Motivic integration[Sundays 12-2, rm. 209

The goal of the course is to describe applications of model theory to some problems of algebra and analysis. In particular we will discuss ideas of the proof of the following two results

a) Let $X, Y \subset \mathbb{P}^n(\mathbb{C})$ be elliptic curves such that varieties $\mathbb{P}^n(\mathbb{C}) - X$ and $\mathbb{P}^n(\mathbb{C}) - Y$ are isomorphic. Then the curves X, Y are isomorphic.

b) Let V be a finite-dimensional $\mathbb{Q}_p$-vector space, $\psi : \mathbb{Q}_p \to \mathbb{C}$ a additive character, $P : V \to \mathbb{Q}_p$ a polynomial and Φ be the Fourier transform of $\psi(P)$ which we consider as a distribution on the space $V^\vee$. Then there exists a proper algebraic subvariety $Z \subset V^\vee$ such that the restriction of Φ on $V^\vee - Z$ is locally constant.

The outline of the course.

a) An introduction into basic concepts of the mathematical logic and the model theory.

b) Elimination of quantifiers for the theory ACF of algebraicly closed fields and the Chevalley theorem.

c) Statements of the main results.

d) Elimination of quantifiers for the theory ACVF of algebraicly closed valued fields.

e) An introduction to the "geography" of ACVF- a study of restrictions on the maps between different sorts.

f) The detailed study of of "curves"- 1-dimensional objects of ACVF over different types of substructures.

g) Outline of the proofs of main results.

Prerequisites. The knowledge of the Galois theory and the understanding of the notion of compactness.