

```
#> [1] "s"
#>
#> $ylbias
#> [1] 0.2
```

2.1.3 Device region

```
opar <- par(xpd = NA,
    mar = c(5,4,4,2) + 0.1,
    oma = c(3,3,3,3) + 0.05)

plot(1:10, 1:10, type = "n",
     xlab = "", ylab = "Y")

box("plot", col = "red")
box("inner", col = "green")
box("outer", col = "blue")

text(5,9, "Plot", col = "red", cex  = 2)
mtext("Figure", col = "green", cex = 2,
      side = 3, line = 2)
mtext("Device", col = "blue", cex = 2,
      side = 3, line = 1, outer = T)

mtext(text = c("Line 0",
               "Line 1",
               "Line 2",
               "Line 3"),
      side = 3, line = 0:3,
      at = grconvertX(1, "npc", "user"),
      adj = 1,
      col = "green")

mtext(text = c("Line 0",
               "Line 1",
               "Line 2",
               "Line 3"),
      side = 2, line = 0:3,
      adj = 1,
      col = "green")

mtext(text = c("Line 0",
               "Line 1",
               "Line 2"),
      side = 1, line = 0:2, outer = T,
      at = 0, adj = 0,
      col = "blue")


mtext(text = "Margins",
      side = 1, line = 2, cex = 2)
mtext(text = "par(mar=c(5,4,4,2) + 0.1)",
```

```
      side = 1, line = 3)

mtext(text = "Outer Margin",
      side = 1, line = 1, cex = 2, outer = T)
mtext(text = "par(oma=c(3,3,3,3))",
      side = 1, line = 2, outer = T)
```




```
par(opar)
```

2.1.3.1 Coordinate system outside plot

```
par("mar") # Margine Area
#> [1] 5.1 4.1 4.1 2.1
par("oma") # Outer Margin Area
#> [1] 0 0 0 0
par("mgp") # position of [1] x/y-label, [2] axis, [3] ticks
#> [1] 3 1 0
par("mex") # "height"" of one line
#> [1] 1
```

2.1.3.2 Normalized device coordinates (NDC) [0, 1]

```
par("fig") # Start and endpoint of ploting region
#> [1] 0 1 0 1
par("omd") # oma in NDC
#> [1] 0 1 0 1
```

2.1.3.3 Change between coordinate system

Use `grconvertX()` to change between different coordinate systems

2.1.3.4 Plot outside plotting region

```
par("xpd")
#> [1] FALSE
```

`FALSE` ⇒ clipped to the plot regions
`TRUE` clipped to the figure region
`NA` clipped to the device region

Chapter 3

Methods

We describe our methods in this chapter.

Chapter 4

Applications

Some *significant* applications are demonstrated in this chapter.

4.1 Example one

4.2 Example two

Chapter 5

Final Words

You can label chapter and section titles using `{#label}` after them, e.g., we can reference Chapter **??**. If you do not manually label them, there will be automatic labels anyway, e.g., Chapter 3.

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 5.1. Similarly, you can reference tables generated from `knitr::kable()`, e.g., see Table 5.1.

```
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, 2018) in this sample book, which was built on top of R Markdown and **knitr** (Xie, 2015).

We have finished a nice book.

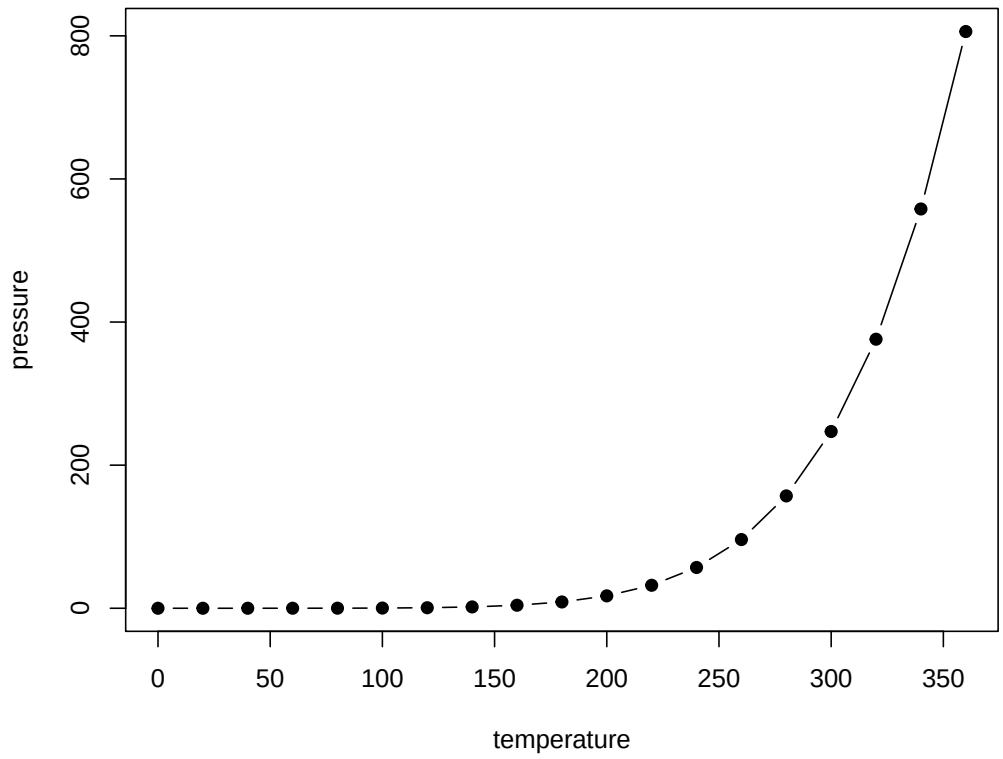


Figure 5.1: Here is a nice figure!

Table 5.1: 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

Bibliography

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

Xie, Y. (2018). *bookdown: Authoring Books and Technical Documents with R Markdown*. R package version 0.9.