

Mathematics

Introducing

Description

In the Analysis-Algebra course:

- Laplace transform and application to the resolution of first and second order linear ODEs.
- bilinear algebra: bilinear forms, symmetric bilinear forms, associated quadratic form, scalar product, orthogonality, Gram-Schmidt orthogonalization procedure, orthogonal of a vector subspace, orthogonal projection, norm associated with a scalar product, convergence, continuity, Weierstrass theorem.
- functions of several variables: continuity, partial derivatives, differentiability, local extremum points, multiple integrals.

In the Probabilities section:

- probability space and conditional probabilities, independence of events
- discrete and continuous random variables (law of probability, expectation, variance, etc.)
- couples of random variables
- limit theorems (law of large numbers, central limit theorem)

Objectives

Introduce the Laplace transform and its use to solve certain ordinary differential equations.

Introduce some notions of bilinear algebra, in particular the scalar product and orthogonality.

Introduce concepts of analysis in several variables.

Introduce the basic concepts of probability.

Necessary prerequisites

1st year linear algebra.

1st year analysis: functions of a single variable (continuity, derivative, integrals, local extremum points).

Newton binomial, geometric series, exponential series.

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