Titles and Abstracts

Mini Courses

Speaker: *Mahuya Datta, ISI Kolkata*
Title: *Theory of Convex Integration - A topological approach to partial differential relations*

Abstract: Convex integration is a topological technique to deal with partial differential equations and more general relations which mainly arise in Geometry. The theory has its origin in the work of Nash (1954) and Kuiper (1955). In the early 70's, working on the ideas of Kuiper's result, Gromov formulated Convex integration of first order partial differential relations which he later generalised for higher order differential relations as well. In the first talk, we shall begin with some examples to illustrate the 1- dimensional convex integration and then formulate the main theorem. In the second talk, we shall develop the theory for functions on higher dimensional manifolds and see some applications. In the third talk, we shall discuss the proof of Isometric C^1-embedding Theorem due Nash and Kuiper.

Speaker: *M. Sundari, CMI, Chennai*
Title: *An Introduction to Harmonic Analysis on Compact Groups*

Abstract: In this course we shall see how the idea behind Fourier series can be generalized to the case of Compact Lie groups.

Plenary Talks

Speaker: *Shobha Madan, IIT Kanpur*
Title: *On the Convergence of Multiple Fourier series*

Abstract: In this talk we will talk about the norm convergence of multiple Fourier series. We will show that the situation in higher dimensions can be very different from the one dimensional Fourier series, and, in a surprising way. We will use the Kakeya-Besicovich set to show that the spherical (multiple) Fourier series converges only in the space L^2. We indicate the connection of Bochner Riesz Means the Kakeya maximal function, and explain the Bochner-Riesz Conjecture and the Kakeya Conjecture.

Speaker: *Sudesh Kaur Khanduja, IISER Mohali*
Title: *Irreducible Polynomials*

Abstract: The irreducibility of polynomials has a long history. In 1797, Gauss proved that the only irreducible polynomials with complex coefficients are linear polynomials. However, in view of Eisenstien Irreducibility Criterion proved in 1850, for each number $n \geq 1$, there are infinitely many irreducible polynomials of degree n over rationals. We discuss some generalizations of this criterion as well as of the theory of valuations.

Speaker: *Vijaylakshmi Trivedi, TIFR Mumbai*
Title:

Abstract:

Invited Talks

Speaker: *Neena Gupta, ISI Kolkata*
Title: *Projective modules over the kernel of a locally nilpotent derivation on a polynomial ring*

Abstract: Let k be an algebraically closed field of characteristic zero, B the polynomial algebra n variables over k, D a locally nilpotent derivation on B and A the kernel of D. A question of Miyanishi asks whether finitely generated projective modules over A are free. It is well known that for n=2, i.e., when B=k[X,Y], the kernel A is a polynomial algebra in one variable over k. Again, when n=3, i.e., when B= k[X,Y,Z], a result of Miyanishi shows that the kernel A is a polynomial algebra in two variables over k. Thus, for n=2 and n=3, Miyanishi's question has an affirmative answer by a theorem of Seshadri. In my talk I will address Miyanishi's question for n > 3.

Speaker: *Nita H. Shah, Gujurat University*
Title: *Mathematical Model for Fire Spread*

Abstract: A mathematical model to determine the rate of fire spread and its intensity is discussed. The model was developed by Richard C. Rothermal (1972) and it is considered as the basis in the National Fire Danger Rating System. The model considers physical and chemical properties of the fuel and the environmental conditions in which it is expected to burn. The physical properties incorporated are fuel loading, fuel depth, fuel particle surface-area to volume ratio, fuel particle heat content, fuel particle moisture and mineral content, and the moisture content at which extinction is expected. Environmental inputs are mean wind velocity and slope of terrain.

Speaker: *Ruchi Das, University of Delhi*
Title: *A Journey with Dynamical Properties in Dynamical Systems*.

Abstract: In topological dynamical systems, topological dynamics is roughly, the study of phenomena related to iterations of continuous maps from a metric space to itself. Topological conjugacy is an important and useful notion in topological dynamics. Any property of a map which is preserved under topological conjugacy is called a dynamical property. We shall discuss some important dynamical properties, their interrelations, interesting applications and some generalizations in other settings.