

Randomly Supported Independence

Date Tuesday, April 6

Time 3 pm

Location 303 Mudd

Abstract: We study questions of the following flavor: given a random subset X of $[q]^n$, what is the probability that there exists a k -wise independent distribution supported on X ?

We show that there are constants $c_{q,k}$ such that, with high probability, a uniformly random set of $c_{q,k} \cdot n^k \log(n^k)$ points from $[q]^n$ can support a k -wise independent distribution, and that this is sharp up to the logarithmic factor and the exact value of $c_{q,k}$. For the case $k = 2$, we are able to remove the logarithmic factor and show that, with high probability, a uniformly random set of $c_{q,2} \cdot n^k$ points from $[q]^n$ can support a pairwise independent distribution. Finally, we show that there are other constants $c'_{q,k} > 0$ such that every subset of $[q]^n$ with size at least $q^n(1 - c'_{q,k})$ can support a k -wise independent distribution.

(Joint work with Johan Håstad)