מכון ויצמן למדע

THE WEIZMANN INSTITUTE OF SCIENCE

FACULTY OF MATHEMATICS AND COMPUTER SCIENCE

Algebraic Geometry and Representation Theory Seminar

Room 290C ,Ziskind Building
on Tuesday, Nov 21, 2017
at 11:15

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Uniform p-adic integration and applications

Abstract:

As a concrete variant of motivic integration, I will discuss uniform p-adic integration and constructive aspects of results involved. Uniformity is in the p-adic fields, and, for large primes p, in the fields F_p((t)) and all their finite field extensions. Using real-valued Haar measures on such fields, one can study integrals, Fourier transforms, etc. We follow a line of research that Jan Denef started in the eighties, with in particular the use of model theory to study various questions related to p-adic integration. A form of uniform p-adic quantifier elimination is used. Using the notion of definable functions, one builds constructively a class of complex-valued functions which one can integrate (w.r.t. any of the variables) without leaving the class. One can also take Fourier transforms in the class. Recent applications in the Langlands program are based on Transfer Principles for uniform p-adic integrals, which allow one to get results for F_p((t)) from results for Q_p, once p is large, and vice versa. These Transfer Principles are obtained via the study of general kinds of loci, some of them being zero loci. More recently, these loci are playing a role in the uniform study of p-adic wave front sets for (uniformly definable) p-adic distributions, a tool often used in real analysis.
This talk contains various joint works with Gordon, Hales, Halupczok, Loeser, and Raibaut, and may mention some work in progress with Aizenbud about WF-holonomicity of these distributions, in relation to a question raized by Aizenbud and Drinfeld.