

A U S H A N G

FREIE UNIVERSITÄT BERLIN

Fachbereich Mathematik und Informatik

Promotionsbüro, Arnimallee 14, 14195 Berlin

D I S P U T A T I O N

Dienstag, 1. April 2025, 15:00 Uhr

Ort: Seminarraum 031

(Fachbereich Mathematik und Informatik, Arnimallee 6, 14195 Berlin)

Disputation über die Doktorarbeit von

Evgeniya Lagoda

Thema der Dissertation:

k-regular maps and cohomology theory of configuration spaces

Thema der Disputation:

Metric Thickenings of Vietoris-Rips Complexes

Die Arbeit wurde unter der Betreuung von **Prof. Dr. P. Blagojevic** durchgeführt.

Abstract: In topological data analysis, to apply persistent homology to finite data, it is common to obtain a filtered simplicial complex through a Vietoris-Rips construction. This construction associates a simplicial complex $VR(X; r)$ to a metric space X at a scale parameter r by adding as its simplices all finite subsets of X with a diameter less than r . This fueled the interest in studying homotopy types of Vietoris-Rips complexes of non-finite spaces as the limiting cases. One of the shortcomings of working with $VR(X; r)$ when X is not a locally finite space is that it is not metrizable. To address this limitation of $VR(X, r)$, in 2018, Adamaszek, Adams, and Frick introduced the Vietoris-Rips metric thickening $VR^m(X, r)$. The underlying set of $VR^m(X, r)$ is the same as of $VR(X, r)$, however, the points are treated as finitely supported probability measures and, thus, $VR^m(X, r)$ is equipped with the 1-Wasserstein distance for probability measures. The relationship between Vietoris-Rips complexes and their metric thickenings was studied in further detail, and it was proven by Gillespie in 2023 that the two are weakly homotopy equivalent. In this presentation, we will discuss the above context and Gillespie's result.

Die Disputation besteht aus dem o. g. Vortrag, danach der Vorstellung der Dissertation einschließlich jeweils anschließenden Aussprachen.

Interessierte werden hiermit herzlich eingeladen

Der Vorsitzende der Promotionskommission
Prof. Dr. P. Blagojevic