Algebra and Number Theory Seminar

Title: Finite Fields Meet Markov Chains

Speaker: Persi Diaconis (Stanford)

Date: Thu 1st October 2020 at 2:00PM

Location: Online

Abstract: Let p be a prime. Consider a random walk on $F(p)$ that moves from j to j^2+1 or j^2-1 with probability 1/2 (the square and add Markov chain). It is an open problem to analyze this simple-sounding scheme. We don't even know the support of the stationary distribution. When $p \equiv 3 \pmod 4$ Jimmy He has determined the stationary distribution but this is open for $p \equiv 1 \pmod 4$. Squaring is an automorphism for a field of characteristic 2 and, with He and Marty Isaacs we study the 'square and add' chain over $F(2^d)$. For some choice of generators, we can show that $(1/2)d \log d$ steps are necessary and sufficient for mixing BUT the generating set seems to matter and many mysteries remain. This mix of algebra and probability poses simple to state open problems.

https://ucd-ie.zoom.us/j/95697362979?pwd=U2k2L2VuZ1RVd2NmWldQTEt5VFFLZz09