MATH-617

Quantum groups and crystal bases

Gerber Thomas

Cursus	Sem.	Type
Mathematics		Obl.

Language of teaching	English
Credits	1
Session	
Exam	Oral presentation
Workload	30h
Hours	**28**
Lecture	14
Practical work	14
Number of positions	

Frequency

Only this year

Remark

From 8 April 2019 to 31 May 2019

Summary

Quantum groups are deformations of universal enveloping algebras of certain Lie algebras. In this course, we study representation theory of these quantum groups and introduce Kashiwara's theory of crystal bases.

Content

- Kac-Moody algebras and associated quantum groups
- integrable representations
- crystal bases and crystal graphs
- example of sl(2,C)

Note

The students will be required to independently work out examples and fill in details left as exercises.

Keywords

representation theory, combinatorics, Lie algebras, quantum groups, crystals

Learning Prerequisites

Required courses

Representation theory

Learning Outcomes

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

• state the fundamental results linking crystal combinatorics and representation theory, and to compute examples of crystals.

Resources

Bibliography

Jin Hong and Seok-Jin Kang: "Introduction to Quantum Groups and Crystal Bases" Masaki Kashiwara: "Bases cristallines des groupes quantiques" (rédigé par Charles Cochet) Daniel Bump and Anne Schilling: "Crystal Bases: Representations and Combinatorics"