# An ensemble algorithm for randomized singular value decomposition and randomized principal component analysis

Ting-Li Chen

*Academia Sinica*

## Abstract

The computation of singular value decomposition (SVD) or principal component analysis (PCA) is expensive when the size of the matrix becomes large. Instead of processing the full scale of the matrix, a randomized approach is to work on a much smaller matrix which is the full scale matrix multiplied by a random matrix. In this talk, we will present an ensemble algorithm to combine the results of multiple randomized SVD. The algorithm is based on optimization on the Stiefel manifold. This ensemble SVD can be applied to solve large scale PCA. We will demonstrate the performance of the ensemble algorithm by simulation studies. We will also give theoretic results of the asymptotic behavior of the ensemble.