250030-1 VO Random Walks on Groups (2023S)

ECTS: 5.00 SWS: 3.00

The topic is random walks on infinite, finitely generated groups.

We will cover some classical results such as growth of the group vs transience of walks and Kesten's amenability condition. The main focus will be on connections between the geometry of the group and the behavior of random walks. The model result is the theorem of Kaimanovich that the Poisson boundary of a random walk on a hyperbolic group coincides with the Gromov boundary, so the 'random walk boundary' and the 'geometric boundary' agree. We will cover the recent construction of Qing-Rafi-Tiozzo of a sublinear Morse boundary that plays the role of the Gromov boundary in the non-hyperbolic case, with a proof that for CAT(0) groups the Poisson boundary agrees with the sublinear Morse boundary.

Prior experience with hyperbolic and CAT(0) groups is not required---these concepts will be developed in the lectures.

The Wednesday meetings will be lectures. The Thursday meetings will be discussion/exercise.

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Meetings: W 8:00-9:30, Th 9:45-10:30 in SR12

Mode: This is planned to be an in-person class, following applicable University guidelines on Covid19 prevention. If the University cancels in-person meetings we will switch to synchronous online presentation on Zoom, which will be available through the Moodle page. There will not be livestreaming of the lectures by default, but this can be reconsidered if conditions demand.

Text: The course will not follow a fixed text, but the first 3 months will include topics from:

Wolfgang Woess, Random walks on infinite graphs and groups, Cambridge Tracts in Mathematics, vol. 138, Cambridge University Press, Cambridge, 2000.

The last month will focus on the construction from this paper:

Yulan Qing, Kasra Rafi, Sublinearly Morse boundary I: CAT(0) spaces, Advances in Mathematics, Volume 404, Part B, 2022, https://doi.org/10.1016/j.aim.2022.108442.

Exercises: Sheets of exercises will be given out periodically, and will be discussed on Thursdays.

Exam: The exam will be oral, covering the contents of the lecture.

Disclaimer: Information in this syllabus is subject to change. Changes will be announced via Moodle.