Mathematics

Syllabus

Academic Year: 2014/15

Instructors: Paolo Pellizzari

paolop@unive.it, http://virgo.unive.it/paolop/

Objectives
The course describes topics and mathematical tools often encountered in models and economic applications. The student will understand in some depth arguments contained in many papers and will gain insights on how to customize the mathematical tools to his/her own research needs, matching the theoretical features with the desired (or empirical) behaviour.

Requirements
Students are expected to master the topics of the course “Mathematics – Preparatory course”. Solve the autotest (in the attached pdf) to assess your skills.

Content of the course
Tentatively, each of the following topics will be covered in one week of course:

- Vector spaces and subspaces. Normed spaces, contractions, Banach Theorem. Chapter 2 (especially 2.6 and 2.11), 10.2 of Lu.
- Linear difference equations, eigenvalues, eigenvectors. Chapter 23 of SB (if time permits, also the pseudo-inverse of Moore-Penrose will be covered).
- Introduction to non-linear difference equations and chaos. Chapter 10 of St.
- Discrete time dynamic optimization problems. Chapter 12 of HSS.
- Dissecting the math of a good paper: “Modeling the impact of warming in climate change economics”, R. Pindyck, http://www.nber.org/papers/w15692

Textbooks
[Lu] David Luenberger, Optimization by vector space methods, Wiley and Sons.
[St] Steven Strogatz, Nonlinear dynamics and chaos, Perseus Books.
[HSS] Peter Hammond, Atle Seierstad, Arne Strom, Further mathematics for economic analysis, Financial Times/ Prentice Hall.

Additional material will be available on the webpage of the course.

Exam
Homework sets are proposed during the course, active participation is compulsory and students are expected to solve problems, discuss ideas and methods and present their work. A written final exam should not be needed.