The 35th PNU-PMI Algebraic Combinatorics Seminar and the third CCAGG joint seminar

Organized by H. Ahn, M. Hirasaka and J. Koolen

November 28, 2009

Date

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Place

Mathematics Science Building Room 404, POSTECH

Program

11:00–11:50, Bart De Bruyn (Ghent University)
The valuations of the near polygon $\mathbb{G}_n$

13:50–14:40, Boram Park (Seoul National University)
Variants of Competition Graphs of doubly partial orders

14:50–15:40,Chika Yamazaki(Kinki University)
Duality for multiple zeta-star values and the generating function

16:00–16:50, Hee-Kap Ahn (POSTECH)
On Empty Pseudo-triangles in a Point Set

17:00–17:50,Jung Yeun Lee (Seoul National University)
TBA

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 the room.

Speaker: Bart De Bruyn (Ghent University, Belgium)
Title: The valuations of the near polygon $\mathbb{G}_n$
Abstract: After giving an introduction to general (dense) near polygons and their valuations, we take a look to the dense near $2n$-gon $\mathbb{G}_n$. Explicit descriptions of the valuations of the near polygons $\mathbb{G}_3$ and $\mathbb{G}_4$ were given in respectively [1] and [2]. An explicit description of all the valuations of $\mathbb{G}_n$ seems not feasible for general n, but still it is possible to obtain a complete classification of these objects in the following sense: each valuation of $\mathbb{G}_n$, $n \geq 2$, is induced by a unique classical valuation of the Hermitian dual polar space $DH(2n-1,4)$ into which $\mathbb{G}_n$ is isometrically embeddable ([3]).
[1] B. De Bruyn and P. Vandecasteele. The distance-2-sets of the slim dense near hexagons. *Ann. Comb.* 10 (2006), 193–210.
[2] B. De Bruyn and P. Vandecasteele. The valuations of the near octagon $\mathbb{G}_4$. *Discrete Math.*, to appear.
[3] B. De Bruyn. The valuations of the near polygon $\mathbb{G}_n$. *Electron. J. Combin.* 16 (2009), Research Paper 137, 29 pp.

Speaker: Boram Park (Seoul National University)
Title: Variants of Competition Graphs of doubly partial orders
Abstract: The competition graph of a digraph D is the graph which has the same vertex set as D and has an edge between u and v if and only if there exists a vertex x in D such that (u,x) and (v,x) are arcs of D. There have also been introduced a variety of generalizations of the notion of competition graph. The competition-common enemy graph of a digraph D has the same set of vertices as D and an edge between vertices u and v if and only if there are vertices w and x in D such that (w,u), (w,v), (u,x), and (v,x) are edges of D. The niche graph of $D=(V,A)$ has the same set of vertices as D and an edge between vertices u and v if and only if there is a vertex w such that $(w,u) \in A$ and $(w,v) \in A$, or $(u,w) \in A$ and $(v,w) \in A$. The p-competition graph of D has the same vertex set as D and an edge between vertices x and y if and only if there exist p distinct vertices $w_1, w_2, \ldots, w_p$ such that (x,w_i) and (y,w_i) are arcs of D for each $1 \leq i \leq p$. The m-step competition graph of D has the same vertex set as D and an edge between vertices x and y if and only if there exists a vertex w such that there are directed walks of length m from x to z and and from y to z in D. It has been shown that the competition graph of a doubly partial order is an interval graph and the competition-common enemy graph of a doubly partial order is an interval graph unless it contains a cycle of length 4 as an induced subgraph.
In this talk, we present results on p-competition graphs, m-step competition

graphs and niche graphs of doubly partial orders. We first show that the p-competition graph and m-step competition graph of a doubly partial order are interval graphs. We show that interval graph with sufficiently many isolated vertices is the m-step competition graph of a doubly partial order. Then we show that the niche graph of a doubly partial order is not necessarily an interval graph. In fact, we prove that, for each $n \geq 4$, there exists a doubly partial order whose niche graph contains an induced subgraph isomorphic to a cycle of length n. We also prove that if the niche graph of a doubly partial order is triangle-free, then it is an interval graph.

Speaker : Chika Yamazaki(Kinki University, Osaka, Japan)
Title : Duality for multiple zeta-star values and the generating function
Abstract: Multiple zeta-star values were introduced by Euler. Many relations among them has been found. One of the recent results is a kind of duality for multiple zeta-star values of height 1 given by Kaneko-Ohno. I am planning to talk about another proof of duality property of multiple zeta-star values of height 1. And we also give the relation between the special values of ${}_3F_2$ and the gamma function.

Speaker: Hee-Kap Ahn (POSTECH)
Title: On Empty Pseudo-triangles in a Point Set
Abstract: A pseudo-triangle is a simply connected region of the plane with exactly three convex vertices such that the boundary curves connecting pairs of these convex vertices are concave. When all three boundary curves are polygonal, a pseudo- triangle is a simple polygon with exactly three convex vertices, which are con- nected by concave chains, that is, all the other vertices are concave (we consider a vertex with internal angle π to be concave). By definition, any triangle is a pseudo-triangle, and the convex hull of any pseudo-triangle is a triangle.
In this talk, we first show how many empty pseudo-triangles we can have among n points in the plane. We then study three optimization problems of computing an empty pseudo-triangle: minimizing the perimeter, maximizing the area, and minimizing the length of the longest concave chain.

Speaker: Jung Yeun Lee (Seoul National University)
Title: TBA
Abstract: TBA