Department of Mathematics

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Scientific Computing Seminar

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A level set based variational principal flow method for nonparametric dimension reduction on Riemannian manifolds

Thursday, November 1, 2018
1:30 PM- 2:30 PM
Room 646 PGH

Abstract: We propose a variational formulation for dimension reduction on Riemannian manifolds. The algorithm is developed based on the level set method together with a recently developed principal flow algorithm. The original principal flow algorithm is a Lagrangian technique which extends the principal component analysis (PCA) to dimension reduction on Riemannian manifolds. We propose to incorporate the level set method to obtain a fully implicit formulation so that the overall algorithm can naturally handle various topological changes in the curve evolution. The variational formulation consists of two terms which try to balance the contributions from both the dataset itself and the principal direction by the PCA. We will demonstrate that the method is insensitive to the initial guess and is robust enough for noisy data.