

Institut fuer Geometrie

**Gastvortrag**

10.03.2017, 09:00-10:00

Seminarraum 2 Geometrie (Kopernikusgasse 24, 4.Stock)

## **Topological Analysis in Information Spaces**

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Understanding high dimensional data remains a challenging problem. Computational topology, in an effort dubbed Topological Data Analysis (TDA), promises to simplify, characterize and compare such data. However, standard TDA focuses on Euclidean spaces, while many types of high-dimensional data naturally live in non-Euclidean ones. Spaces derived from text, speech, image... data are best characterized by non-metric dissimilarities, many of which are inspired by information-theoretical concepts. Such spaces will be called information spaces.

I will present the theoretical foundations of topological analysis in information spaces. First, intuition behind basic computational topology methods is given. Then, various dissimilarity measures are defined along with information theoretical and geometric interpretation. Finally, I will show how the framework of TDA can be extended to information spaces. In particular, I will explain to what extent existing software packages can be adapted to this new setting.

No previous knowledge about (computational) topology or information theory is required. This is joint work with Herbert Edelsbrunner and Ziga Virk.

Michael Kerber