

MATH 275
Introduction to R Programming
Winter Term 2008

1 Overview

"R is a language and environment for statistical computing and graphics. It is a GNU project which is similar to the S language and environment which was developed at Bell Laboratories (formerly AT and T, now Lucent Technologies) by John Chambers and colleagues. R can be considered as a different implementation of S". (<http://www.r-project.org>). Most of the code written for S runs unaltered under R.

The following are some of the compelling reasons for using R:

- R is available as Free Software under the terms of the Free Software Foundation's GNU General Public License in source code form.
- R provides a wide variety of statistical analysis
- R makes well-designed publication-quality plots with ease and can incorporate mathematical symbols and formulae when needed.
- While S is the vehicle of choice for research in statistical methodology, R provides an Open Source route to participation in that activity.
- R compiles and runs on wide variety of UNIX platforms and similar systems (including FreeBSD and Linux), Windows and MacOS.

2 Who should take the course?

- Beginners who would like to know R programming, or intermediate R users who would like to enhance their programming skills.
- Those interested in doing statistical research (i.e, simulations).
- Those interested in using open-source software for statistical analysis.
- Those interested in making high-end graphs for publication purposes.

3 Course Goals

- To understand the technology behind the R package
- To be able to access a wide range of available functionality
- To be able to write programs in R
- To be able to analyze and produce graphs in R
- To be able to use R effectively with other applications

4 Course Outline

1. Introduction to the R language and the R community
2. The R Environment
3. R data objects
4. Using R functions
5. The “apply” family of functions
6. Writing R functions
7. Standard and Advanced Graphics
8. Performing Statistical Analysis in R
9. Using R with spreadsheet applications
10. Special Topics such as calling Fortran or C routines, or making R-packages