R Markdown do Word

Arnošt Komárek

### <https://msekce.karlin.mff.cuni.cz/~komarek>

### Basics

Path to the working directory

ROOT <- "/home/komarek/teach/mff\_2023/nmst547\_AdvRko/Tutorial12/Rmd/"

Load data being previously saved in the R format

load(paste(ROOT, "../Data/auta2004.RData", sep = ""))

Mean consumption

mean(auta$spotreba, na.rm = TRUE)

## [1] 10.70616

The result can also be shown without showing the code.

## [1] 10.70616

It is also possible to show code only while not showing the result.

mean(auta$spotreba, na.rm = TRUE)

It is also possible to calculate something while showing neither the code nor the result.

The result can also be used inside a sentence within a text. Mean consumption of cars in the dataset is 10.71 l/100 km.

Let denote consumption values in data. The above mentioned sample mean is given by

where and .

Text can be easily formatted as *italic* or in **bold**.

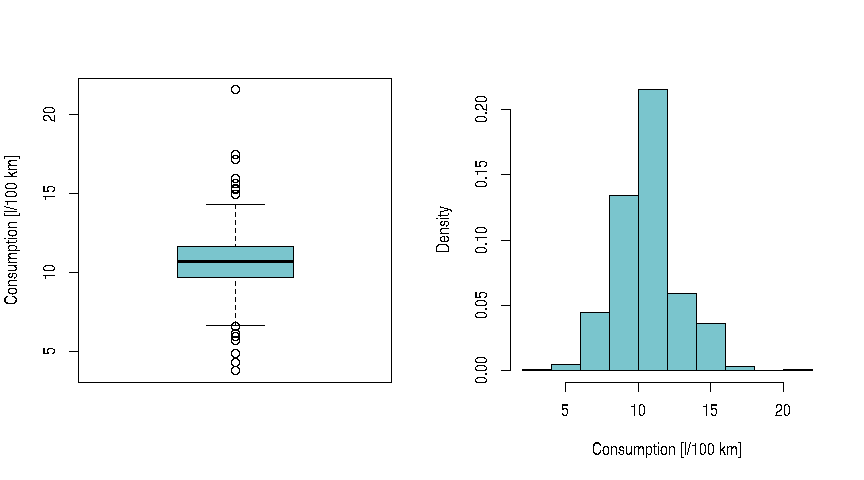
* Item 1;
* Item 2;
  + Subitem a;
  + Subitem b;
* Item 3.

### Figures

#### Boxplot and histogram

Boxplot is a useful plot which graphically shows the most important descriptive statistics. Histogram provides more information on the distribution (it is a basic density estimator).

par(mfrow = c(1, 2))  
boxplot(auta$spotreba, ylab = "Consumption [l/100 km]", col = "cadetblue3")  
hist(auta$spotreba, prob = TRUE, xlab = "Consumption [l/100 km]", ylab = "Density",   
 col = "cadetblue3", main = "")



Krabičkový graf spotřeby.

### Tables using the *xtable* package

#### Descriptive statistics of consumption (*spotreba*) given drive of the car (*fnahon*) saved in a form of the *data.frame*.

spotr <- data.frame(  
 MEan = with(auta, tapply(spotreba, fnahon, mean, na.rm = TRUE)),  
 SD = with(auta, tapply(spotreba, fnahon, sd, na.rm = TRUE)),  
 Median = with(auta, tapply(spotreba, fnahon, median, na.rm = TRUE)),  
 Q1 = with(auta, tapply(spotreba, fnahon, quantile, prob = 0.25, na.rm = TRUE)),  
 Q3 = with(auta, tapply(spotreba, fnahon, quantile, prob = 0.75, na.rm = TRUE)),  
 n = with(auta, tapply(!is.na(spotreba), fnahon, sum)),  
 NAs = with(auta, tapply(is.na(spotreba), fnahon, sum)))  
print(spotr)

## MEan SD Median Q1 Q3 n NAs  
## predni 9.674306 1.888841 9.800 8.45 10.70 216 10  
## zadni 11.293981 1.293581 11.250 10.55 11.85 108 2  
## 4x4 12.477222 2.339009 11.725 10.70 14.05 90 2

#### Change names of rows and columnsZměna názvu řádků a sloupců

colnames(spotr) <- c("Mean", "Std. Dev.", "Median", "Q1", "Q3", "n", "Missing")  
rownames(spotr) <- c("Front", "Rear", "4x4")  
print(spotr)

## Mean Std. Dev. Median Q1 Q3 n Missing  
## Front 9.674306 1.888841 9.800 8.45 10.70 216 10  
## Rear 11.293981 1.293581 11.250 10.55 11.85 108 2  
## 4x4 12.477222 2.339009 11.725 10.70 14.05 90 2

#### Package *xtable*

Package *xtable* provides possibilities to format rectabgular structures (*matrix*, *data.frame*) into a table written in either the LaTeX or html code.

library("xtable")

#### Format the table

tspotr <- xtable(spotr, align = c("l", rep("c", 7)),   
 digits = c(0, rep(2, 5), 0, 0),  
 caption = "Table of descriptive statistics.",   
 label = "tab:popis")

#### Print the *html* code of the table

print(tspotr, type = "html")

## <!-- html table generated in R 4.3.2 by xtable 1.8-4 package -->  
## <!-- Thu Dec 7 14:54:09 2023 -->  
## <table border=1>  
## <caption align="bottom"> Table of descriptive statistics. </caption>  
## <tr> <th> </th> <th> Mean </th> <th> Std. Dev. </th> <th> Median </th> <th> Q1 </th> <th> Q3 </th> <th> n </th> <th> Missing </th> </tr>  
## <tr> <td> Front </td> <td align="center"> 9.67 </td> <td align="center"> 1.89 </td> <td align="center"> 9.80 </td> <td align="center"> 8.45 </td> <td align="center"> 10.70 </td> <td align="center"> 216 </td> <td align="center"> 10 </td> </tr>  
## <tr> <td> Rear </td> <td align="center"> 11.29 </td> <td align="center"> 1.29 </td> <td align="center"> 11.25 </td> <td align="center"> 10.55 </td> <td align="center"> 11.85 </td> <td align="center"> 108 </td> <td align="center"> 2 </td> </tr>  
## <tr> <td> 4x4 </td> <td align="center"> 12.48 </td> <td align="center"> 2.34 </td> <td align="center"> 11.72 </td> <td align="center"> 10.70 </td> <td align="center"> 14.05 </td> <td align="center"> 90 </td> <td align="center"> 2 </td> </tr>  
## <a name=tab:popis></a>  
## </table>

#### Table in the output

Table of descriptive statistics.

Mean

Std. Dev.

Median

Q1

Q3

n

Missing

Front

9.67

1.89

9.80

8.45

10.70

216

10

Rear

11.29

1.29

11.25

10.55

11.85

108

2

4x4

12.48

2.34

11.72

10.70

14.05

90

2

Additional possible adjustment, see *help(print.xtable)*.

print(tspotr, type = "html",   
 caption.placement = "top")

Table of descriptive statistics.

Mean

Std. Dev.

Median

Q1

Q3

n

Missing

Front

9.67

1.89

9.80

8.45

10.70

216

10

Rear

11.29

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108

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4x4

12.48

2.34

11.72

10.70

14.05

90

2

### Automatized documents preparation.

#### More on R Markdown

* <http://rmarkdown.rstudio.com/>
* <http://rmarkdown.rstudio.com/authoring_basics.html>

#### R Markdown and R package *knitr*

* <http://yihui.name/knitr/>

#### Sweave

*Sweave* can be used to integrate LaTeX and R code/output. For more see <https://stat.ethz.ch/R-manual/R-devel/library/utils/doc/Sweave.pdf>

### Shiny

*Shiny* can be used to create html documents with interactive items (user influences what should be displayed), see <http://shiny.rstudio.com/>

* **Reference manual**: <http://shiny.rstudio.com/reference/shiny/latest/>
* **Galery**: <http://shiny.rstudio.com/gallery/>
* **Guide to creation of layouts**: <http://shiny.rstudio.com/articles/layout-guide.html>