



Introduction to Computational Methods in Economics

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The Pennsylvania State University

June 21 - 24, 2011

GOAL:

- The goal of the course is to provide graduate students with an introduction to computational methods used to solve, simulate, and estimate nonlinear and dynamic economic models.
- The course will include discussion of the most commonly-used computational methods and computer applications using MATLAB.

ADRESSED TO:

- PhD Master students in economics who are looking for advanced Tools in quantitative topics.
- Researchers whose work requires the handling and treatment of individual data.
* Basic knowledge of Matlab and programming is recommended.

TOPICS:

- Solving nonlinear equations
- Optimization
- Numerical Integration
- Dynamic Programming
- Introduction to MCMC

USEFUL INFORMATION:

- **Dates:** 21 - 24 June, 2011
- **Venue:** Faculty of Economics, UNIVERSIDAD DE VIGO
- **Application deadline:** June 10
- **Contact information:** Daniel Miles Touya; dmiles@uvigo.es
- **Price:** 200 € (100€ PhD students)
- **To apply:** please email to xgzlez@uvigo.es or dmiles@uvigo.es and we will send the registration form and bank account details.

SYLLABUS:

1. Solving nonlinear equations

- Judd, chapter 5 and MF, chapter 3.
- Application – Gravity equation in international trade.
- Ref: Anderson, J., and E. van Wincoop (2003), "Gravity with Gravitas: A Solution to the Border Puzzle." *American Economic Review*, 93(1): 170–192.

2. Optimization

- Judd, chapter 4 and MF, chapter 4.
- Application - Maximum likelihood estimation of a model with a nested fixed-point.
- Ref: Dunne, T., S. Klimek, M. Roberts and D. Xu (2009), "Entry, Exit, and the Determinants of Market Structure." NBER 15313:
<http://www.econ.psu.edu/~mroberts/dkrx-nber.pdf>

3. Numerical Integration

- Judd, Chapter 7, 8 and MF, chapter 5.
- Application – Integrating consumer heterogeneity in differentiated product demand models.
- Ref: Berry, S., J. Levinsohn and A. Pakes (1995), "Automobile Prices in Market Equilibrium." *Econometrica*, 60(4), 889-917.

4. Dynamic Programming

- Judd, chapter 12 and MF, chapter 7.
- Application – Stochastic macro growth model.
- Ref: Jerome Adda and Russell Cooper (2003), *Dynamic Economics: Quantitative Methods and Applications* (chapter 5). The MIT Press.

5. Introduction to Markov Chain Monte Carlo simulation

- Application: Sampling from the posterior distribution of the parameters of a normal.

REFERECES:

- K. L. Judd (1998), *Numerical Methods in Economics*. MIT Press. (Judd)
- M.J. Miranda and P.I L. Fackler (2002), *Applied Computational Economics and Finance*. MIT Press. (MF)

COURSE SCHEDULE:

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|---------|---------------|-------------------------|
| June 21 | 11:00 – 13:00 | |
| June 22 | 10:00 – 11:30 | 12:00 – 13:30 |
| June 23 | 10:00 – 12:00 | 13:00 – 14:00 (Seminar) |
| June 24 | 10:00 – 11:30 | 12:00 – 13:30 |

Seminar

Title: "Outward Foreign Direct Investment, Quality and Productivity in Taiwan's Electronics Industry"

Presenter: Bee Yan Aw (Pennsylvania State University)