

# APPLICATIONS OF MANIFOLD LEARNING TECHNIQUES TO SPECTRAL PARAMETERS OF QUASARS

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Variations in different spectral parameters of type 1 quasars may be explained by their position in the parameter space known as Eigenvector 1 (E1) where quasars populate an elbow-shaped main sequence. The E1 and the quasar main sequence were first revealed by applying principal component analysis (PCA) on a sample of ~80 quasars (Boroson & Green 1992). In this contribution, we apply manifold learning techniques on a sample of low redshift ( $z < 0.35$ ) type 1 quasars taken from the Sloan Digital Sky Survey Data Release 7 quasar catalog (Liu et al. 2019) and compare our results to previous research related to identification of driving mechanism behind the main sequence. Furthermore, we test how well manifold learning algorithms perform in classification of different quasar populations (Sulentic et al. 2000) compared to PCA. Our preliminary results indicate that Locally Linear Embedding (LLE) algorithm performs better than PCA in classification of quasar populations when we input large number of parameters. Also, the results are in agreement with the previous findings which indicate that Eddington ratio is indeed driving the main sequence.

## References

Boroson, T. A., Green, R., F.: 1992, *The Astrophysical Journal Supplement Series*, **80**, 109.

Liu, H. et al.: 2019, *The Astrophysical Journal Supplement Series*, **243**, 21.