Some applications of p-adic uniformization of orbits

Katia Amerik

A few years ago, Bell, Ghioca and Tucker proved that, under some conditions, the orbits of a p-adic analytic self-map of $(Z_p)^n$ can be *uniformized*, that is, for each point x there exists a p-adic analytic map from Z_p to $(Z_p)^n$ such that its value at a positive integer k is the kth iterate of x (a generalization of the classical *Skolem-Mahler-Lech method*). They used this to settle the so-called dynamical Mordell-Lang conjecture in the unramified case. Then I have used a version of their result to prove the existence of non-preperiodic algebraic points for any rational self-map of infinite order (on a variety defined over a number field). Recently, the same idea has also been applied in a joint work with P. Kurlberg, K. Nguyen, A. Towsley, B. Viray and F. Voloch to study the unramified case of the so-called dynamical Brauer-Manin problem. I shall try to explain all this. If time permits, I shall say something about p-adic linearization in a neighbourhood of a fixed point, which can also be helpful in algebraic dynamics.

Enriques surfaces (with emphasis on their automorphisms)

Shigeru Mukai

Enriques surfaces are similar to K3 surfaces. Both are of Kodaira dimension one and their automorphism can be studied lattice theoretically by virtue of Torelli type theorem. Enriques surfaces are similar to rational surfaces also. They change into rational elliptic surfaces by logarithmic transformation, and degenerate to rational surfaces with quotient singularities of type $(1, 1)/4$. This similarity is also useful in studying their automorphism groups.

In these talks I will discuss some basics on Enriques surfaces including twisted Picard lattice, period, genus-one fibrations and various projective models etc. with emphasis on their automorphism groups. The goal will be the classification of Enriques surfaces with only finite automorphisms by Nikulin and Kondo, and the following:

Theorem: The automorphism group of an Enriques surface is infinite and virtually abelian if and only if the twisted Picard lattice contains the (negative) root lattice of type $E8$.