

# COLLOQUIUM

Sufficient Dimension Reduction of  
Features in the Presence of Dependent  
Observations

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Abstract: Sufficient dimension reduction methods are designed to help reduce the dimensionality of large datasets without loss of regression information for a better visualization, prediction, and modeling. We develop their use for dependent multi-dimensional features with respect to an outcome of interest in the presence of other covariates. Existing likelihood-based sufficient dimension reduction methods assumes independent and identically distributed samples. However, observations are often recorded on subjects or clusters. While the observations from cluster to cluster could be independent, the within-cluster observations are likely dependent. Treating the within-cluster observations as independent may adversely affect the estimation of the central subspace. We propose a method for estimation of the central subspace when the observations are dependent within cluster and discuss some structures of the dependence among the features.