

## Combinatorics Seminar

### *Uniform Hypergraphs Containing no Grids*

Miklos Ruszinko (Renyi Institute and Memphis)

**Abstract:** A hypergraph is called an  $r \times r$  grid if it is isomorphic to a pattern of  $r$  horizontal and  $r$  vertical lines, i.e., a family of sets  $\{A_1, \dots, A_r, B_1, \dots, B_r\}$  such that  $A_i \cap A_j = B_i \cap B_j = \emptyset$  for  $1 \leq i < j \leq r$  and  $|A_i \cap B_j| = 1$  for  $1 \leq i, j \leq r$ . Three sets  $C_1, C_2, C_3$  form a triangle if they pairwise intersect in three distinct singletons,  $|C_1 \cap C_2| = |C_2 \cap C_3| = |C_3 \cap C_1| = 1$ ,  $C_1 \cap C_2 \neq C_1 \cap C_3$ . A hypergraph is linear, if  $|E \cap F| \leq 1$  holds for every pair of edges. We construct large linear  $r$ -hypergraphs which contain no grids. Moreover, a similar construction gives large linear  $r$ -hypergraphs which contain neither grids nor triangles. For  $r \geq 4$  our constructions are almost optimal. These investigations are related to Erdős-Brown-Sós conjecture. This is a joined work with Zoltán Füredi.

Monday, October 19 at 3:00 PM in SEO 427