MA 315 Jan. 3:0

Lie Algebras and their Representations

Instructor

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Department: Department of Mathematics

Course Time: Tue., Thu., 11:00-12:30AM

Lecture venue: LH-5, Department of Mathematics

Detailed Course Page: http://math.iisc.ac.in/all-courses/ma315.html

Announcements

Brief description of the course

It is an elective course and it is at the level of second year PhD students. Bright undergraduate students and

integrated PhD students are encouraged to attend.

Prerequisites

Linear Algebra (MA 219), Algebra I (MA 212)

Syllabus

Finite dimensional Lie algebras, Ideals, Homomorphisms, Solvable and Nilpotent Lie algebras, Semisimple

Lie algebras, Jordan decomposition, Kiling form, root space decomposition, root systems, classification of

complex semisimple Lie algebras Representations Complete reducibility, weight spaces, Weyl character

formula, Kostant, steinberg and Freudenthal formulas

Course outcomes

Students would learn the structure theory and representations theory of Lie algebras from this course.

Grading policy

20% for assignments, 30% for mid-term, 50% for final exam

Assignments

Resources

(1) J E Humphreys, Introduction to Lie algebras and Representation theory ,Springer-Verlag, 1972.

(2) J P Serre, Complex Semisimple Lie Algebras ,Springer, 2001.

(3) Fulton. W., and Harris J., Representation theory ,Springer-Verlag. 1991.

(4) Roger Carter, Lie Algebras of Finite and Affine Type, Cambridge Studies in Advanced Mathematics, 2005.