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KAIST Graph Theory Day

2011/5/10 TUESDAY

KAIST 자연과학동 (E6-1) #1409

CONTACT

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11AM-12PM

Maria Chudnovsky

Columbia University, New York

Coloring some perfect graphs

A graph G is called perfect if for every induced subgraph H of G, the chromatic number and the clique number of H are equal. After the recent proof of the Strong Perfect Graph Theorem, and the discovery of a polynomial-time recognition algorithm, the central remaining open question about perfect graphs is finding a combinatorial polynomial-time coloring algorithm. (There is a polynomial-time algorithm known, using the ellipsoid method). Recently, we were able to find such an algorithm for a certain class of perfect graphs, that includes all perfect graphs admitting no balanced skew-partition. The algorithm is based on finding special "extremal" decompositions in such graphs; we also use the idea of "trigraphs".

This is joint work with Nicolas Trotignon, Theophile Trunck and Kristina Vuskovic.

2PM-3PM

Ken-ichi Kawarabayashi

National Institute of Informatics, Tokyo

A separator theorem in minor-closed class of graphs

It is shown that for each t, there is a separator of size $O(t\sqrt{n})$ in any n-vertex graph G with no K_t-minor.

This settles a conjecture of Alon, Seymour and Thomas (J. Amer. Math. Soc., 1990 and STOC'90), and generalizes a result of Djidjev (1981), and Gilbert, Hutchinson and Tarjan (J. Algorithm, 1984), independently, who proved that every graph with n vertices and genus g has a separator of order $O(\sqrt{(gn)})$, because K_t has genus $\Omega(t^2)$.

Joint work with Bruce Reed.

4PM-5PM

Bojan Mohar

Simon Fraser University, Vancouver

On the chromatic number of digraphs

Several reasons will be presented why the natural extension of the notion of undirected graph colorings is to partition the vertex set of a digraph into acyclic sets. Additionally, some recent results in this area, the proofs of which use probabilistic techniques, will be outlined.

5PM-6PM

Paul Seymour

Princeton University, Princeton

Colouring tournaments

A tournament is a digraph obtained from a complete graph by directing its edges, and colouring a tournament means partitioning its vertex set into acyclic subsets (acyclic means the subgraph induced on the subset has no directed cycles). This concept is quite like that for graph-colouring, but different. For instance, there are some tournaments H such that every tournament not containing H as a subgraph has bounded chromatic number. We call them heroes; for example, all tournaments with at most four vertices are heroes.

It turns out to be a fun problem to figure out exactly which tournaments are heroes. We have recently managed to do this, in joint work with Berger, Choromanski, Chudnovsky, Fox, Loebl, Scott and Thomassé, and this talk is about the solution.