

Invitation to the Oral Examination – Department MATH

For the occasion of his examination for a Doctoral Degree,

Fabian Roll

will present his dissertation entitled

Geometric Complexes in Topological Data Analysis

on **Friday, July 19, 2024 at 14:00 h**

Attendance to the presentation is open to the public. The presentation will be in English.

The candidate, all members of the Examination Committee, and authorized examiners of the TUM School of CIT are invited to the presentation and subsequent oral examination.

The presentation and subsequent examination will take place in room **02.06.011, Boltzmannstr. 3, 85748 Garching.**

Examination committee:

Chair: Prof. Claudia Scheimbauer, TUM

First Examiner: Prof. Ulrich Bauer, TUM

Second Examiner: Prof. Facundo Memoli, Ohio State University

Third Examiner: Prof. Žiga Virk, University of Ljubljana

Garching, the 11th of July, 2024

Mailing list:

Members of the examination committee

Doctoral candidate

CIT staff

Abstract:

We study geometric complexes and their interaction with the persistent homology pipeline. We provide a variety of nerve theorems suitable for topological data analysis. We establish a close connection between discrete Morse theory and persistent homology with applications to shape reconstruction. We generalize a famous result of Rips on the contractibility of Vietoris—Rips complexes, with strong implications to the computation of persistent homology for tree-like metric data.