Department of Applied Economics
University of Minnesota

Applied Economics Math Review Course

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Office hours: by appointment
Class meetings: Monday to Friday from 9:00am -12:00am in 143 Ruttan Hall

Course Objectives

In this course you will become familiar with the most common mathematical concepts used in the construction of economic theory and the foundations of much of modern economic research. The aim is to cover some mathematical tools generally required in the first year Ph.D. Microeconomic Theory courses. Unfortunately, due to time constrains, the contents covered here are not sufficient to deal with all the mathematical problems you will encounter in your first year economic theory courses, not to mention your future research career.

Background

Since you are in a PhD program in Applied Economics or in a related field, I acknowledge that you will have some familiarity with some basic mathematical concepts in Differential and Integral Calculus and some basic knowledge of Linear Algebra.

Recommended Texts and Readings

The course will follow material from several sources. There is no required text. Some recommended text in this area are:

Chiang, A. (1992): Elements of Dynamic Optimization. McGraw-Hill, New York, NY.

Kamien, M., and N. Schwartz (1991): Dynamic Optimization: The Calculus of Variations and Optimal Control in Economics and Management. Elsevier Science, New York, NY.

Luenberger, D. G. (1969): Optimization by Vector Space Methods. Wiley, New York.

Mas-Colell, A., M. Whinston, and J. Green (1995): Microeconomic Theory. Oxford University Press, New York.

Munkres, J. R. (1999): Topology. Prentice Hall, Englewood Cli.s, NJ, 2d edn.

Rudin, W. (1976): Principles of Mathematical Analysis. McGraw-Hill, New York, third edn.

Simon, C. P., and L. Blume (1994): Mathematics for Economists. W. W. Norton, New York.

Stokey, N., R. Lucas Jr. , and E. Prescott (1989): Recursive Methods in Economic Dynamics. Harvard University Press, Cambridge, MA.

Sundaram, R. K. (1996): A First Course in Optimization Theory. Cambridge University Press, Cambridge, UK.

Takayama, A. (1985): Mathematical Economics. Cambridge University Press, Cambridge, UK, second edn.

Course Content

Topics covered will include:

Introduction to First-Order Logic, Quantifiers and Methods for proofs.

Introduction to Set Theory.

Functions.

Basic Real Analysis and Topology.

Differential Calculus.

Multivariate Calculus.

Linear Algebra.

Optimization.