

Interaction Pursuit Biconvex Optimization

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Abstract: We study the high-dimensional multivariate regression analysis with the number of predictors and the number of responses both grow at an exponential rate in sample size. The proposed method explores the regression relationship when the predictors, errors and responses are all assumed be the samples of different multivariate normal distributions with general covariance matrices. We use the precision matrix estimation for multivariate analysis and use the laplacian quadratic associated with the graph information to promote smoothness among coefficients associated with the correlated predictors and responses. Theoretical results are proved under interpretable conditions. We provide an efficient algorithm for computing the estimates. Simulation studies and real data examples compare the proposed methods with several existing methods, indicating that the proposed methods achieve better interpretability and accuracy.