אוניברסיטת
בן-גוריון בנגב

The Department of Mathematics

2021–22–A term

Course Name Introduction to Geometric Group Theory

Course Number 201.1.0311

Course web page
`https://math.bgu.ac.il//en/teaching/fall2022/courses/introduction-to-geometric-g`

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Office Hours `https://math.bgu.ac.il/en/teaching/hours`

Abstract

Requirements and grading[1]

Course topics

Basic concepts: Group actions, Cayley graphs and Schreier graphs, The word metric. Quasi isometries. The Milnor-Svarc lemma. Free groups and trees: Group presentations. The groupAut(T),elliptic and hyperbolic elements. The boundary of the tree. Covering theory of graphs and the Nielsen Shcreier theorem. The ping-pong lemma. Free and amalgamated products, HNN extensions. The group PSL_2 (Z)=Z/2Z*Z/3Z and its action on the Farey tree. Some Hyperbolic geometry: Poincare models, their boundaries. Isometry groupsPSL_2 (R),PSL_2 (C), elliptic, hyperbolic, parabolic and loxodromic isometries and the trace. Free subgroups using the ping-pong lemma. Poincare lemma and surface groups as crystallographic hyperbolic groups. The fundamental domain of SL_2 (Z)and the space of lattices. The Farey tessellation and continued fractions. Hyperbolic groups. Gromov hyperbolic spaces and their boundaries. Hyperbolic groups, elliptic and hyperbolic elements. Quasi convex subgroups. Existence of free subgroups using ping-pong. Small cancellation groups. Solvability of the word problem and finite presentability. Existence of many quotients.

[1] Information may change during the first two weeks of the term. Please consult the webpage for updates