



統計科學研究所

INSTITUTE OF
STATISTICAL SCIENCE



統計所學術演講



中研院統計所

學術演講

講題：High-Dimensional Multivariate Linear
Regression with Weighted Nuclear Norm
Regularization

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時間：2022年12月28日(星期三)，10:30-12:00

地點：統計所B1演講廳

Abstract

A low-rank matrix estimation problem when the data is assumed to be generated from the multivariate linear regression model is considered. To induce the low-rank coefficient matrix, we employ the weighted nuclear norm (WNN) penalty defined as the weighted sum of the singular values of the matrix. The weights are set in a non-decreasing order, which yields the non-convexity of the WNN objective function in the parameter space. Such objective function has been applied in many applications, but studies on the estimation properties of the estimator from the objective function are limited. We propose an efficient algorithm under the framework of alternative directional method of multipliers (ADMM) to estimate the coefficient matrix. The estimator from the suggested algorithm converges to a stationary point of an augmented Lagrangian function. Under the orthogonal design setting, effects of the weights for estimating the singular values of ground-truth coefficient matrix are derived. Under the Gaussian design setting, a minimax convergence rate on the estimation error is derived. We also propose a generalized cross-validation (GCV) criterion for selecting the tuning parameter and an iterative algorithm for updating the weights. Simulations and a real data analysis demonstrate the competitive performance of our new method. Several extensions of the proposed method with applications will also be discussed.

※ 茶會：10：10。

※ 實體與線上視訊同步進行。