A Proof of the Manickam-Miklós-Singhi Conjecture for Vector Spaces

Date October 29

Time 3 pm

Location 303 Mudd

Abstract: Let V be an n-dimensional vector space over a finite field. Assign a real-valued weight to each 1-dimensional subspace in V so that the sum of all weights is zero. Define the weight of a subspace $S \subset V$ to be the sum of the weights of all the 1-dimensional subspaces it contains. We prove that if $n \geq 3k$, then the number of k-dimensional subspaces in V with nonnegative weight is at least the number of k-dimensional subspaces in V that contain a fixed 1-dimensional subspace. This result verifies a conjecture of Manickam and Singhi from 1988.

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