1163-53-1023   **Ryan Vaughn*** (`rv2152@nyu.edu`), **Tyrus Berry** and **Harbir Antil**. *Diffusion Maps for Manifolds with Boundary.*

Manifolds with boundary are a natural class of objects to consider for manifold learning applications, including data-driven solvers for boundary value problems. Despite their relative importance, the geometry of such manifolds presents several obstactles to proving pointwise consistency results for manifold learning methods based on estimating the Laplacian (such as diffusion maps). In this work, we show that several of these issues can be resolved by viewing the Laplacian in a weak (variational) sense. We also derive new asymptotic estimates to show pointwise consistency of the bias of graph Laplacian estimators on manifolds with boundary. These theoretical results are then verified experimentally by numerically solving several boundary value problems on point cloud data sampled from manifolds with boundary. (Received September 14, 2020)