

Syllabus for SS 200: Math Camp

September 6, 2005 through September 23, 2005

Room: 315 Baxter

Times: Week 1: September 6 through 9

9:00am – 10:15am

10:30am – 11:45am

Week 2: September 12 through 16

9:00am – 10:00am

10:15am – 11:15am

Week 3: September 19 through 23

9:00am – 10:00am

10:15am -11:15am

Reference Texts/Materials

Elementary Linear Algebra, Anton, 1981, Wiley

Mathematics for Economists, Novshek, 1993, Academic Press

Mathematics for Economists, Simon and Blume, 1994, W.W. Norton and Company

A First Course in Optimization Theory, Sundaram, 1996, Cambridge Univ. Press

Mathematical Statistics, Bickel and Doksum, 1976, Holden Day

Matrix Algebra Useful for Statistics, Searle, 1982, Wiley

Introduction to Mathematical Analysis, Parzynski and Zipse, 1982, McGraw-Hill

Microeconomic Analysis, Varian, 1992, Norton

Infinite Dimensional Analysis, Aliprantis and Border, 1994, Springer-Verlag

<http://www.caltech.edu/~kcb/Notes> (Kim Border's linear algebra, probability, and optimization notes, pdf format, only accessible from caltech.edu domain)

Instructor: Phil Hoffman

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Office Hours: Anytime

Secretary: Sabrina Boschetti

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Objective of the Course: Provide a review of some of the basic mathematical concepts and tools used in our graduate program. Since two core ideas in economics are optimization and equilibrium, emphasis will be given to developing concepts and tools for doing constrained and unconstrained optimization and comparative statics. Since a working knowledge of linear algebra is needed in these areas as well as in econometrics, we will start with a review of the basics in linear algebra. Along the way, we will review the basics in real analysis and set theory. Here is a rough sketch of what we will cover from day to day, although the schedule may vary as we go along:

Week 1:

- 9/6 Overview and Motivating Examples
Solving Systems of Linear Equations, Inverses, Determinants, Cramer's Rule
- 9/7 Vectors in 2 and 3 dimensions
Vector Spaces, Inner Products, Norms, Metrics, Topologies
- 9/8 Linear Transformations
Eigenvalues and Eigenvectors
- 9/9 Applications

Week 2:

- 9/12 Univariate Calculus
Hyperplanes and Quadratic Forms
- 9/13 Weierstrass Theorem
Separation Theorems
- 9/14 Basic Analysis
Correspondences
- 9/15 Multivariate Calculus
Unconstrained and Constrained Optimization
- 9/16 No Class

Week 3:

- 9/19 Comparative Statics
Implicit Function Theorem, Envelope Theorem
- 9/20 Applications
And More Applications
- 9/21 through 9/23
Miscellaneous: Probability, Order Statistics, Transformations of Random Variables, Contraction Mappings, Fixed Point Theorems with Applications, Euler's Theorem, Mean Value Theorem, etc.