

Applied Topology in Albany (ATiA) Seminar

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USING ZIGZAG PERSISTENCE FOR BIFURCATION DETECTION

Friday, October 15th, 2021
11:00 a.m. on Zoom

ABSTRACT. Bifurcations in a dynamical system are drastic behavioral changes, thus being able to detect the parameter values for which these bifurcations occur is essential to understanding the system overall. We develop a one-step method to study and detect bifurcations using zigzag persistent homology. While standard persistent homology has been used in this setting, it usually requires analyzing a collection of persistence diagrams, which in turn drives up the computational cost. Using zigzag persistence, we can capture topological changes in the state space of the dynamical system in only one persistence diagram.