

Asymptotic Statistics

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Introduction

The goal of this course is to introduce classical asymptotic results in parametric and non-parametric statistics, and some of the tools that can be used to establish these results. The course will be illustrated using examples in estimation and regression.

Course Overview

After a reminder on basic topics in parametric estimation (least squares estimation, consistency and asymptotic normality of maximum likelihood estimators in regular models), the first part of the course will study nonparametric estimation [Tsybakov, 2009], with a focus on kernel density estimation and non-parametric regression. The following topics will be covered :

- Bias-variance tradeoffs
- Convergence rates of estimators in Hölder classes
- Minimax lower bounds
- Curse of dimensionality

The second part of the course will focus on more advanced topics in parametric estimation [Van der Vaart, 2000]. We will address consistency and asymptotic normality of general M and Z estimators. We will then study the notions of contiguity, local asymptotic normality and efficiency.

Références

- [Tsybakov, 2009] Tsybakov, A. B. (2009). *Introduction to nonparametric estimation*. Revised and extended from the 2004 French original. Translated by Vladimir Zaiats.
- [Van der Vaart, 2000] Van der Vaart, A. W. (2000). *Asymptotic statistics*. Cambridge series in statistical and probabilistic mathematics. Cambridge University Press.