國立中山大學應用數學系
學術演講

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講　題：SPReM: Sparse Projection Regression Model for High-dimensional Linear Regression

時　間：2014/06/24（星期二）16：10～17：00

地　點：理學院四樓理 SC 4009-1 室

茶　會：15:30 於理 SC 4010 室（系辦公室）

摘要

　　The aim of this paper is to develop a sparse projection regression modeling (SPReM) framework to perform multivariate regression modelling with a large number of responses and a multivariate covariate of interest. We propose two novel heritability ratios to simultaneously perform dimension reduction, response selection, estimation, and testing, while explicitly accounting for correlations among multivariate responses. Our SPReM is devised to specifically address the low statistical power issue of many standard statistical approaches, such as the Hotelling's T^2 test statistic or a mass univariate analysis, for high-dimensional data. We formulate the estimation problem of SPREM as a novel sparse unit rank projection (SURP) problem and propose a fast optimization algorithm for SURP.Furthermore, we extend SURP to the sparse multi-rank projection (SMURP) by adopting a sequential SURP approximation. Theoretically, we have systematically investigated the convergence properties of SURP and the convergence rate of SURP estimates. Our simulation results and real data analysis have shown that SPReM outperforms other state-of-the-art methods.

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