

1116-05-2060

Thomas Grubb* (grubbtho@msu.edu), **Paul Han** and **Bill Kay**. *Probabilistic Thresholds for Combinatorial Structures*.

The process of optimizing the size of a set with a specified property has a long history within combinatorics. In this talk we use standard probabilistic tools to explore a related operation; namely, for positive integers n , we take a ground set G of size $f(n)$, and create a subset A of G by selecting each element in G independently with probability p . Then, with a specific property in mind, we determine an asymptotic threshold function $t(n)$ such that

$$\begin{aligned} p \ll t(n) &\implies P(A \text{ has the desired property}) \rightarrow 1 \text{ as } n \rightarrow \infty \\ p \gg t(n) &\implies P(A \text{ has the desired property}) \rightarrow 0 \text{ as } n \rightarrow \infty. \end{aligned}$$

Alternatively, if the chance that A has the desired property increases with the size of A , then the role of 0 and 1 will be interchanged above. Topics studied include set packings, permutation packings, and generalized Sidon properties. (Received September 21, 2015)