

Department of Mathematics, BGU

BGU Probability and Ergodic Theory (PET) seminar

On Thursday, February 15, 2024

At 11:10 – 12:00

In 101-

Shlomo Hoory

will talk about

On the Girth of Graph Lifts

Abstract: The size of the smallest k -regular graph of girth g is denoted by the well studied function $n(k, g)$. We suggest generalizing this function to $n(H, g)$, defined as the smallest size girth g graph covering the, possibly non-regular, graph H . We prove that the two main combinatorial bounds on $n(k, g)$, the Moore lower bound and the Erdos-Sachs upper bound, carry over to the new setting of lifts, even in their non-asymptotic form.

We also consider two other generalizations of $n(k, g)$: i) The smallest size girth g graph sharing a universal cover with H . We prove that it is the same as $n(H, g)$ up to a multiplicative constant. ii) The smallest size girth g graph with a prescribed degree distribution. We discuss this known generalization and argue that the new suggested definitions are superior.

We conclude with experimental results for a specific base graph and with some conjectures and open problems.

<https://arxiv.org/abs/2401.01238>¹

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