

PhD Course: “Springer Correspondence”

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This course aims to present one of the first results in geometric representation theory: the Springer Correspondence. The goal of geometric representation theory is to study representations of certain algebraic structures (finite Weyl groups, in our case) via geometric methods. Springer’s result (generalised in several ways and still a central tool nowadays) achieves a construction of all representations of a finite Weyl group (e.g. the symmetric group) in terms of the cohomology of a certain variety. The striking point of Springer’s construction is that the Weyl group action he discovers is highly non trivial and hidden, since the Weyl group does not act on the variety itself.

Some of the arguments we are going to address are: representation theory of the symmetric group via tableaux combinatorics; flag variety and Bruhat decomposition; nilpotent cone, the Springer resolution, Springer fibres; construction of the Weyl group action on the cohomology of the Springer sheaf.

The discussion will be more or less detailed, depending on the participants’ background and interests.

Where:

Conference Room 1201 – “Roberta Dal Passo”,
Department of Mathematics of University “Tor Vergata”

Schedule:

March 10 (presentation of the course/introductory lecture)
March 17, 20, 24, 27, 31; April 14, 21
h. 11:00 – 13:00.