MATH7301: Lie Groups and Lie Algebras (2026 Spring)

COURSE SYLLABUS

Logistics

Instructors: Zhibin Geng (gengzb@hku.hk), Pengcheng Li(pcli25@hku.hk).

Time & Venue: Wednesdays 10:00–12:50 am; MWT6.

Office Hours & Location: Wednesdays 2:00–5:00 pm; P206, Graduate House.

Course Description

This is an introductory course of Lie groups and Lie algebras and their representations. It covers basic concepts of Lie groups and Lie algebras, the Lie algebra of a Lie group, exponential map, the fundamental theorems of Lie theory, representations of compact Lie groups.

References:

[Kir08] Alexander Kirillov, An Introduction to Lie Groups and Lie Algebras, Cambridge University Press, 2008.

[Eti24] Pavel Etingof, Lie groups and Lie algebras, 2024, https://arxiv.org/abs/2201.09397.

Gradings

The final grade of each student will be determined based on the following components,

$$\text{Final Grade} = 40\% \cdot (\text{H}) + 60\% \cdot (\text{E}).$$

(H) Homework (40%).

- These assignments are designed to reinforce class concepts and will be given every two weeks throughout the semester.
- Each assignment consists of 5 - 6 problems and should be submitted by 11:59 am on Wednesday of the even-numbered weeks.
- Collaborative work is allowed but should be clearly acknowledged.
- Late submissions will incur deductions. Assignments submitted after the solution release will not be graded. Exceptions for late submissions due to special circumstances will be considered.

(E) Examination (60%).

- Details regarding the final examination will be announced later.
- These assessments will evaluate students' understanding of the course material, and the use of reference materials or electronic devices will **NOT** be permitted.