

abstract

Computer Science/Discrete Mathematics Seminar II
Topic:

Speaker:

Affiliation:

Date:

Time/Room:

A twenty-year old conjecture by Manickam, Mikl'os, and Singhi asked whether for any integers n, k satisfying $n \geq 4k$, every set of n real numbers with nonnegative sum always has at least $\binom{n-1}{k-1}$ k -element subsets whose sum is also nonnegative. In this talk we discuss the connection of this problem with an old question by Erdős, who asks to determine the maximum possible number of edges in a k -uniform hypergraph on n vertices with no matching of size t , and with the question of estimating the probability that the sum of nonnegative independent random variables exceeds its expectation by a given amount. Using these connections and probabilistic techniques, we verify the Manickam-Mikl'os-Singhi conjecture for $n \geq 33k^2$.

In the remaining time of the talk, we will give an overview of the progress on Erdős' conjecture, and discuss its application to a problem of existence of perfect matchings in uniform hypergraphs, and to a question about finding an optimal data allocation in a distributed storage system.

This talk is based on joint works with Alon, Frankl, Loh, Rödl, Ruciński and Sudakov.