

MSRI UP 2023 - HW 1 - DAY 5

Due: Monday 6/19 by 5:00pm. Submit your assignment to your personal dropbox.

Important: This assignment is different, **this time you do have to complete the entire assignment**. Make sure to present your complete solutions in a neat and organized manner. **Avoid discussing this assignment**, do and write your solutions on your own.

- (1) During week one we have described three application pillars in TDA:
 - (a) Topological Time Series Analysis (TTSA): Which is the development of theoretical and computational tools to probe time-varying data with topological methods.
 - (b) Machine Learning with Persistence Diagrams (MLwPD): Deals with the mathematical foundations, algorithmic/mathematical breakthroughs needed for learning with topological signatures, as well as their application to specific scientific domains.
 - (c) Topological Dimensionality Reduction (TDR): The use of topological techniques to visualize and simplify data sets while maintaining their topological properties.

For this question I'd like to ask for your honesty; to forget for a moment how easy these topics came to you, what your friends like, and instead to really focus on your academic interests, intellectual curiosity and professional ambitions. **Please rank-order the topics** (TTSA, MLwPD and TDR) from most to least relevant for you. We will use your responses to populate research groups and assign problems moving forward. Your preferences will be accommodated where possible, but the final decision on group membership will be up to me (Dr. Perea) and the research staff; our goal is to have groups which are vibrant, balanced and productive.

- (2) Use the provided LaTeX template and Cheat Sheet to type up the problems and solutions to Homeworks Day 1, 2, 3, 4 and 5.