

Probability Seminar

Organizer: Jomy Alappattu & Elchanan Mossel & Sebastien Roch

Wednesday, 3:10–4:00pm, 332 Evans

Nov. 29 **Ben Morris**, UC Davis

A theorem about card shuffling

Durrett introduced the following “ L -reversal model” for the evolution of a genome: there are n cards arrayed in a circle. At each step, an interval of cards of length at most L is chosen uniformly at random and its order is reversed.

E. Thorp introduced the following model of a card shuffle in 1973. Cut the deck into two equal piles. Drop the first card from the left pile or the right pile according to the outcome of a fair coin flip; then drop from the other pile. Continue this way until both piles are empty.

We prove a theorem about card shuffling that yields mixing time bounds for both the L -reversal model and Thorp shuffle that are within a few logarithmic factors of optimal. Previously, the best bounds had been n times optimal for the L -reversal model and more than $(\log n)^{25}$ times optimal for the Thorp shuffle. Also, previous proofs for the Thorp shuffle had been valid only when n was a power of two.