

Statistics and Data Science Seminar

Single index models with regularized matrix coefficients

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Abstract: Single index models extend standard linear models to account for non-linearity between multivariate predictors and responses. We study single index models where the unknown coefficients can be formulated as a matrix and enforce regularization term(s) on the coefficient matrix to induce meaningful structure, e.g., sparsity and low-rank. We propose an iterative estimation procedure in which an alternating direction method of multipliers (ADMM) algorithm is employed to accommodate multiple regularization terms. We focus on two particular models: scalar response on matrix predictor model and multivariate response on multivariate predictor model. We apply the former model to study nonlinear association between functional connectivity networks and fluid intelligence, and the latter model to a genetic association study. The work is based on two papers, "Sparse single index models for multivariate responses" which is to appear in Journal of Computational and Graphical Statistics and "Single index models with functional connectivity network predictors", which has been tentatively accepted by Biostatistics.

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