Jugal Verma (09:15 - 10:00)

Title and Abstract: TBA

1. Sumit Chandra Mishra (10:30 - 11:05)

Title: Local-global principles for norms over semi-global fields

Abstract : A well-known result of Hasse states that the local-global principle holds for norms over number fields for cyclic extensions. In other words, if L/F is a cyclic extension of number fields then an element $\lambda \in F$ is in the image of norm map $N_{L/F} : L \to F$ if and only if λ is in the image of the norm map locally everywhere i.e., for completions associated to all archimedean and non-archimedean places of F. In this talk, we would explore local-global principles for norms over fields which are function fields of curves over complete discretely valued fields, for example, $\mathbb{C}((t))(x)$.

2. Pronay Kumar Karmakar (11:05 - 11:40)

Title: Bipartite Euler systems in reducible case

Abstract: In this work we combine the ideas of Bertolini-Darmon, Mazur-Rubin and Howard to construct bipartite Euler systems in the reducible case.

3. Arunava Mandal (11:40 - 12:15)

Title: Power maps for groups over non-Archimedean local fields.

Abstract: When elements in a Lie group admit all its k-th roots is still an open problem. Here we present some recent progress in structural conditions on algebraic and linear groups over non-Archimedean local fields for the power maps to be dense/surjective. This is joint work with C. R. E. Raja.

4. Chandan Maity (12:15 - 12:50)

Title: Lower dimensional cohomologies of homogeneous spaces

Abstract: In this talk we will describe lower dimensional cohomologies (de Rham) of a general homogeneous space. A key step is an equivariant version of the well-known Cartan's theorem which describes cohomology of homogeneous spaces in terms of cohomology of a Koszul complex. As a consequence, we show that for a large class of homogeneous spaces the difference of the dimensions of the third and fourth cohomologies coincides with the difference of the number of simple factors of the Lie algebras of certain compact subgroups associated to the homogeneous space.

5. Yogesh (02:30 - 03:05)

Title: Urns with Multiples drawings and graph-based interactions

Abstract: We study the evolution of N interacting two-colour (white and black) urns, placed on the vertices of a finite undirected, connected graph. The sampling is done from the nearest neighbours and is of multiple drawing-type. The reinforcement of balls takes place according to a reinforcement scheme that can be either Polya-type or Friedman-type. We study the asymptotic properties of the system for various models defined by the type of reinforcement and the graph structure. We obtain almost sure limits for the fraction of balls of either colour and CLT-type limit theorems for the Friedman case.

6. Neeraj K Dhanwani (03:05 - 03:40)

Title: Dehn quandle

Abstract:- Quandles are algebraic systems with a binary operation that encodes the three Reidemeister moves of planar diagrams of links in the 3-space. In this talk, we introduce quandles, particularly Dehn quandles. We prove equivalent conditions for a quandle to be a Dehn quandle and discuss the properties of enveloping groups of such a type of quandles. Specializing in surfaces, we give generating sets for Dehn quandles of orientable surfaces and compute their automorphism groups. We shall end the talk by discussing two different approaches to writing explicit presentations for Dehn quandles using presentations of their underlying groups.

7. Divya Setia (04:10 - 04:45)

Title: Tensor Product of local Weyl modules

Abstract: I will introduce the notion of current algebra and some special representations of current algebra like local Weyl modules (Wloc(λ)) and Demazure modules (D(l, λ)). In 1994, V.Chari and A.N.Pressley introduced the notion of local Weyl modules and proved that every finite dimensional cyclic integrable highest weight representation is the quotient of a local Weyl module. Tensor product of two local Weyl modules is also a representation of current algebra. In 2017, D.Blanton gave a presentation of Wloc(λ)⊗Wloc(μ) as sl_2[t]-module and proved its graded character formula. In this talk, I will give a presentation of Wloc(λ)⊗ Wloc(μ) as sl_3[t]-module and motivation for the graded character of this module.

8. Tejbir Lohan (04:45 - 05:20)

Title: REVERSIBILITY OF HERMITIAN ISOMETRIES

Abstract:Let G be a group. An element g in G is called reversible if it is conjugate to g^{−1} in G, i.e., there exists h in G such that g^−1 = hgh^{−1}. The element g is called

strongly reversible if g is a product of two involutions (i.e., element of order at most two) in G. Equivalently, g is strongly reversible if it is conjugate to its inverse by an involution. In this talk, we will classify reversible and strongly reversible elements in the isometry groups of F-Hermitian spaces, where F = C or H. More precisely, we will classify reversible and strongly reversible elements in the groups Sp(n) ⋉H^n, U(n)⋉C^n and SU(n)⋉ C^n.
This is a joint work with my supervisor Dr. Krishnendu Gongopadhyay.

Day - 2

C S Rajan (09:00 - 09:45)
Title and Abstract: TBA

1. Ravi Tomar (10:15 - 10:50)

Title: Combination theorems for convergence groups

Abstract: Gehring and Martin introduced the notion of convergence groups. Let G(Y) be a graph of convergence groups with parabolic edge groups and let G be the fundamental group of G(Y). First of all, I will discuss that G is a convergence group. We explicitly construct a compact metrizable space on which G acts as a convergence group. Then, I will discuss some combination theorems for relatively hyperbolic groups. If time permits, I will discuss some examples of groups that are not convergence groups.

2. Pravin Kumar (10:50 - 11:25)

Title: $K(\pi,1)$ conjecture for Artin groups

Abstract: Artin (or Artin-Tits) groups are generalizations of braid groups and are intimately related to Coxeter groups. These groups are defined using a finite set of generators that satisfy relations of 'braid type'. Classical problems such as the word problem, the conjugacy problem, determining the center, torsion, orderability, linearity, and cohomology are still open for general Artin groups. One of the fundamental questions about Artin groups is whether the associated space is an Eilenberg--MacLane space. We will begin by showing that the configuration space for the braid group is its classifying space. We will then introduce Artin and Coxeter groups and hyperplane arrangements associated with Coxeter groups. Towards the end of the talk, we will prove that $K(\pi,1)$ conjecture holds for Artin groups of FC type.

3. Suneel Mourya (11:25 - 12:00)

Title: On the local constancy of certain mod p Galois representations.

Abstract: Let f be a 'normalized eigenform' of weight k ≥ 1, character ψ and level Γ1(N) such that p - N. Then there is a 2- dimensional p-adic Galois

representation ρf : Gal(Q¯/Q)→ GL2(Q¯p). We will discuss some interesting results on the local structure of ρf at the primes l. In the case l = p, the representation ρf is crystalline. We discuss some existing results on local constancy of the modp 2-dimensional crystalline representations of Gal(Q¯p/Qp). Finally, we will present our result, which proves local constancy in the weight space by giving an explicit lower bound on the local constancy radius centered around weights going up to (p−1)2+ 3 and the slope fixed in (0, p−1) satisfying certain constraints. If time permits, we will give a brief sketch of the proof. This is the joint work with my PhD advisor Dr. Abhik Ganguli.

4. Shushma Rani (12:00 - 12:35)

Title: Filtration and Graded Decomposition of Fusion Modules for Current Algebra of sl_3.

Abstract: Let g be a simple finite-dimensional complex Lie algebra and g[t] the associated current algebra. Given k cyclic g-modules V1, V2, · · · , Vk, and a k-tuple z = (z1, . . . , zk) of pairwise distinct complex numbers, Feigin and Loktev constructed a cyclic graded g[t] module F_z(V1, · · · , Vk) which they referred to as the fusion product module. It was conjectured that the fusion product module is independent of the parameters z_i's. For k = 2 and g of type A2, we prove this conjecture by constructing a g[t]−module Fλ1,λ2 which is defined via generators and relations, and showing that the latter is isomorphic to the fusion product of irreducible g-modules V(λ1) and V(λ2).

5. Niranjan Nehra (02:30 - 03:05)

Title: Image of multilinear Lie polynomial of degree 2 evaluated on nilpotent Lie algebra.

Abstract: A non zero multilinear Lie polynomial in two variables is non-zero scalar multiple of the Lie bracket of these variables. For split semi-simple Lie algebras, the image of Lie polynomial of degree 2 is precisely L'= [L, L], i.e. each element of L' is a Lie bracket of elements of L'. But this is not true for nilpotent Lie algebras. We study the image of multilinear Lie polynomial of degree 2 evaluated on L where L is a finite-dimensional nilpotent Lie algebra over field k with dim L' ≤ 4. More precisely, we will discuss all the cases when the image set of multilinear Lie polynomial of degree 2 is equal to L'.

6. Gurleen Kaur (03:05 - 03:40)

Title: Central units of integral group rings of monomial groups

Abstract: For a finite group G, it is well known that the group of central units of the integral group ring ZG, Z(U(ZG)), is a finitely generated abelian group. We are concerned with the rank of Z(U(ZG)) and large subgroups of Z(U(ZG)), i.e., subgroups of finite index in Z(U(ZG)). Both of these problems have been the center of attraction for several decades starting with the work of Higman and require a deep

understanding of the structure of G and that of the rational group algebra QG. In this talk, we will see that the group generated by Bass units contains a subgroup of finite index in Z(U(ZG)) for a subgroup closed monomial group G with the property that every cyclic subgroup of order not a divisor of 4 or 6 is subnormal in G. If G is a generalized strongly monomial group, then it is proved that the group generated by generalized Bass units contains a subgroup of finite index in Z(U(ZG)). Furthermore, for a generalized strongly monomial group G, the rank of Z(U(ZG)) is determined. The formula so obtained is in terms of generalized strong Shoda pairs of G. This generalizes the corresponding work done by Jespers, Olteanu, del R´ıo and Van Gelder in 2013.

7. Vinay Gaba (04:10 - 04:45)

Title: Properties of glued Knots

Abstract:The study of knots and links in the real projective space has been motivated by one of the questions from the famous list of problems given by Hilbert in 1900. We will see a method introduced by Björklund known as "gluing" and will establish some results relating the degree of the glued knots and the values of classical knot invariants that these knots possess. There is a strong relation between affine glued knots and links made of rigid ellipses. We exploit this connection along with the Skein Relations of polynomial invariants of the knots and links to get results concerned with maximum degrees of polynomial invariants of these two. We will then see the classification of affine glued real rational knots up to degree 6 and consequently get all the prime 3-component links which have all 3 components as ellipses.

8. Damanvir Sing Binner (04:45 - 05:20)

Title: Number of partitions of n with a given parity of the smallest part.

Abstract: We study integer partitions using the principle of exclusion. Our goal is to obtain a combinatorial proof of a surprising weighted partition equality of Berkovich and Uncu. The combinatorial proof naturally leads to a formula for the number of partitions with a given parity of the smallest part, in terms of S(i), the number of partitions of i into distinct parts with even rank minus the number with odd rank, for which there is an almost closed formula by Andrews, Dyson and Hickerson. By taking examples, we demonstrate that this method of calculating the number of partitions of n with a given parity of the smallest part is practical and efficient.