

MATH 423/502: LINEAR REPRESENTATIONS OF FINITE GROUPS

Times and Locations: Tuesday, 2:00-3:30, in Math Annex 1102;
Thursday, 8-9:30am (!) in Mathematics 225.

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Office hours: TBA

Textbook: Jean-Pierre Serre, Linear Representations of Finite Groups.

Course description. Representation theory is the study of groups by means of linear algebra. Since this applies, in particular, to groups of automorphisms of various geometric objects, this subject is very important in several areas of mathematics, as well as physics and chemistry. In fact, the textbook we will be using was written at the request of a chemist.

In this course, we will talk about representations of finite groups. We will cover approximately Part I and Part II of Serre's book. Then we will switch to some other sources (copies of relevant notes will be handed out in class), and classify the representations of the group of invertible 2×2 -matrices over a finite field. On the one hand, this will be an example of the use of many of the tools of representation theory, and on the other hand, it will connect with the sequence of courses on Lie Theory that will be offered next year.

Background expectations. The official prerequisites are Math 412 or Math 501. You will need good understanding of linear algebra; familiarity with rings and modules is a big plus, but I will try not to assume it.

Marking. The mark will be based on homework (50%), a take-home midterm (25%), and a take-home final exam (25%). Interaction and collaboration on homework is encouraged, but if you collaborate, please acknowledge this in writing. Collaboration on the midterm and final is not permitted.