MATH-540

Diophantine approximation

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

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

Remark

Pas donné en 2025-26

Summary

The main theme in Diopahntine approximation is to approximate a real number by a rational number with a certain denominator bound. The course covers the case of one real number, that is classical and well understood, and proceeds to simultaneous Diophantine approximations.

Content

- Continued Fractions and convergents
- Convergents as best approximations
- Approximation theorems and Liouville's theorem
- Quadratic irrational numbers and periodic continued fractions
- Simultaneous Diophantine approximation
- Dirichtets Theorems and algorithms
- Applications of Simultaneous Diophantine approximation in Discrete Optitization
- Lower bounds based on covering
- Schmidt's subspace theorem and open research questions

Learning Prerequisites

Required courses

Analysis 1+2
Linear Algebra 1+2
Rings and Fields

Assessment methods

Written exam at the end of the semester

Resources

Bibliography

A. Ya. Khinchin: Continued Fractions
Wolfgang Schmidt: Diophantine Approximation
Some research papers.

Ressources en bibliothèque

- Find the references at the Library

Moodle Link

- https://go.epfl.ch/MATH-540