Advanced R
Organization

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Motivation

- What is the difference between compiled and interpreted program code? Which one does R use?
- What is the difference between Call-by-Reference and Call-by-Value? Which one does R use?
- Which programming paradigms does R follow? And what is a programming paradigm?
- Name 6 ways to index a vector.
- Name the 3 components of an R function.
- What is a replacement-function?
- Why should I care about the answers to these questions?
Aim of the lecture

We want to understand R.

Up to now

- R is a tool to solve a problem - no matter how, the main thing is that it runs
- Programs partly cumbersome, difficult to read and understand, slow

From now on

- Why does my program do what it should?
- How can I improve my programs and make the most of R?

Not a pure programming course! Even though we will end up doing a lot of programming...
Why can a computer do math?

Main parts of R
- Data types and structures
- Functions

How to program in R (correctly)?
- imperative programming
- object oriented programming
- functional programming

Maybe some fun topic at the end, if there is time

No topic: the creation of packages. Unfortunately, there is not enough time for that.
Formalia

Termine

- Lecture: Monday, 12:00-14:00, room CT ZE 15. Lectures will be recorded.
- Time of tutorial session will be announced in the first lecture.
- 2h weekly tutorial:
  - 1h actual exercise + discussion of exercise sheet
  - 1h "time to talk about R"
  - Handing in the exercise sheet on a voluntary basis

Exam

- 2 practical tests during the semester (50% of the grade)
- 1h written exam after the semester (50% of the grade)
- Spezialgebiet (4.5 ECTS) for Statistics Master, 3 ECTS programming course for Data Science Master