

OPTIMIZATION

Master in Economics: Empirical Applications and Policies

Office: Office Building, room 2C32
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class hours 9:30-11:30 Monday – Tuesday
from 12th September to 4th October

BRIEF DESCRIPTION

The behavior of economic agents can be often modeled as the outcome of a constrained optimization problem. Static optimization is optimal choice at a single point time whereas dynamic optimization involves optimization over time. This course deals with the techniques for analyzing and solving such problems.

COURSE TOPICS

1. Static Optimization.

1.1. Basic notions.

1.2. Unconstrained Problems

Necessary Conditions: FOCs. Sufficient Conditions: Second-order conditions. Direct restrictions on variables.

1.3. Equality Constraint Problems

The Lagrange Function. Necessary and Sufficient Conditions for an optimum.

1.4. Inequality Constraint Problems

Convex Constraint Set. The Lagrange Function. The Kuhn-Tucker Conditions.

1.5. Non-negativity Constraints

Convex Constraint Set. The Lagrange Function. The Kuhn-Tucker Conditions.

1.6. Comparative Statics Results.

2. Dynamic Optimization in Discrete Time.

2.1. Difference Equations.

Basic Concepts. Initial- and Boundary- Value Problems. Solving Difference Equations. Dynamic Stability of Equilibrium

2.2. Modelling Dynamic Optimization problems.

2.3. Solving Dynamic Optimization problems.

The Lagrangean approach: Basic necessary and sufficient conditions. Transversality conditions. Non-negative variables. Infinite horizon problems

BIBLIOGRAPHY

- ✓ Carter, M. "Foundations of Mathematical Economics", The MIT Press, 2001.
- ✓ Chiang: "Fundamental Methods of Mathematical Economics", Mc-Graw Hill International Editions, 3th edition, 1984.
- ✓ De la Fuente: "Mathematical Methods and Models for Economists", Cambridge University Press, 2000.
- ✓ Hoy, M. et al., "Mathematics for Economics", The MIT Press, 2001.
- ✓ Mas-Colell A, M.R. Whinston and J.R. Green, "Microeconomic Theory", Oxford University Press, 1995.
- ✓ Romer, P. "Capital Accumulation and Long-Run Growth", chapter 2 in "Modern Business Cycle Theory", edited by Robert J. Barro.
- ✓ Sydsater, K, P. Hammond , A. Seierstad and A. Strom, "Further Mathematics for Economic Analysis", Prentice Hall, 2008.
- ✓ Takayama: "Analytical Methods in Economics", Harvester Wheatsheaf, 1994.

GRADING PLAN

Coursework will be weighted as follows:

Final exam	35 %
Homework assignments	35 %
Attendance	15 %
in-class assignment points	15 %

- ✓ More than two unexcused absences may result in a failing grade for the attendance contribution.
- ✓ Electronic Devices: Turn off your mobile before class.