

ECON 280: Computation

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Course Description

The first half of the course will be dedicated to the basics of three software packages: Matlab, STATA and SAS. We will focus on Matlab and Stata and give a brief introduction to SAS. Whereas STATA and SAS are useful for carrying out standard data-analysis procedures, Matlab provides the power to carry out non-standard procedures without having to rely on other people's computer programs. The second half of the course will be dedicated to numerical methods to solve a nonlinear equation and to optimize a nonlinear objection function. If time permits, the course will also introduces simulation-based econometric methods.

Tentative Schedule

- Overview of the statistical packages and computing environment, 0.5 week
- MATLAB Guide, 2 weeks
- STATA: A Primer, 2 weeks
- SAS: A Short Introduction, 1 week
- Numerical Methods, 3 weeks
 - Root finding algorithms
 - Optimization algorithms
 - Numerical Differentiation and Integration
 - Random Number Generator
 - Monte Carlo Integration
- Simulation-based Econometric Methods, 1.5 weeks

General References: MATLAB

- Moler, C.B.(2004) *Numerical Computing with MATLAB*. Free on-line text available at <http://www.mathworks.com/moler/> A hard copy of this text is also available from Amazon. Moler is the Chairman and Chief Scientist of the MathWorks, which produces Matlab. He is the original author of Matlab and knows what he is talking about.
- Duane Hanselman and Bruce Littlefield (2004), *Mastering MATLAB 7*. This book covers all essential aspects of MATLAB. More book information is available at <http://www.eece.maine.edu/mm/mm7.html>

General References: STATA

- Hamilton: Statistics with STATA 9.
- STATA: Logitudinal/Panel Data , Release 9.
- STATA: User's Guide, Release 9.

General References: SAS

- TBA

General References: Numerical Methods

- Press, et al, *Numerical Recipes* Chapters 9 – 10, available on line at <http://lib-www.lanl.gov/numerical/bookcpdf.html>
- Judd, K. (1998) *Numerical Methods in Economics*, MIT Press.
- M. Miranda and P.L. Fackler (2002) *Applied Computational Economics*, MIT Press.

General References: Simulation-based Econometric Methods

- Stern, S., (1997) “Simulation Based Estimation,” *Journal of Economic Literature*, 35: 2006-2039.
- Train, K., (2002), *Discrete Choice Methods with Simulation*, Cambridge, MA: Cambridge University Press, Ch. 10.

Grading Policy:

Grades will be based on four homework assignments. Some assignments will be joint with Econ 220C. Each student must do all of these assignments with a passing grade to pass the course.

Office Hours: Thursday 2:00 pm-4:00pm