Contribution ID: **7** Type: **not specified**

Random matchings in linear hypergraphs

Wednesday, 28 August 2024 16:30 (30 minutes)

For a given hypergraph H and a vertex $v \in V(H)$, consider a random matching M chosen uniformly from the set of all matchings in H. In 1995, Kahn conjectured that if H is a d-regular linear k-uniform hypergraph, the probability that M does not cover v is $(1 + o_d(1))d^{-1/k}$ for all vertices $v \in V(H)$. This conjecture was proved for $k = 2$ by Kahn and Kim in 1998.
We disprove this conjecture for all $k \geq 3$. For infinitely many values of d, we construct d-regular linear k-uniform hypergraph H containing two vertices v_1 and v_2 such that $\mathcal{P}(v_1 \notin M) = 1 - \frac{(1+o_d(1))}{d^{k-2}}$ and $\mathcal{P}(v_2 \notin M) = \frac{(1+o_d(1))}{d+1}$. The gap between $\mathcal{P}(v_1 \notin M)$ and $\mathcal{P}(v_2 \notin M)$ in this H is best possible. In the course of proving this, we also prove a hypergraph analog of Godsil's result on matching polynomials and paths in graphs, which is of independent interest.

Primary author: LEE, Hyunwoo (KAIST & IBS ECOPRO)

Presenter: LEE, Hyunwoo (KAIST & IBS ECOPRO)

Session Classification: Contributed Talk