



THE UNIVERSITY OF CHICAGO

COMPUTATIONAL AND APPLIED MATHEMATICS
STUDENT SEMINAR

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Area of Focus: Algorithms and complexity, Machine learning and optimization
Toyota Technological Institute at Chicago

Upper and Lower Bounds on the Speed of a One Dimensional Excited Random Walk

THURSDAY, November 16, 2017, at 1:00 PM
Jones 226, 5747 South Ellis Avenue

ABSTRACT

Excited random walks (ERWs) are a self-interacting non-Markovian random walk in which the future behavior of the walk is influenced by the number of times the walk has previously visited its current site. We study the speed of the walk, defined as $V = \lim_{n \rightarrow \infty} X_n/n$ where X_n is the state of the walk at time n . While results exist that indicate when the speed is non-zero, there exists no explicit formula for the speed. It is difficult to solve for the speed directly due to complex dependencies in the walk since the next step of the walker depends on how many times the walker has reached the current site. We derive the first non-trivial upper and lower bounds for the speed of the walk that agree very closely with numerical simulation for some model parameters.

Joint work with Erin Bossen, Brian Kidd, Owen Levin, Jacob Smith, Jonathon Peterson