MATH-523

Introduction to dynamical systems

Cursus	Sem.	Type
Ing.-math	MA1, MA3	Opt.
Mathématicien	MA1, MA3	Opt.

Language of teaching	English
Credits	5
Session	Winter
Semester	Fall
Exam	Written
Workload	150h
Weeks	14
Hours	**4 weekly**
Courses	2 weekly
Exercises	2 weekly
Number of positions	

Remark

Pas donné en 2026-27

Summary

An introduction to some key concepts and theorems from dynamical systems, including discrete dynamical systems as well as flows.

Content

-abstract dynamical systems
-ergodicity
-Poincare recurrence
-Birkhoff theorem
-invariant manifolds and hyperbolicity
-Conjugation problem
-Poincare-Bendixson theory.

Learning Prerequisites

Required courses

Analysis I - IV, Algebre Lineaire I and II.

Recommended courses

Analysis I - IV, Algebre Lineaire I and II.

Important concepts to start the course

Understand key concepts of real analysis, such as measure and Lebesgue integral. Some familiarity with Fourier series and ordinary differential equations. Be able to construct a rigorous mathematical argument.

Learning Outcomes

By the end of the course, the student must be able to:

- Analyze abstract dynamical systems
- Examine issues concerning the local and global behavior of dynamical systems
- Prove basic results, such as Poincare recurrence.

- Contrast different dynamical behaviors.

Assessment methods

Written exam

Supervision

Office hours	No
Assistant.e.s	Yes
Forum	No

Resources

Virtual desktop infrastructure (VDI)

No

Moodle Link

- https://go.epfl.ch/MATH-523