ABSTRACTS OF TALKS
IN KIAS–DUKSUNG COMBINATORICS WORKSHOP

1. Norihide Tokushige

Stability results in intersecting families

The Erdős–Ko–Rado Theorem determines the maximum size of intersecting families and the corresponding unique extremal family. Its stability version roughly claims that if an intersecting family has size close to the maximum size then it is close to the extremal family in structure. I will present various stability results obtained by Dinur–Friedgut, Ellis, Keller–Lifshitz, Lee–Siggers–Tokushige, etc.

2. Byung Chan Kim

Operations on integer partitions and false theta functions

We introduce operations on integer partitions and consider the number of orbits under these operations. We discuss some arithmetic properties of these numbers and how they are related with false theta series.

Date: Tue 15$^{\text{th}}$ May, 2018, 1:43am.

3. Jang Soo Kim
Lecture Hall Tableaux

We introduce lecture hall tableaux, which are fillings of a skew Young diagram satisfying certain conditions. Lecture hall tableaux generalize both lecture hall partitions and anti-lecture hall compositions, and also contain reverse semistandard Young tableaux as a limit case. We show that the coefficients in the Schur expansion of multivariate little q-Jacobi polynomials are generating functions for lecture hall tableaux. Using a Selberg-type integral we show that the moment of multivariate little q-Jacobi polynomials, which is equal to a generating function for lecture hall tableaux of a Young diagram, has a product formula. We also explore various combinatorial properties of lecture hall tableaux. This is joint work with Sylvie Corteel.

4. Mark Siggers
Recolouring and other problems of connectivity in the Hom-graph

For problems with a discrete set of solutions, a reconfiguration problem defines solutions to be adjacent if they meet some condition of closeness, and then asks for two given solutions it there is a path between them in the set of all solutions.The reconfiguration problem for graph homomorphisms has seen fair activity in recent years. Fixing a target graph H, the H-recolouring problem Recol(H) asks if one can get from one H-colouring of a graph G to another by changing one vertex at a time, always remaining an H-colouring. This is equivalent to deciding if there is a path between the two H-colourings in the Hom graph Hom(G,H). Depending on H, the problem seems to be either polynomial time solvable or PSPACE-complete. We discuss many recent results about graph recolouring, and the related problems of deciding if Hom(G,H) is connected, or has singleton components for a given graph G.

This is joint work with Rick Brewster, Jae-baek Lee, Ben Moore and Jon Noel.

5. Shinya Fujita

Recent progress on safe sets in graphs

A non-empty subset S of the vertices of a connected graph $G = (V(G), E(G))$ is a safe set if, for every component C of $G[S]$ and every component D of $G - S$, we have $|C| \geq |D|$ whenever there exists an edge of G between C and D. If $G[S]$ is connected, then S is called a connected safe set. The safe number of G is defined as the minimum size of safe sets in G. Similarly, the connected safe number of G is defined as the minimum size of connected safe sets in G. These new graph parameters attract much attention recently and thus, a lot of work has been done extensively. In this talk, some recent results on this topic will be reviewed.

6. Suyung Choi

Weyl group action on real toric manifolds and its geometric representations

We study geometric representations of finite groups G on the real toric spaces X^R, and we give a combinatorial description of the G-module structure of the homology of X^R. Especially, we make explicit computations of the Weyl group representations on the homology of real toric varieties associated to the Weyl chambers of type A and B, which show an interesting connection to the topology of posets. We also realize a certain kind of Foulkes representation geometrically as the homology of real toric varieties.