2019 Distinguished Lecture Series

Painlevé Dynamics

Nalini Joshi - University of Sydney

Lecture 1: Tuesday, April 30, 2019, 3:00 – 3:50 p.m. MS 6627

When applied mathematics collided with algebra - Imagine walking from one tile to another on a lattice defined by reflections associate with an affine Coxeter or Weyl group. Examples include triangular or hexagonal lattices on the plane. Recently, it was discovered that translations on such lattices give rise to the Painlevé equations, which are reductions of integrable systems that are more familiar to applied mathematicians and mathematical physicists. I will explain this surprising development through introductory examples and explain the background to the discovery of continuous and discrete Painlevé equations.

Lecture 2: Wednesday, May 1, 2019, 3:00 – 3:50 p.m. MS 6627

Geometric dynamics - The solutions of the Painlevé equations share deep geometric properties with elliptic functions. I will describe how such properties arise from considering them as dynamical systems in the space of initial values, also known as Okamoto space for the continuous Painlevé equations. These spaces are foliated vector bundles, where each fibre is compactified and regularized by a minimum of 9 blow-ups in P^2 (or 8 on a Hirzebruch surface). I will explain how to construct such spaces and use them to deduce properties of solutions.

Lecture 3: Thursday, May 2, 2019, 3:00 – 3:50 p.m. MS 6627

Cremona isometries - The initial value space and the symmetry group of a discrete Painlevé equation are orthogonal subgroups of the Picard lattice associated with the equation. Starting with an initial value space of $A_5^{(1)}$ -type, we explain how to construct Cremona isometries that give rise to a discrete Painlevé equation. If time permits, we will also touch on examples in $E_s^{(1)}$.

UCLA College
Mathematics

The 2018-2019
Distinguished Lecture Series
is supported in part by the
Larry M. Weiner Mathematics Fund