

Analysis 1

Introducing

Description

Integration

Improper integrals: integrals of positive functions, functions of any sign, absolute convergence and semi-convergence

Parameter-dependent integrals: dominated convergence theorem, continuity, differentiability

Multiple integrals: Fubini's theorem, change of variable theorem

Numerical Series

Introduction, partial sums and summation techniques

Series with positive terms, comparison theorem

Series with arbitrary terms: absolute convergence, alternating series test

List of Competencies:

1_1: Master the mathematical concepts and computational tools of the engineer

1_2: Establish rigorous scientific reasoning and develop the capacity for abstraction

2_1: Master the fundamental tools of the mathematical engineer

The student shall be able to:

Study the differentiability of a function of several variables and perform a limited (Taylor) expansion

Perform integral calculations of functions of several variables or over unbounded domains

Search for extrema of a function of class C^1 or C^2

Study the convergence of a numerical series using bounding and comparison methods

The student shall have understood and be able to explain (main concepts):

The notion of the differential of a function of several variables, partial derivatives, and their relation to the differential

The notion of improper integrals, integrals of parameter-dependent functions or of functions of several variables

The notion of numerical series and the concept of convergence of numerical series

Necessary prerequisites

First-year Linear Algebra: Vector spaces, linear maps, matrices, concept of image and kernel of a linear map. First-year Analysis Course: Functions, limits, continuity, differentiability in one dimension, linear algebra (vector spaces, linear maps, matrices, vectors).

Objectives

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