

# 0-dimensional Homology Preserving Dimensionality Reduction with TopoMap

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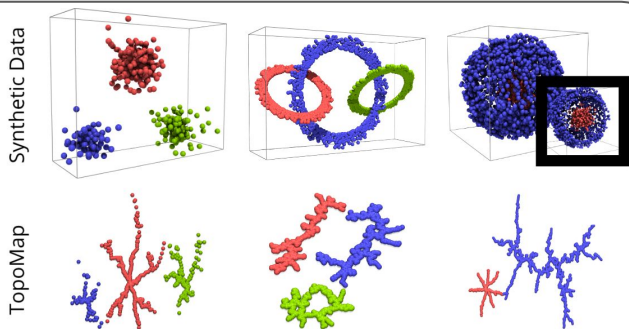
## Problem

- Project the points in 2D such that:
  - 0-dimensional persistence diagram of the Rips filtration is preserved
  - One-to-One mapping between components in the original space and projected space
  - Creation and destruction time of components is preserved

## Key Insight

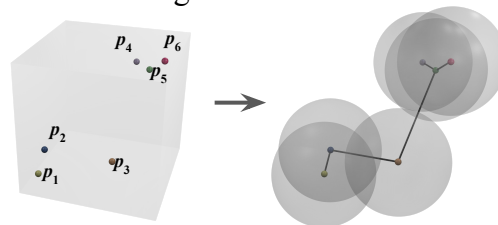
- Topology changing edges (that merges two components) form the *Minimum Spanning Tree*

## Sample Results

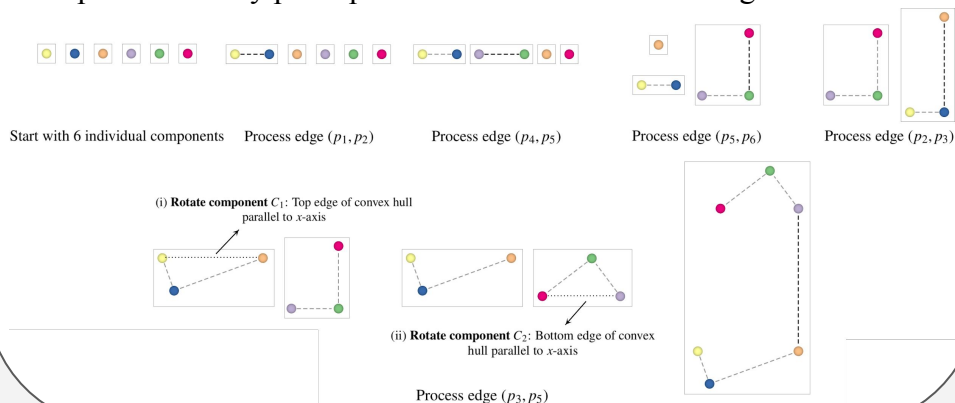


## TopoMap

- Step 1: Compute MST in high dimension



- Step 2: Iteratively place points in 2D based on MST edges



**Full Paper:** Harish Doraiswamy, Julien Tierny, Paulo J. S. Silva, Luis Gustavo Nonato, and Claudio Silva, *TopoMap: A 0-dimensional Homology Preserving Projection of High-Dimensional Data*, IEEE TVCG (IEEE VIS) 2020.

Code

