

Department of Mathematical Sciences

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Sufficient Dimension Reduction in Regression and Beyond

Sufficient dimension reduction (SDR) in regression has generated considerable interest in the statistical literature in the past thirty years. It started with a simple idea of inverse regression in early nineties with focus on the distribution of predictors conditioning on the response, which lead to nonparametric-like model-free procedures. Many variants are introduced along this line, e.g. for the conditional mean space only, for multivariate and categorical responses, for groups and subpopulations, for variable selection and sparsity. Asymptotic results for both the dimension and subspace are discussed. Cook (2005, Fisher Lecture) connects the ideas developed so far with classic notions of data reduction and sufficiency. It opens a new chapter of model-based dimension reduction. Traditional methodologies like principal component and partial least squares are reintroduced and new framework like envelope models are developed. In this talk, we review the history of SDR and discuss the state-of-art and future research directions.

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