1_basics

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0.1 1 - What is R?

R is a computing environment that combines:

- a programming language called S, developed by John Chambers at Bell Labs, that implements the idea of programming with data (Chambers 1998),
- an extensive set of functions for classical and modern statistical data analysis and modeling,
- powerful numerical analysis tools for linear algebra, differential equations, and stochastics,
- graphics functions for visualizing data and model output,
- a modular and extensible structure that supports a vast array of optional **add-on packages**, and
- extensive help and documentation facilities.
- **free** and **open source**
- widely usedboth in academia and industry
- teaser: http://shiny.rstudio.com/gallery

R is an open source software project, available for free download (R Core Team 2014a). Originally a research project in statistical computing (Ihaka and Gentleman 1996), it is now managed by a development team that includes a number of well-regarded statisticians, and is widely used by statistical researchers and working scientists as a platform for making new methods available to users.

R has been developed by statisticians and is hence very **convenient for actuaries**.

0.2 2 - What is RStudio?

Rtudio (https://www.rstudio.com/) is an integrated Development Environment (IDE) for R:

- like Microsoft Word, Excel, etc.
- built to help you write R code, run R code, and analyze data with R
- text editor, latex integration, debugging tool, version control
- Easy reporting via RShiny

To work with RStudio is one option to work with R. Other options are using Jupyter Notebooks (https://jupyter.org/).

RStudio consists of four different panes, each keeps track of separate information.

- R Console
- R Scipt
- Plot
- Help files

See a short video on https://www.rstudio.com/products/RStudio/#Desktop

0.3 3 - Calculations

0.3.1 R as a simple caclulator

```
In [44]: # Calculate 3 + 4
         sqrt(2)
         x <- 3
         y <- x^2
         x + y
         sin(2*pi)
```

1.4142135623731
12
-2.44929359829471e-16

0.3.2 Creating vectors

```
In [47]: c(1, 5, 80)
         2:11
         a <- c(1, 6, 10, 22, 7, 13)
         mean(a)
         sum(a)
```

1. 1 2. 5 3. 80
1. 2 2. 3 3. 4 4. 5 5. 6 6. 7 7. 8 8. 9 9. 10 10. 11
9.83333333333333
59

0.3.3 Creating matrices and data frames

```
In [56]: matrix()
         m <- matrix(1:6, nrow=3, ncol=2, byrow = TRUE)
         m
```

NA
1 2
3 4
5 6