Combinatorics and Probability (Math 285)

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Zoom Lecture 1 (March 30, 2020)

What this class is about?

Assorted recent and classical results in Combinatorial Probability.

Special emphasis on S_n and uniform random sampling of combinatorial objects.

Examples of subjects:

- Probability of generation, *Dixon's theorem*: $P(\langle \sigma, \omega \rangle = S_n) \to 3/4$ as $n \to \infty$,
- Random walks on $\mathbb{Z}^d$, special walks on the grid such as Gessel walk, Kreweras walk, etc.
- Random walks on groups such as S_n, $GL(n, q)$, $U(n, q)$, coupling and stopping time arguments
- Testing group properties (abelian, nilpotent, solvable) via Erdős–Renyi subproducts
- Testing finiteness of linear groups via random walks
- Random walk on linear extensions, approximation in polynomial time
- 1/3–2/3 conjecture for Young tableaux via random walks
- Random walk on contingency table, Burnside walks
- Wilson's LERW, uniform random trees, Aldous–Broder algorithm