Mumbai–Pune Number Theory Seminar - 2016

September 16 – 17, 2016

Schedule and Abstracts of Talks

School of Mathematics
Tata Institute of Fundamental Research

Title of Talks

Chandrashekhar Khare	*S_5 Galois extensions of totally real fields and automorphy*
Sandeep Singh	*On the arithmeticity and thinness of the hypergeometric monodromy groups*
Neha Prabhu	*Statistics of Hecke Eigenvalues: Beyond Equidistribution*
Manish Mishra	*The Bernstein center of supercuspidal blocks*
Santosh Nadimpalli	*Non-admissibility of universal supersingular representations*
U. K. Anandavardhanan	*Distinction and L-indistinguishability*

Abstracts

Friday, 16 September 2016 (14:30-15:30)

Speaker : Chandrashekhar Khare
Title : S_5 Galois extensions of totally real fields and automorphy

We consider S_5 extensions of totally real fields that are totally odd. These arise as splitting fields of quintic polynomials over F all of whose roots are not real. Noting the isomorphism $S_5 = PGL_2(F_5)$, one can ask if these arise as splitting fields of the 5-torsion of an elliptic curve defined over F, or more generally from the 5-torsion of an abelian variety defined over F with real multiplication (a question considered in some form classically by Hermite who was interested in solving quintics using elliptic functions). One can also ask if such S_5 extensions arise from Hilbert modular forms. The case when the images of complex conjugations are even permutations (so conjugate to (12)(34)) is understood, while the case of odd permutations is still open. The case of S_5 extensions is also interesting from the point of view of automorphy lifting results of Wiles, Taylor-Wiles et al as when the fixed field of $PSL_2(F_5)$ is given by $F(\zeta_5)$ this falls in a blind spot of the Wiles method. This talk will describe some joint work with Jack Thorne on such S_5 extensions.

Friday, 16 September 2016 (16:00-17:00)

Speaker : Sandeep Singh
Title : On the arithmeticity and thinness of the hypergeometric monodromy groups

The monodromy groups of hypergeometric differential equations are (up to conjugation) the subgroups of GL_n generated by the companion matrices of two monic coprime polynomials of degree n, and the Zariski closures of these groups inside GL_n are either symplectic or orthogonal groups. In this talk, we will discuss the progress on the question to determine the hypergeometric differential equations for which the associated monodromy groups are arithmetic or thin.

Friday, 16 September 2016 (17:15-18:15)

Speaker : Neha Prabhu
Title : Statistics of Hecke Eigenvalues: Beyond Equidistribution

A famous conjecture of Sato and Tate (now a celebrated theorem of Taylor et al) predicts that the normalised p-th Fourier coefficients of a non-CM Hecke eigenform follow the semicircle distribution as we vary the primes p. In 1997, Serre obtained a distribution law for the vertical analogue of the Sato-Tate family, where one fixes a prime p and considers the family of p-th coefficients of Hecke eigenforms. In this talk, we address a situation in which we vary the primes as well as families of Hecke eigenforms. In 2006, Nagoshi obtained distribution measures for Fourier coefficients of Hecke eigenforms in these families. We consider another quantity, namely the number of primes p for which the p-th Fourier coefficient of a Hecke eigenform lies in a fixed interval I. On averaging over families of Hecke eigenforms, we obtain a conditional central limit theorem for this quantity. This is joint work with Kaneenika Sinha.

Saturday, 17 September 2016 (09:00-10:00)

Speaker : Manish Mishra
Title : The Bernstein center of supercuspidal blocks

Let G be a connected reductive group defined over a non-archimedean local field k. The center of the category of smooth representations of $G(k)$ is called the Bernstein center. I will review some basic results in the theory of Bernstein center. At the end, I will state my result about the Bernstein center of supercuspidal blocks.

Saturday, 17 September 2016 (10:30-11:30)

Speaker : Santosh Nadimpalli
Title : Non-admissibility of universal supersingular representations

Irreducible smooth representations of p-adic reductive groups over characteristic p is reduced to the study of supersingular (supercuspidal) representations. Supersingular representations are well understood for $\mathrm{GL}_2(\mathbb{Q}_p)$. In this talk we will explain the reasons for the failure of similar constructions for $\mathrm{GL}_3(\mathbb{Q}_p)$.

Saturday, 17 September 2016 (11:45-12:45)

Speaker : U. K. Anandavardhanan
Title : Distinction and L-indistinguishability

Let E/F be a quadratic extension of p-adic fields. For a reductive algebraic group defined over F, Dipendra Prasad has recently formulated a very general conjecture which in particular proposes a recipe to classify $G(F)$-distinguished representations inside an L-packet of representations of $G(E)$ (cf.arXiv:1512.04347). This talk will discuss Prasad's conjecture when $G = SL(n)$.