Macroeconomics

Spring 2019

Instructors: Edoardo Grillo, Claudio Campanale

40 hours

The purpose of this class is to familiarize the student with some basic techniques that are used in quantitative macroeconomics. The emphasis is not on theory (neither macroeconomic nor mathematical) but on the practical methods to apply on the computer that are useful in macroeconomic research.

The pre-requisites for the course are a basic knowledge of calculus, static optimization, linear algebra and probability.

1. Why quantitative macroeconomics?

2. Markov chains and applications
   a) Basic theory and simulation
   b) Conversion of an AR(1) process into a Markov chain
   c) Applications: The labour income process and technology shock process

3. Finite horizon dynamic programming
   a) Presentation of the problem for the deterministic case
   b) Solution by numerical discrete dynamic programming
   c) Economic examples

4. Some basic numerical procedures:
   a) Root finding
   b) Optimization
   c) Approximation
   d) Applications to dynamic programming

5. Numerical solution of life-cycle consumption saving problems
   a) Stochastic finite horizon dynamic programming
   b) Putting the pieces together: The life-cycle model with earnings uncertainty

6. The deterministic neoclassical growth model in discrete time
   a) Basic theory and qualitative solution
   b) Numerical solution by dynamic programming

7. The stochastic neoclassical growth model
   a) Basic theory

b) Linearization, impulse response functions
c) The prototype Real Business Cycle model

8. Hints at future studies:

a) Recursive general equilibrium
b) Examples of applications

Course material

- A general good reference for the course is: “Lectures in Quantitative Economics” by T.Sargent and J. Stachurski (Available at the website: https://lectures.quantecon.org/)

- A general reference for Numerical Methods in Economics is: “Numerical Methods in Economics” by K. Judd, MIT press.

- Handouts based on material available on the web, research papers and chapters form other books will be used as well and suggested during the class based on needs.

Grading

Grading will be based on a set of homeworks (20%), a numerical project (25%) and a final exam (55%). Weights in parenthesis are tentative and may be adjusted.