

Background course on Probability and Statistics + Matlab, EUI 2012

Course Outline

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Introduction

The main goal of the course is to give introduction to the probability theory and to basics of univariate statistics. The course will consist of 3 short parts. The first part will formalize the probability theory and provide (mathematical) structure to the measure of uncertainty. In the second part the concept of random variables will be introduced and basic statistical concepts will be discussed. The third part, introduction to Matlab, will cover the basic features and some words about programming in general will be said. Numerical examples illustrating probability/statistics concepts will be shown and discussed. Some knowledge of undergraduate probability, statistics and calculus is required. There will be 8 sessions of the course, about 6 will be dedicated to probability and statistics and about 2 will provide introduction to Matlab. At the end of each session problem set for the next session will be distributed. Some of the solutions will be discussed in class. Handing in solutions to the problem set(s) is not required. There will be no exam in the end of the course. Further material will be made available as the course approaches.

Topics to be covered

Part I: Probability Theory

1.1 Random Experiment, Event Space, σ -algebra

1.2 Approaches to Probability

1.3 Probability Function

1.4 Conditional Probability and Independence

1.5 Basic Elements in Counting and Combinatorics

Part II: Random Variables

2.1 Random Variable

2.2 Distribution Functions of Random Variables

2.3 Discrete and Continuous Random Variables

2.4 Moments of Random Variables

2.5 Transformation of Random Variables

2.6 Univariate Distribution Functions

Part III: Programming in Matlab

Useful References

Lee J. Bain, Max Engelhardt. (1992). Introduction to probability and mathematical statistics

Robert V. Hogg, Allen T. Craig. (1995). Introduction to mathematical statistics

Ron C. Mittelhammer. (1996). Mathematical Statistics for Economics and Business