

MATH5835M Statistical Computing

General Information

<http://www1.maths.leeds.ac.uk/~voss/2018/MATH5835M/>

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2018/19, semester 1

Software

In the module we will use the statistical computing package R. This program is free software, and I would recommend that you install R on your own laptop. There are different versions of R available:

- R itself, together with a lot of additional information, can be found on the R project homepage at <http://www.r-project.org/> .
- A more polished version is RStudio, which can be found at <https://www.rstudio.com/> . (Choose the open source version, “RStudio Desktop”, on the download page.)

Alternatively you can use RStudio or plain R on the university computers.

By week 7, when our practical takes place, you will need working knowledge of R. The MATH5838M homepage (see the link above) contains pointers to some useful resources about learning R.

References

The module is self-contained, *i.e.* you should be able to follow the lectures without referring to additional sources. In case you want to do further reading, a good source is the following book, which was specially written for the module:

- [1] Jochen Voss,
An Introduction to Statistical Computing: A Simulation-based Approach.
Wiley, 2014

More in-depth information, beyond what we will be able to cover in the lectures, is for example contained in the following texts.

- [2] Maria L. Rizzo,
Statistical Computing with R.
Chapman & Hall/CRC, 2008
- [3] Brian D. Ripley,
Stochastic Simulation.
Wiley, 1987
- [4] Christian. P. Robert and George Casella,
Monte Carlo statistical methods.
Springer, 2004
- [5] Wally R. Gilks, Silvia Richardson and David J. Spiegelhalter,
Markov chain Monte Carlo in practice.
Chapman & Hall/CRC, 1995
- [6] Anthony C. Davison and David V. Hinkley,
Bootstrap methods and their application.
Cambridge University Press, 1997
- [7] Andrew Gelman, *et al.*,
Bayesian Data Analysis.
Chapman & Hall/CRC, 3rd edition, 2013

Assessment

Practical (20%), 2.5 hour exam (80%).

The practical, taking place in week 7, will cover the computational parts of the module. You will need to tackle programming tasks (using R), and to present the results in a written report. The exam will assess the theoretical parts of the module.