MATH-479 **Linear algebraic groups**

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Cursus	Sem.	Type
Ing.-math	MA2, MA4	Opt.
Mathématicien	MA2	Opt.

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

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, 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

Teaching methods

Lectures and exercises

Expected student activities

exercises and presentations

Assessment methods

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

Office hours	Yes
Assistants	Yes
Forum	Yes

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