



The University of Chicago
Department of Statistics
STATISTICS COLLOQUIUM

DAN YANG

Department of Statistics
The Wharton School
University of Pennsylvania

Singular Value Decomposition for High-Dimensional Data

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ABSTRACT

Singular value decomposition is a widely used tool for dimension reduction in multivariate analysis. However, when used for statistical estimation in high-dimensional low rank matrix models, singular vectors of the noise-corrupted matrix are inconsistent for their counterparts of the true mean matrix. In this talk, we suppose the true singular vectors have sparse representations in a certain basis. We propose an iterative thresholding algorithm that can estimate the subspaces spanned by leading left and right singular vectors and also the true mean matrix optimally under Gaussian assumption. We further turn the algorithm into a practical methodology that is fast, data-driven and robust to heavy-tailed noises. Simulations and a real data example further show its competitive performance.

This is a joint work with Andreas Buja and Zongming Ma.

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