Course Description

Mathematics for Economic Analysis

Autumn 2017

Textbooks

- Simon, C. P., & Blume, L. (1994). Mathematics for economists.
- Lay, S. R. (2015). Analysis with an Introduction to Proof.
- De la Fuente, A. (2000). Mathematical methods and models for economists.
- Treil, S. (2017). Linear algebra done wrong (available at `https://www.math.brown.edu/~treil/papers/LADW/LADW.html`
- Sundaram, R. K. (1996). A first course in optimization theory.

Syllabus

This section will be updated as we progress through the term. Always check the lastest version on the Dropbox folder for references that will be added.

1. Preliminaries [Lay, Ch 1]
    - Logic and proof
2. Real analysis [De la Fuente, Ch 1, 2; Simon & Blume, Ch 12, 29, A1]
    - Sets
    - Relations
    - Functions
    - Basic Topology
    - Sequences and convergence

- Compactness
- Continuity of functions

3. Linear algebra [Treil, Ch 1, 2, 3, 4, 7]
    - Vector spaces
    - Matrices
    - Systems of linear equations
    - Eigenvalues, eigenvectors, and diagonalization
    - Quadratic forms
4. Multivariate calculus [Simon & Blume, Ch 2, 4, 13, 14, 15, 20, 30, A4]
    - Derivatives
    - Taylor expansion
    - Implicit and inverse functions
    - Integrals
    - Homogeneous functions
5. Static optimization [Simon & Blume, Ch 21, 17, 18, 19]
    - Concave and quasiconcave functions
    - Unconstrained optimization
    - Constrained optimization
6. Differential equations
    - First-order differential equations
    - Linear systems of first-order differential equations
7. Dynamic programming