



Contribution ID: 55

Type: **Poster**

Manifold reconstruction using linear approximations

Wednesday, April 22, 2020 10:10 PM (10 minutes)

We study a method to reconstruct a nonlinear manifold embedded in Euclidean space from point cloud data using only linear approximations. Such an approximation is possible by warping the submanifold via an embedding to a higher dimensional Euclidean space. The subsequent reduction in the curvature can be justified using techniques from geometry. The immediate use of this formalism is in denoising submanifolds (with bounded and zero-mean noise); and we will use the linear version of the manifold moving least squares method after choosing an appropriate map. We would show preliminary results from three different noisy datasets: reconstruction of noisy spectra of a very high dimensional matrix, track reconstruction and parameter estimation from the tracker hit datasets used for top quark identification; and finally in order to illustrate the advantage of the linear approximation we would consider an overfitting problem often encountered when a complex model is used for the shape of the parton distribution function fitting, using one of the NNPDF3.1 datasets.

Consider for young scientist forum (Student or postdoc speaker)

Yes

Second most appropriate track (if necessary)

Novel approaches and algorithms, and theoretical analysis

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Session Classification: Recording sessions