SCPP Workshop on "Groups and Representations"

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Ramanujan Hall, 2nd Floor, Department of Mathematics, IIT Bombay

November 12-13, 2026

The Schedule, Titles and Abstracts of the Talks

Speaker: Dipendra Prasad (IIT Bombay)

Time: 10:00 am - 11:00 am, **Thursday, 12th November**

Title: Varying the "forms" of a group, varying the field.

Abstract: The talk will discuss some aspects of representation theory of the groups G(F), where G may vary among groups which are "forms" of each other, i.e., they become isomorphic over algebraic closure of F. The field F may vary too. I will try to discuss a few examples to illustrate similarities and differences.

Tea break: 11:00 am - 11:30 am

Speaker: Shiv Prakash Patel (IIT Delhi)

Time: 11:30 am - 12:30 pm, Thursday, 12th November

Title: A conjugacy class perspective of tensor products

Abstract: For a finite group G, a classical theorem in representation theory states that the number of irreducible representations of G is equal to the number of conjugacy classes in G – yet no "canonical" bijection between these two sets exists in general. In this talk, we revisit this phenomenon for the group $G = \mathrm{GL}_2(\mathrm{F}_q)$ and discuss a bijection that pairs each irreducible representation with a conjugacy class in a way that respects the natural algebraic structures on both sides. Specifically, the bijection is such that the tensor products of representations correspond to products of conjugacy classes. In particular, we relate trilinear forms with the triple product of conjugacy classes. This is a joint work with Ankita Parashar.

Lunch break: 12:30 pm - 3:00 pm

Speaker: Mohammed Saad Qadri (TIFR Mumbai)

Time: 3:00 pm - 4:00 pm, Thursday, 12th November

Title: On Extensions and Parabolic Induction for GL(n)

Abstract: The category of smooth representations of the p-adic general linear group is not a semi-simple category and one would like to understand extensions between irreducible representations. We discuss the question of when non-trivial extensions exist between certain irreducible representations of the p-adic general linear group. In order to do this we study the behaviour of Ext modules under the parabolic induction functor. This talk is based on joint work with K.Y. Chan.

Tea break: 4:00 pm - 4:30 pm

Speaker: Anupam Singh (IISER Pune)

Time: 4:30 pm - 5:30 pm, Thursday, 12th November

Title: Lie polynomial maps on Lie algebras

Abstract: A Lie polynomial defines a map on a given finite-dimensional Lie algebra by evaluation. The general question in the subject is to understand the image and fiber of such maps. In this talk, we explore the images of such polynomials, especially by considering an analog of Luboztky's result. We also try to understand, for finite simple Lie algebras, whether it is generated by 2 elements.

Speaker: Indranil Biswas (Shiv Nadar University, Delhi-NCR)

Time: 10:00 am - 11:00 am, **Friday, 13th November**

Title: Poisson structure on character varieties

Abstract: It is shown that the G-character variety for a n-punctured oriented surface has a natural Poisson structure. We also show that the moduli space of logarithmic G-connections on a compact Riemann surface X singular over a divisor D has a Poisson structure. It is proved that the monodromy map from the moduli space of logarithmic G-connections to the moduli space of G-characters is Poisson structure preserving. Joint work with Lisa C. Jeffrey.

Tea break: 11:00 am - 11:30 am

Speaker: Tymoteusz Chmiel (Jagiellonian University, Poland)

Time: 11:30 am - 12:30 pm, Friday, 13th November

Title: Monodromy group of a Picard-Fuchs operator

Abstract: I will introduce the monodromy representation of a one-parameter family of Calabi-Yau three-folds. After discussing some of its properties, including the integral symplectic realization, I will explain how it can be equivalently describe in terms of certain differential equation.

Lunch break: 12:30 pm - 3:00 pm

Speaker: Lal Bahadur Sahu (IIT Bombay)

Time: 3:00 pm - 4:00 pm, Friday, 13th November

Title: Some infinite families of arithmetic symplectic hypergeometric groups

Abstract: In this talk, we construct some of the very first examples of infinite families of arithmetic symplectic hypergeometric groups that do NOT satisfy the arithmeticity criterion of Singh and Venkataramana. For example, we show that the hypergeometric groups associated to the pairs of polynomials $(x-1)^4 P_m(x^9)$ and $(x^4+x^3+2x^2+x+1)Q_m(x^9)$, where P_m and Q_m are integral polynomials of degree $2m$ such that the corresponding pair determines a Zariski dense symplectic hypergeometric group, are arithmetic in $\mathrm{Sp}(18m+4)$ for any integer $m \in \mathbb{N}$.

Tea break: 4:00 pm - 4:30 pm

Speaker: Pralay Chatterjee (IMSc Chennai)

Time: 4:30 pm - 5:30 pm, Friday, 13th November

Title: On the topology of homogeneous spaces of Lie groups

Abstract: We will describe our work in collaboration with I. Biswas and C. Maity. We will begin the talk by indicating how the exactness criteria of the Kostant-Kirillov symplectic form on homogeneous spaces of a semisimple Lie group led to the question of computing second cohomology of such spaces. We will then give computable descriptions of the first four Betti numbers of a homogeneous space of a Lie group. We will also indicate how an interesting topological invariant is obtained using certain Lie theoretic data associated to a homogeneous space. We will apply the results when the homogeneous spaces are nilpotent orbits in a semisimple Lie group.