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Non-parametric estimation of manifolds from noisy data

Abstract:

A common task in many data-driven applications is to find a low dimensional manifold that describes the data accurately. Estimating a manifold from noisy samples has proven to be a challenging task. Indeed, even after decades of research, there is no (computationally tractable) algorithm that accurately estimates a manifold from noisy samples with a constant level of noise. In this talk, we will present the first method that is guaranteed to estimate a manifold and its tangent in the ambient space. Moreover, we establish rigorous convergence rates, which are essentially as good as existing convergence rates for function estimation.