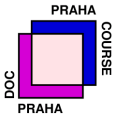


Harmonic Analysis
in Computer Science and Combinatorics

February 2 – March 3, 2006

Program for February 20 – February 24

All lectures are held in S8.

`Mon, Feb 20`

9 – 12	*G. Kalai*	Harmonic Analysis in Computer Science and Combinatorics
14 – 17		Excercises

`Tue, Feb 21`

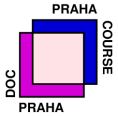
9 – 12	*G. Kalai*	Harmonic Analysis in Computer Science and Combinatorics
14 – 17		Excercises

`Wed, Feb 22`

10:40	*G. Kalai*	**58th Mathematical Colloquium:** Convexity, Convex Polytopes and Combinatorics

`Thu, Feb 23`

10:40	*A. Naor*	An Introduction to the Theory of Bi-Lipschitz Embeddings
14:00	*A. Naor*	Embedding Lower Bounds via Fourier Analysis



DocCourse Prague 2006
Harmonic Analysis in Computer Science and Combinatorics
Programme coordinators: Jiří Matoušek and Jaroslav Nešetřil
http://kam.mff.cuni.cz/∼matousek/doccourse06.html

Abstracts of lectures

Assaf Naor: An Introduction to the Theory of Bi-Lipschitz Embeddings

This will be an expository talk, aimed at presenting the basic definitions, theorems and problems of metric embedding theory.

Assaf Naor: Embedding Lower Bounds via Fourier Analysis

We will show how harmonic analysis can be used to prove embedding lower bounds for several natural metrics, such as the edit distance, the Earthmover distance on the hypercube, and flat tori. Time permitting, I will also discuss the case of the Earthmover distance on the planar grid, where continuous Fourier analysis (namely the theory of singular integrals) can be used in designing new embeddings into L_1.

Abstracts of lectures

Gil Kalai: Convexity, Convex Polytopes and Combinatorics

In the lecture I will describe some combinatorial problems concerning convex sets and convex polytopes. Some such connections are quite old. Examples are: The classification of Platonic solids; Euler's famous formula $V - E + F = 2$; Helly's theorem that asserts that given n convex sets in d-space, if every $d + 1$ of those convex sets share a point then all of them do. And there are splendid new examples and related problems that we will discuss in the lecture. The lecture will be quite elementary and students are welcome.