



UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Introduction To Statistical Inference M

2021-1-F8204B013

Learning objectives

The aim of the course is to present basic concepts of statistical inference and some tools of multivariate statistics necessary to follow the subsequent statistical courses. It is addressed to students who do not possess a statistical background comparable to the one provided by a bachelor degree in Statistics.

Contents

- Elements of probability theory
- Sampling and statistical inference
- Point estimation
- Interval estimation
- Hypotheses testing
- Principal components
- Cluster analysis

Detailed program

1. Random variables, main discrete and continuous univariate distributions
2. Random vectors, some examples (Normal and multinomial)
3. Law of large numbers and central limit theorem
4. Sampling and statistical inference
5. Point estimation: property of estimators, criteria of evaluation

6. Estimation methods
7. Interval estimation: methods of construction, important examples
8. Hypotheses testing: test statistic, first and second kind error, p-value
9. Some important tests
10. Data matrix and its summaries
11. Data representation, subject and variable spaces, distances among subjects and among variables.
12. Cluster analysis: main clustering techniques, clustering evaluation, applications.
13. Principal components: component extraction, stopping rules, measures of explained variability, applications.

Prerequisites

None

Teaching methods

Class lectures.

Assessment methods

Oral exam.

Textbooks and Reading Materials

- Cicchitelli, G. Probabilità e Statistica 2 edizione, Maggioli, 2004.
- Zani, S., Cerioli, A. Analisi dei dati e data mining per le decisioni aziendali. Giuffrè Editore, Milano 2007.

Semester

I semester, I term (six weeks)

Teaching language

Italian
