

**MATHÉMATIQUES ADAPTÉES I : ANALYSE - ALGÈBRE****ADAPTED MATHEMATICS I : APPLIED ANALYSIS - ALGEBRA****Lecturers:** Abdel-Malek ZINE, Hélène HIVERT

| Lecturers : 18.0 | TC : 20.0 | PW : 0.0 | Autonomy : 0.0 | Study : 0.0 | Project : 0.0 | Language : FR

Objectives

We present basic tools for algebra and analysis : vector spaces, polynomials, orthogonalization, matrices and diagonalization, integration, differential calculus, optimization, ordinary differential equations

Keywords : Polynomials, Hilbert spaces, matrix diagonalization, integration, functional space, ODE, differential calculus, optimisation

Programme

Algebra : Polynomials. Hilbert spaces, euclidean spaces. Matrices, determinant. Eigenvalues, eigenvectors and applications.

Analysis : Recap and complements. Lebesgue's integration. Integration : theorems and functional spaces. Differential calculus and optimization. Ordinary differential equations.

Learning outcomes

- Be able to use the fundamental tools of algebra.
- Be able to justify the computation of an integral with several variables.
- Be able to determine the extrema of a function defined over \mathbb{R}^d .
- Be able to determine qualitative properties of the solution of an ordinary differential equation

Independent study

Objectifs : Gain experience with exercises.

Méthodes : WIMS.

Core texts

C. Gasquet, P. Witomski, *ANALYSE DE FOURIER ET APPLICATIONS*, Masson, 1990
J.-M. Monier *MATHÉMATIQUES, MÉTHODES ET EXERCICES MP.*, Dunod, 2009
D. Fredon *MATHÉMATIQUES, RÉSUMÉ DU COURS EN FICHES MPSI-MP*, Vuivert, 2010

Assessment

Final mark = 75% Knowledge + 25% Know-how
Knowledge mark = 100% final exam
Know-how mark = 100% continuous assessment