

MATH-492

Representation theory of semisimple lie algebras

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 2018-19

Summary

We will establish the major results in the representation theory of semisimple Lie algebras over the field of complex numbers, and that of the related algebraic groups.

Content

Highest weight theory
 Universal enveloping algebra
 Construction of irreducible representations
 Weyl's degree formula
 Freudenthal's formula.

If time permits, construction of Chevalley groups and simple algebraic groups.

Learning Prerequisites**Required courses**

Theorie des Groupes, Anneaux et corps, Algebres de Lie semisimples

Important concepts to start the course

The classificaiton of complex semisimple Lie algebras. Root systems.

Teaching methods

Lectures

Expected student activities

Exercises, extra reading, presentation of exercises.

Assessment methods

Final written 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

Resources

Bibliography

James Humphreys : Introduction to Lie algebras and Representation Theory.

Bourbaki, Lie algebras and Lie groups, Chapters 1 - 3.

Ressources en bibliothèque

- [Introduction to Lie algebras and Representation Theory / Humphreys](#)
- [Lie algebras and Lie groups / Bourbaki](#)