

MATH-479 Linear algebraic groups

| Cursus | Sem. | Туре | Language of | English |
|---------------|----------|------|--|--|
| Ingmath | MA2, MA4 | Opt. | teaching | English |
| Mathématicien | MA2 | Opt. | Credits Session Semester Exam Workload Weeks Hours Lecture Exercises Number of positions | 5 Summer Spring Oral 150h 14 4 weekly 2 weekly 2 weekly |

Remark

Pas donné en 2023-24

Summary

The aim of the course is to give an introduction to linear algebraic groups and to give an insight into a beautiful subject that combines algebraic geometry with group theory.

Content

First definitions and properties, morphisms, Jordan decomposition, tangent space, commutative linear algebraic groups, tori, unipotent groups, the Lie algebra of a linear algebraic group, group actions on algebraic varieties, invariants and quotients, Hilbert's finiteness theorem.

Keywords

algebraic groups group actions on algebraic varieties Lie algebra algebraic geometry group theory

Learning Prerequisites

Required courses at least one introductory course in algebraic geometry

Recommended courses

courses in group theory, Lie theory, and algebraic geometry

Learning Outcomes

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

- State the most important notions and results
- Construct examples
- Prove basic results in the theory
- Express your mathematical thoughts orally

Teaching methods



Lectures and exercises

Expected student activities

Attending the course, doing the weekly assignments, participating actively in the course and the exercise classes.

Assessment methods

There will be a final oral exam. Part of the grade might be based upon student presentation of some course material, quizes, or corrected written homework assignments.

Dans le cas de l'art. 3 al. 5 du Règlement de section, l'enseignant décide de la forme de l'examen qu'il communique aux étudiants concernés.

Supervision

| Yes |
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| Yes |
| Yes |
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Resources

Bibliography

Algebraic Transformation Groups - an Introduction, H. Kraft, manuscript on the website of the author Linear Algebraic Groups, J. Humphreys, Springer Linear Algebraic Groups, T. Springer, Birkhauser Linear Algebraic Groups, A. Borel, Springer Linear algebraic groups and finite groups of Lie type, G. Malle and D. Testerman, CUP

Références suggérées par la bibliothèque

- Linear Algebraic Groups / Borel
- Linear algebraic groups and finite groups of Lie type / Malle & Testerman
- Linear Algebraic Groups / Humphreys
- Linear Algebraic Groups / Springer
- Algebraic Transformation Groups / Kraft

Moodle Link

• https://go.epfl.ch/MATH-479