

Introduction to Quantitative Macroeconomic Theory

2013/14

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Office hours: Mondays 10-12 Room W302

Lectures: Wednesday 3-5p.m. Room W316

Course webpage: http://webpace.qmul.ac.uk/gfella/teaching/phd_macrotheory/macrotheory.html

Aims

The course is an introduction to numerical techniques to solve stochastic, dynamic macroeconomic models. The course is divided into three parts. The first part covers numerical techniques. The second part introduces some basic results in dynamic programming, the main technique to formulate stochastic, dynamic optimization problems. The third part covers solution methods for dynamic programming problems.

Assessment

One computer project. Solution discussed in an individual oral presentation with Roman Sustek and myself on Monday 10 March.

SYLLABUS

I. BASIC NUMERICAL TECHNIQUES

- Function approximation.
 - * Ljungqvist, L. and T. J. Sargent 2004 (LS), *Recursive Macroeconomic Theory*, Chapter 3.2
 - * den Haan W., Lecture notes on “Function approximation,” available at <http://tinyurl.com/5tv93vr>
 - * Judd, K. L., 1998, *Numerical Methods in Economics*, Chapters 2, 6
- Numerical integration.
 - * den Haan W., Lecture notes on “Numerical integration,” available at <http://tinyurl.com/6cbrqqr>
 - * Judd, K. L., 1998, *Numerical Methods in Economics*, Chapter 7
- Numerical optimization.

II. DYNAMIC PROGRAMMING

- Mathematical preliminaries.
- Contraction mapping theorem.
 - * LS, Appendix A
 - Stockey, N.L., R.E. Lucas Jr., and E.C. Prescott, 1989, *Recursive Methods in Economic Dynamics*. Chapters 1, 2, 3, and 4.

III. SOLUTION METHODS FOR DYNAMIC PROGRAMMING PROBLEMS

- Discretized value function iteration.
- Endogenous grid points Euler equation methods.
 - * LS, Chapter 4.
 - * Carroll, C. D. 2006, “The method of endogenous gridpoints for solving stochastic optimization problems,” *Economics Letters*, 91, 312-320.
 - Judd, Numerical Methods in Economics, Chapter 12.
 - Hintermaier, T. and W. Koeniger (2010), “The method of endogenous gridpoints with occasionally binding constraints among endogenous variables,” *Journal of Economic Dynamics and Control*, 34, 2074-2088.
 - Fella, G. (2014), “A generalized endogenous grid method for non-smooth and non-concave problems,” *Review of Economic Dynamics*, forthcoming.