The 26th PNU-POSTECH Algebraic Combinatorics Workshop

Organized by M.Hirasaka and J.Koolen

June 7, 2008

Date

June 7, 2008

Place

C32-208, Department of Mathematics in Pusan National University

Program

11:00–11:50, Paul Terwilliger (University of Wisconsin)
The classification of tridiagonal pairs of q-Racah type

14:00–14:50, Hirotake Kurihara (Kyushu University)
On spherical designs obtained from standard realization of association schemes

15:00–15:50, Kentaro Ihara (POSTECH)
On the structure of the algebra generated by multiple zeta values

16:10–17:00, Jaeho Lee (POSTECH)
On the spectral radius of a graph

17:10–18:00, Young Soo Kwon (Yeungnam University)
About distinguishing number of merged Johnson graphs

19:00–21:00, Banquet (free of charge)

Available Devices for Presentation

We strongly encourage speakers to give a classical styled talk with chalk and blackboard. However, one beam projector is equipped at C32-208.

Important Notice In principle, each participant has to give comments or questions at least twice during the seminar.

Speaker: Paul Terwilliger (Wisconsin University)

Title: The classification of tridiagonal pairs of q-Racah type

Abstract: Our research concerns the tridiagonal pairs of linear transformations. These pairs come in a number of types depending on the form of the eigenvalues and dual eigenvalues. The most general type is called q-Racah. We classify up to isomorphism the tridiagonal pairs of q-Racah type. The main ingredients in our proof are the Drinfel'd polynomial and a related module for the quantum affine sl2 algebra. This is joint work with Tatsuro Ito.

Speaker: Hirotake Kurihara (Kyushu University)

Title: On spherical designs obtained from standard realization of association schemes

Abstract: We would like to introduce spherical designs obtained from standard realization. This method is new construction of spherical designs from finite graphs. A standard realization is a method of construction a crystal lattice from the given finite graph into the Euclidean space. Here, a crystal lattice is an infinite graph which decided fundamental pattern appears from the adjacent relation of a finite graph periodically.

The edges of the crystal lattice, whose set is called block set, are vectors in Euclidean space. Then, the properties which a block set holds imply physical stability. This fact indicates that a block set is a spherical design if all vectors in this set have the same norm.

It is very important problem when all vectors in a block set have the same norm. Then, we proved all vectors in a block set obtained from a symmetric association scheme have the same norm.

In this talk, we introduce some examples of spherical designs obtained from this standard realization, and we observe the properties of this design.

Speaker: Kentaro Ihara (POSTECH)

Title: On the structure of the algebra generated by multiple zeta values

Abstract: Recently there has been a cosiderable amount of interests in certain real numbers called multiple zeta values (MZVs). These numbers related to many mathematical fields: combinatorics, arithmetic geometry, knot theory and so on. One of the most interesting properties about multiple zeta values is the product of MZVs can be expressed as a linear combination of the MZVs with rational coefficients. Hence the vector space generated by all MZVs makes an algebra. In this seminer, I will talk on the structure of the algebra, (on the product structure and the number of generators,) and discuss the related topics.

Speaker: Jaeho Lee (POSTECH)

Title: On the spectral radius of a graph

Abstract: R. Woo and A. Neumaier showed that a graph G whose spectral radius $\rho(G)$ satisfies $2 < \rho(G) < \frac{3}{2}\sqrt{2}$ is either an open quipu, a closed quipu, or a dagger, [On graphs whose spectral radius is bounded by $\frac{3}{2}\sqrt{2}$, Graphs Combinatorics 23(2007), 713-726]. In this talk, we refine the result of R. Woo and A. Neumaier as defining new terminologies: the m-Laundry graph and the m-Urchin graph. Applying these results, we determine the minimal spectral radius of a graph with n vertices and diameter D near to $n/2$(resp. n).

Speaker: Young Soo Kwon (Yeungnam University)

Title: About distinguishing number of merged Johnson graphs

Abstract: The distinguishing number of a graph G is the minimum number of colors for which there exists an assignment of colors to the vertices of G such that the set of color-preserving automorphims of G only consists of the identity. In this talk, we will consider the distinguishing number of the merged Johnson graph which is a generalization of both the Kneser graph and the Johnson graph.