INSA INSTITUT NATIONAL DES SCIENCES APPLIQUÉES TOULOUSE

Inferential statistics

Introducing

Description

Syllabus (detailed contents):

• Review of the definitions and properties of the usual distributions (normal, Chi-square, Student's, Fisher's, Gaussian vectors, etc.) and probabilistic tools (law of large numbers, central limit theorem, Slutsky's lemma)
• Estimation in a parametric model: method of moments, maximum likelihood
• Cramer-Rao bound, and efficiency of an estimator
• Confidence interval for the mean and the variance of a Gaussian or a non-Gaussian sample
• Parametric hypothesis testing: concept, tests on the mean and the variance of a Gaussian sample, tests on a proportion, p-value, test for comparing two independent Gaussian samples, Neyman-Pearson's lemma, maximum likelihood ratio tests

Objectives

At the end of this module, the student will have understood and be able to explain (main concepts):

• defining a parametric model using usual distributions, such as normal, exponential, Bernoulli, Poisson, etc
• parameter estimation in a parametric model
• confidence interval construction
• hypothesis testing

The student will be able to:
• Model a situation using usual probability distributions, and manipulate them
• Estimate parameters in a parametric model and study the properties of these estimators
• Construct a parametric confidence interval
• Construct a parametric hypothesis testing

Necessary prerequisites

Probability and Statistics (2MIC)

Évaluation

L'évaluation des acquis d'apprentissage est réalisée en continu tout le long du semestre. En fonction des enseignements, elle peut prendre différentes formes : examen écrit, oral, compte-rendu, rapport écrit, évaluation par les pairs...

Practical info

Location(s)

Toulouse