Seminar on Combinatorial Computing
November 10, Wednesday, 6:30 p.m.
Room 6421, Graduate Center
365 Fifth Avenue, New York

Linear hash functions

Gábor Tardos
DIMACS, New Brunswick and Hungarian Academy

Abstract

Consider the set of all linear (or affine) transformations between two vector spaces over a finite field F. We study how good this set is as a class of hash functions, namely we consider hashing a set S of size n into a range having the same cardinality n by a randomly chosen linear function and look at the expected size of the largest hash bucket. Linear functions form a universal class of hash functions for any finite field, but with respect to our measure different fields behave differently. Surprisingly, for the two element field F the linear transformations behave close to optimal, the expected largest bucket size is $O(\log n \log\log n)$, while for large fields $|F| = n$ we have that the expected largest bucket size can be as large as $\sqrt{n}$, worst possible for a universal family. (This is joint work with N. Alon, M. Dietzfelbinger, P. Bro Miltersen and E. Petrank.)

For further information contact Janos Pach at pach@cims.nyu.edu,
or visit our website: http://math.gc.cuny.edu/Seminars/Combinatorics.html