Minioficina de Combinatória

NUMEC/MaCLinC, Núcleo de Modelagem Estocástica e Complexidade
Instituto de Matemática e Estatística, USP

Sexta-feira, 10 de maio de 2013

2:00–3:00
On Erdős–Ko–Rado type theorems
PETER FRANKL
Hungarian Academy of Sciences

The lecture will focus on extremal set theory. The general problem concerns the maximum possible size of a subset of the power set of a finite set X of n elements subject to some conditions. The simplest result is probably the following.

Proposition 0. If F is a subset of 2^X such that any two sets in F have non-empty intersection, then $|F| \leq 2^{n-1}$.

One way to achieve equality is by taking all subsets containing a fixed element.

Erdős–Ko-Rado Theorem. If F is a collection of k-element subsets of X such that any two sets in F have non-empty intersection and, moreover, $2k < n$, then $|F| \leq \binom{n-1}{k-1}$, with equality holding if and only if all subsets in F contain a fixed element.

We shall discuss various generalisations and extensions of this result, some of which are still unsolved.

3:20–4:20
On two Ramsey type problems for K_{t+1}-free graphs
VOJTĚCH RÖDL
Emory University

In 1970, Erdős and Hajnal asked if for any r and t there is a K_{t+1}-free graph H with the property that any r-coloring of the edges of H yields a monochromatic K_t. This conjecture was resolved positively by Folkman for $r = 2$ and by Nešetřil and the speaker for r arbitrary. In this talk we will discuss some old and new results related to this conjecture.

A related question was raised by A. Hajnal. The *t-independence number* $\alpha_t(H)$ of a graph H is the largest size of a subset of vertices of H containing no K_t. Let $h_t(n)$ be the minimum value of $\alpha_t(H)$ with the minimum taken over all graphs on n vertices containing no K_{t+1}. Hajnal proposed the problem of investigating $h_t(n)$. This question was addressed first by Erdős and Rogers, who proved that $h_t(n)$ is at most $n^{1-\epsilon}$, where $\epsilon = \Theta(1/t^{4\log t})$. Recently, jointly with Dudek and Retter, we proved that $h_t(n) = n^{1/2+o(1)}$ for any given t.