Meeting: 1001, Evanston, Illinois, SS 2A, Special Session on Extremal Combinatorics

1001-05-192 **Dhruv Mubayi** and **Yi Zhao*** (zhao@math.uic.edu), Dept of Math, Stat and Comp Sci, Univ of Illinois at Chicago, 851 S Morgan St (m/c 249), Chicago, IL 60607. *Co-degree Density of hypergraphs.*

Given a family F of r-uniform hypergraphs, the classical Turán theory studies the maximum proportion of r-sets an n element set can have without containing any member of F. This limit, as n becomes large, is sometimes called the Turán density of F. We consider the related problem of determining the (normalized) maximum possible minimum co-degree that the family of r-sets in an n element set can have without containing any member of F. As n goes to infinity, this approaches a limit which we call the co-degree density of F, and write $\gamma(F)$.

For each $r > 1$, let $G_r = \{\gamma(F) : F \text{ is a family of } r\text{-graphs}\}$. Our main result is that for each $r > 2$, G_r is dense in $[0, 1)$. This is in stark contrast to the fact that $G_2 = \{0, \frac{1}{2}, \frac{2}{3}, \frac{3}{4} \ldots\}$, a fact that follows from the Erdős-Simonovits-Stone theorem. This phenomenon is similar to the existence of real numbers that are not jumps in hypergraphs, proved by Frankl and Rödl. Several other results about co-degree densities are provided parallel to those of the classical Turán theory.

This is a joint work with Dhruv Mubayi. (Received August 25, 2004)