



UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Theory of Statistical Inference

2021-1-F8204B002-F8204B004M

Learning objectives

The course aims at presenting the general concepts and methods of statistical inference with particular emphasis on point and set estimation, hypotheses testing and model selection. A likelihood-based approach to inference will be adopted.

Contents

Likelihood, Maximum likelihood estimators, Likelihood ratio based tests and confidence regions, Model selection.

Detailed program

a. Likelihood:

- Likelihood function.
- Likelihood principle.

b. Sufficient statistics and Exponential families

c. Maximum likelihood estimators:

- Likelihood equations

- Expected and observed Fisher information.
- Parametrizations
- Properties of maximum likelihood estimators, their asymptotic distribution
- d. Likelihood -based tests: asymptotic distribution, important examples.
- e. Likelihood-based confidence regions.
- f. Extensions and modifications of the likelihood function.
- g. Model selection criteria.

Prerequisites

Knowledge of probability theory as taught in the course "Probabilità applicata " and of statistical inference at the bachelor's degree level is required.

Teaching methods

Class lectures.

Assessment methods

Written exam.

Textbooks and Reading Materials

- Azzalini A., Inferenza Statistica: un'introduzione basata sul concetto di verosimiglianza (2 ed.). Springer-Verlag, 2001
- Pace L., Salvan A., Introduzione alla statistica: inferenza, verosimiglianza, modelli. Cedam, Padova, 2001.

Semester

Second term (six weeks) of the first semester.

Teaching language

Italian
