מכון ויצמן למדע

THE WEIZMANN INSTITUTE OF SCIENCE

FACULTY OF MATHEMATICS AND COMPUTER SCIENCE

Algebraic Geometry and Representation Theory Seminar

Room 290C ,Ziskind Building
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at 11:15

Ehud Meir
University of Hamburg

Generalized Harish-Chandra functors for general linear groups over nite local rings

Abstract:

Let K be a commutative ring. Consider the groups GLn(K). Bernstein and Zelevinsky have studied the representations of the general linear groups in case the ring K is a nite eld. Instead of studying the representations of GLn(K) for each n separately, they have studied all the representations of all the groups GLn(K) si- multaneously. They considered on R := nR(GLn(K)) structures called parabolic (or Harish-Chandra) induction and restriction, and showed that they enrich R with a structure of a so called positive self adjoint Hopf algebra (or PSH algebra). They use this structure to reduce the study of representations of the groups GLn(K) to the following two tasks:
1. Study a special family of representations of GLn(K), called cuspidal representa- tions. These are representations which do not arise as direct summands of parabolic induction of smaller representations.
2. Study representations of the symmetric groups. These representation also has a nice combinatorial description, using partitions.
In this talk I will discuss the study of representations of GLn(K) where K is a nite quotient of a discrete valuation ring (such as Z=pr or k[x]=xr, where k is a nite eld). One reason to study such representation is that all continuous complex representations of the groups GLn(Zp) and GLn(k[[x]]) (where Zp denotes the p-adic integers) arise from these nite quotients. I will explain why the natural generalization of the Harish-Chandra functors do not furnish a PSH algebra in this case, and how is this related to the Bruhat decomposition and Gauss elimination. In order to overcome this issue we have constructed a generalization of the Harish-Chandra functors. I will explain this generalization, describe some of the new functors properties, and explain how can they be applied to studying complex representations.
The talk will be based on a joint work with Tyrone Crisp and Uri Onn.

Email: hanni.naor@weizmann.ac.il * Phone: (08)9343349 * Fax: (08)9344308