The 44th KNU-PNU-PMI Combinatorics Seminar

Organized by M.Hirasaka, T.Jensen, J.Koolen and M.Siggers,

February 24, 2011

Place

Building 607-Room 208,
Department of Mathematics in Pusan National University

Program (February 24, 2011)

> 11:00–11:50, Jongyook Park (POSTECH)
> On electric resistances for distance-regular graphs
>
> 14:00–14:50, Jeong Rye Park (Pusan National University)
> Any 3-equivalenced association scheme is schurian
>
> 15:00–15:50, Kentaro Ihara (POSTECH)
> Algebra of periods for weight two cusp forms
>
> 16:10–17:00, Stefan Grünewald
> (CAS-MPG Partner Institute for Computational Biology (PICB), Shanghai)
> Quartet compatibility: An introduction and recent results
>
> 17:10–18:00, Tommy Jensen (Kyoungpook National University)
> Infinite Matroids
>
> 18:30–20:30, Banquet

Speaker: Jongyook Park (POSTECH)

Title: On electric resistances for distance-regular graphs

Abstract: We investigate the behavior of electric potentials on distance-regular graphs, and extend some results of a prior paper, which was written by Jack H. Koolen and Greg Markowsky. Our main result shows that if distance is measured by the electric resistance between points then all points are close to being equidistant on a distance-regular graph with large valency. A number of auxiliary results are also presented.

Speaker: Jeong Rye Park (Pusan National University)

Title: Any 3-equivalenced association scheme is schurian

Abstract: In this talk we consider a 3-equivalenced association scheme and briefly show that without any special conditions they are schurian. We will construct some automorphism and prove that the automorphism group of a 3-equivalenced scheme is transitive act on Ω. This is joint work with Mitsugu Hirasaka and Kyoung Tark Kim.

Speaker: Kentaro Ihara (POSTECH)

Title: Algebra of periods for weight two cusp forms

Abstract: In this talk, we introduce the 'multiple automorphic L-function' associated to cusp forms and explain the connection between the L-function and iterated integrals. From the expression one can obtain many relations among special values of multiple L-function (so called periods). Our question is what is the structure of the algebra generated by the special values of L-function. The structure looks very interesting and mysterious. Today we discuss the L-function for weight two cusp forms and give explicit upper-bounds of the number of algebra generators.

Speaker: Stefan Grünewald
(CAS-MPG Partner Institute for Computational Biology (PICB), Shanghai)

Title: Quartet compatibility: An introduction and recent results.

Abstract: The goal of of phylogenetics is to reconstruct the evolutionary history of a collection of taxonomic units, e.g. species. In most cases the object of desire is a tree where the leaves are the species living today and the interior vertices represent speciations. Many methods in phylogenetic tree reconstruction are not feasible for a large number of taxa. Hence, it is a natural approach to construct trees on small taxa sets first and then to look for a big tree (supertree) on the union of the taxa sets that contains all information of the small trees. However, even if all input trees are quartets, i.e. binary trees with four leaves, it is an NP-complete problem to decide whether such a tree exists. I will give an introduction to the underlying combinatorics and present some recent results.

Speaker: Tommy Jensen (Kyoungpook National University)

Title: Infinite Matroids

Abstract: Recently, Bruhn Diestel et.al have defined a set of axioms for infinite matroids which extend the axioms for finite matroids. Their definition overcomes many of the shortcomings of earlier attempts to extend the finite axioms to the infinite case. In particular, it retains duality in a natural way.

We introduce the new axioms for infinite matroids and discuss some of their consequences.