Emergent Research:
The PIMS Postdoctoral Fellow Seminar

May 10, 2023 | 9:30am Pacific

Pacific Institute for the Mathematical Sciences

On illumination number of bodies of constant width

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ABSTRACT:
Borsuk's number b(n) is the smallest integer such that any set of diameter 1 in the n-dimensional space can be covered by b(n) sets of a smaller diameter. Exponential upper bounds on b(n) were first obtained by Shramm (1988) and later by Bourgain and Lindenstrauss (1989).

To obtain an upper bound on b(n), Bourgain and Lindenstrauss provided exponential bounds (both upper and lower) in Grünbaum's problem – the problem of determining the minimal number of open balls of diameter 1 needed to cover a set of diameter 1. On the other hand, Schramm provided an exponential upper bound on the illumination number of n-dimensional bodies of constant width. In 2015 Kalai asked if there exist n-dimensional convex bodies of constant width with illumination number exponentially large in n.

In this talk I will answer Kalai's question in the affirmative and provide a new lower bound in the Grünbaum's problem. This talk is based on a joint work with Andriy Bondarenko and Andriy Prymak.

For more information and registration:
https://www.pims.math.ca/seminars/PIMSPDF

SPEAKER BIO:
Andrii Arman obtained his Ph.D. from the University of Manitoba under the supervision of David Gunderson, where he worked on the problem of determining the maximal number of cycles in graphs with certain restrictions. He obtained his Bachelor's degree from Kyiv National University (Ukraine) and Master's degree from the University of Manitoba.
After obtaining his Ph.D., he was a research fellow at Monash University (Australia) working with Jane Gao and Nick Wormald on uniform generation of contingency tables with given marginals. Following that, he was a Visiting Assistant Professor at Emory University (USA). Currently, he is a PIMS postdoctoral fellow at the University of Manitoba working with Andriy Prymak on covering problems in convex and discrete geometry.

ABOUT PIMS PDF SEMINARS:
PIMS ongoing lecture series featuring our Postdoctoral Fellows every three weeks. You will have the opportunity to connect with emerging research in the mathematical sciences from a PIMS Postdoctoral Fellow. PIMS PDFs are amongst the top young researchers in Canada, and this is an excellent opportunity to learn about them, and their work.