Spring 2008, Course 18.747: Infinite dimensional Lie algebras

TR 2:30-4, Rm. 2-135

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The course will be devoted to a detailed introduction, with proofs, into the structure and representation theory of some of the most important infinite dimensional Lie algebras – Heisenberg algebras, Kac-Moody algebras, Virasoro algebra.

The books for the course are V. Kac and A. Raina "Highest weight representations of infinite dimensional Lie algebras" (required) and V. Kac "Infinite dimensional Lie algebras". We will also use an expository paper by B. Feigin and A. Zelevinsky that will be distributed in class.

We will start with the book of Kac and Raina and discuss representations of the Heisenberg algebra, Virasoro algebra, affine sl(n), and relations to integrable systems.

We will then discuss the structure and representation theory of Kac-Moody algebars, including character formulas and Kac-Macdonald identities.

To officially pass the course, it will be required to solve homework assignments which will be assigned on Thursday and due the following Thursday.