

The Department of Mathematics

2017–18–B term

Course Name Random walks and harmonic functions

Course Number 201.2.0391

Course web page

<https://www.math.bgu.ac.il/en/teaching/spring2018/courses/random-walks>

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Office Hours <https://www.math.bgu.ac.il/en/teaching/hours>

Abstract

Requirements and grading¹

This course deals with random walks, harmonic functions, the relations between these notions, and their applications to geometry and algebra (mainly to finitely generated groups).

The modern point of view will be presented, following recent texts by: Gromov, Kleiner, Ozawa, Shalom & Tao, among others.

Course topics

In a random process, by definition, it is not possible to deterministically predict the next step. However, we will see in this course how to predict rigorously the long term behavior of processes. We will study in this course processes, known as *Markov processes*, in which the next step depends only on the current position. We will see that these processes are deeply related to electrical networks, and to notions from information theory such as entropy. We will develop techniques of discrete analysis, which are counterparts of classical analysis in the discrete setting. These notions are at the cutting edge of current research methods in these fields

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