GEORG-AUGUST-UNIVERSITÄT
GÖTTINGEN

Lecture series

on

The shape space induced by the Gromov-Wasserstein distance

by

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Monday, Oct. 21: 4.15 pm–5.45 pm
Wednesday, Oct. 23: 10.15 am–11.45 am
Thursday, Oct. 24: 4.15 pm-5.45 pm

Venue: Institute for Mathematical Stochastics, Goldschmidtstr. 7, **SR 5.101**

Abstract

Metric measure spaces (mm-spaces) are triples (X,dX,uX) where (X,dX) is a compact metric space and uX is a fully supported Borel probability measure on X. Mm-spaces provide a natural model for datasets where the each point is given a weight and each pair of points is associated with a dissimilarity value. The Gromov-Wasserstein distance --a variant of the Gromov-Hausdorff distance based on ideas from mass transport-- provides an intrinsic metric on the collection of all metric measure spaces. This series of lectures will overview its construction and main properties.

Contents

Lecture 1: The Gromov-Hausdorff distance (Oct. 21, 4.15 pm)
This lecture will discuss the construction of the Gromov-Hausdorff distance on the collection of all compact metric spaces. We will also review main properties including Gromov's pre-compactness theorem.

Lecture 2: **Optimal Transport and metric geometry: The Gromov-Wasserstein distance**
The Gromov-Hausdorff distance can be modified in order to also account for measure theoretic information and thus metrize the collection of all compact metric measure spaces. During this lecture we will recall the definition of the Gromov-Wasserstein distance and its main properties. This distance arises as a certain (quadratic) generalization of the standard Wasserstein distance between probability measures on a fixed metric space. (Oct. 23, 10.15 am)

Lecture 3: **Distributional invariants and their stability and injectivity** (Oct. 24, 4.15 pm)
Many statistically motivated isomorphism invariant quantities associated to metric measure spaces appear naturally when considering the Gromov-Wasserstein distance. This lecture will describe many of these invariants and will overview results related to their injectivity properties on some suitably restricted classes of metric measure spaces.

The principal investigators of RTG 2088 invite you to participate.