

DK: Doctoral Program in Discrete Mathematics

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DISCRETE MATHEMATICS DAY 2013

Friday, June 7, 2013, 09:15-16:30
Lecture hall **HS P2**, Petersgasse 16, EG, TU Graz

Graz, Mai 2013

Program

- 09¹⁵ – 09³⁰ Opening
- 09³⁰ – 10³⁰ Endre Szemerédi
(Alfréd Rényi Mathematical Institute & Rutgers University)
Tight bound for embedding large maximum degree tree
- 10³⁰ – 11⁰⁰ **Coffee break**
- 11⁰⁰ – 11²⁰ DK Talk: Mario Weitzer (Uni Leoben)
Shift Radix Systems - some new characterization results and topological properties
- 11²⁰ – 11⁴⁰ DK Talk: Maria Rita Iacò (TU Graz & University of Calabria)
A dynamical system approach to the Kakutani-Fibonacci sequence of points
- 11⁴⁰ – 14⁰⁰ **Lunch break**
- 14⁰⁰ – 15⁰⁰ Imre Bárány
(Alfréd Rényi Mathematical Institute & University College London)
Extremal problems for convex lattice polytopes
- 15⁰⁰ – 15²⁰ DK Talk: Alina Bazarova (TU Graz)
Extremal theory of dependent processes
- 15²⁰ – 15⁵⁰ **Coffee break**
- 15⁵⁰ – 16³⁰ Ursula Neugebauer (Berlin University of the Arts)
The Greatest Happiness Imaginable
movie presentation & discussion

For lunch buffet and coffee breaks, it is **required** to register by sending an email to discrete@tugraz.at.

Abstracts

- 9:30 - 10:30 **Endre Szemerédi**

(Alfréd Rényi Mathematical Institute, Budapest and Rutgers University, New Jersey)

Title: *Tight bound for embedding large maximum degree tree*

Abstract:

Let $\delta(G)$ denote the minimal degree of G and $\Delta(T)$ denote the maximum degree of a tree T on n vertices. Bollobás conjectured that if $\delta(G) \geq (\frac{1}{2} + \epsilon)n$ and $\delta(t) \leq C$, then for n large enough, G contains T . We prove a much stronger result. We prove that if

$$\Delta(T) \leq \frac{1}{2} \frac{n}{\log n} \quad \text{and} \quad \delta(G) > \frac{n}{2} + 2\Delta(T) \log n,$$

then

$$T \subset G, \quad |V(G)| = |V(T)| = n.$$

- 14:00 - 15:00 **Imre Bárány**

(Alfréd Rényi Mathematical Institute, Budapest and University College London)

Title: *Extremal problems for convex lattice polytopes*

Abstract:

In this survey I will present several extremal problems, and some solutions, concerning convex lattice polytopes. A typical example is to determine the minimal volume that a convex lattice polytope can have if it has exactly n vertices. Other examples are the minimal surface area, or the minimal lattice width in the same class of polytopes. These problems are related to a question of V. I. Arnold from 1980 asking for the number of (equivalence classes of) lattice polytopes of volume V in d -dimensional space, where two convex lattice polytopes are equivalent if one can be carried to the other by a lattice preserving affine transformation.

- 15:00 - 15:20 **Alina Bazarova**

(TU Graz)

Title: *Extremal theory of dependent processes*

Abstract:

Trimming is a standard method of statistics to decrease the effect of large sample elements in various procedures of statistical inference. However, removing extreme elements from function series is also a powerful tool in analysis and probability theory. In this talk, we use this method to prove new results in the metric theory of continued fractions, the theory of games and the theory of stochastic processes.

- 15:50 - 16:30 **Ursula Neugebauer**

(Berlin University of Arts)

Title: *The Greatest Happiness Imaginable*

Abstract:

I dedicated the video "The Greatest Happiness Imaginable" to the mathematician Grigori Perelman, who succeeded in proving the century-old Poincaré conjecture, simply publishing his solution on the Internet for everyone to see. Perelman declined all prizes subsequently awarded to him, for example the Fields Medal and the prize money associated with the Clay Mathematics Institute. Perelman leads a withdrawn life with his mother in a tower block in St. Petersburg and refuses to give interviews.

Impressed by his lack of interest in power and money, I wrote Grigori Perelman a letter that has so far gone unanswered. The video consists of two letters. One which I wrote and sent to Perelman and one in which I reply in his stead. A dialogue which I think might have taken place. The text accompanies the scant paparazzi film footage that exists of Perelman. I see the scientist – interested only in the matter at hand, but not in worldly fame – as an artist and kindred spirit sharing in a space as a place of beauty.