15-20
* What is TDA
* Definition of a Reeb Graph / Contour-Tree
* TTK Demo for Contour Tree

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* Categorification of Reeb Graphs
* Interleaving Distance

10
* Usefulness and computational difficulties
* Future work

1

Measuring Similarities in Data using Reeb Graphs and the Interleaving Distance

Brian Bollen

2

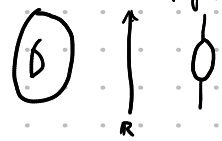
Topological Data Analysis
↳ The study of data using methods from topology

3

Two Canonical Examples
↳ Persistence Diagrams
↳ Reeb Graphs and Contour Trees

4

Setup:
Def scalar field
Def Reeb Graph



5

TTK

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Categorify Them (Why?)
↳ Provides Fruitfulness

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Category Theory Background

8

Category of Scalar Fields & Reeb Graphs (constructibility, perhaps)

9

Pre Cosheafs

10

Bridge from Precosheafs to Reeb Graphs

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ε-compatible maps

12

interleaving distance

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Smoothing and Thickening Functors

14

Images for How we visualize this

Categorified Reeb Graphs

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Computations
↳ Perhaps triangulations
↳ Why interleaving Distance is hard

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Mapper Graphs?

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Future Work

- Approx. interleaving
- Other useful metrics
- Learning metrics

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Fin

I ← category

C ← category

$const_0 : I \to C$

$const_0(x) = const_0(y) = 0 \in C$

$F : I \to C$

$const_0 : I \to C$

$F \Rightarrow const_0$

$F(a) \to const_c(a) = 0$

$F(f) \downarrow$ $\qquad$ $\downarrow const_0(f)$

$F(b) \longrightarrow const_c(b)$

$F(a) \to c$

$F(b) \to c$