

Statistical Computing

Course description

The course tackles computational techniques relevant for statistical research and (advanced) applications. The focus will be on developing numerical skills and knowledge useful in the use and application of modern statistical procedures. The computer tutorial gives an introduction to the statistical software **R** and discusses selected case studies. After completing the course, you will be able to implement complex numerical methods on your own.

Prerequisites

- Calculus; Statistics/Econometrics; Basic programming

Outline

1. Monte Carlo simulation
2. Optimization (Newton methods, genetic algorithms, EM)
3. Numerical integration (quadratures, Monte Carlo integration)
4. Markov Chain Monte Carlo (Metropolis-Hastings, the Gibbs sampler)

Materials

- Slides will be made available in due time
- The basic textbook is
 - Givens, Geof H., and Jennifer A. Hoeting. Computational statistics. 2nd ed. 2013, Wiley.
- More detailed
 - Mooney, Christopher Z. Monte carlo simulation. 1997, Sage Publications.
 - Dennis, John E., and Robert B. Schnabel. Numerical methods for unconstrained optimization and nonlinear equations. 1996, Siam.
 - Gilks, Walter R., Sylvia Richardson, and David Spiegelhalter, eds. Markov chain Monte Carlo in practice. 1995, CRC press.

Schedule

- regular course, 2 hrs. per week
- computer tutorial, 2 hrs. every second week (tutored by Anna Titova) (for this you'll need an account, details in class)
- see univis for exact times and location

Exam

- written exam
- you may use the slides (will be available for download)
- you can earn some bonus points by solving **R** assignments

Contact:

- `mdeme@stat-econ.uni-kiel.de`, `atitova@stat-econ.uni-kiel.de`

Office hours:

- by appointment; but before resorting to such desperate measures do not hesitate to ask simpler questions per email.