This course offers an introductory macroeconomics for PhD students. The aim is to equip students with rigorous tools for analyzing stochastic equilibrium models (also known as SDGE models in modern jargon). The first part contains basic functional analysis for dynamic programming. This is the key machinery in modern treatment of classical macroeconomics. The second part contains various applications, including optimal as well as suboptimal equilibrium analysis. We will also discuss some recent developments in dynamic sticky price models (known as new Keynesian models). There will be several numerical projects and a final examination. Students are expected to master at least one or two of the following programming tools: MATLAB, GAUSS, MATHEMATICA, MATHCAD, MAPLE, FORTRAN and CPP.

Related Texts:

Bertsekas, D.: Dynamic Programming and Stochastic Control. 1976. [Chapter 6: numerical algorithms for discrete state space models.]


Kolmogorov, A. N., and S. V. Fomin: Introductory Real Analysis. 1970. [This book is a popular math reference for economic students in top US universities. The chapters in metric space and Banach space are particularly relevant for my lecture. The measure theory and integration theory are advanced subjects, which will not be covered in this course.]


Readings:

1. Motivation: Stochastic Cass-Koopmans-Ramsey (CKR) Model
   
   Sargent/Ljungqvist: Chapter 3-4.
   Stokey/Lucas /Prescott: Chapter 2.
   

2. Dynamic Programming: Functional Analysis
   
   Kolmogorov/Fomin: Chapter 2 and Parts of Chapter 4.
   Sargent/Ljungqvist: First Part of Chapter 2 and Appendix A.
   Simmons: Chapter 2 and Parts of Chapter 9.
   Stokey/Lucas /Prescott: Chapter 3.

3. Application 1: Optimal Equilibrium Models
   
   Sargent/Ljungqvist: Chpater 6, 8, 12, 13.
   Stokey/Lucas /Prescott: Chapter 2 (section 2.3), 5, 10.
   
   
   RBCLAB Program in [http://homepage.ntu.edu.tw/~mao](http://homepage.ntu.edu.tw/~mao), section RBCLAB: Demand-Supply Analysis of DSGE models.

4. Application 2: Suboptimal Equilibrium Models
   
   Sargent/Ljungqvist: Chapter 11, 15.
   Stokey/Lucas /Prescott: Chapter 17-18.
   


5. Application 3: Dynamic Sticky Price (DSP) Models

Walsh: Chapter 5.