Chen, Hung (National Taiwan University, Taiwan, R.O.C.)

An Algorithm on Identifying Isotropic Structure in Principal Component Analysis

Abstract: PCA (Principal Component Analysis) is one of the oldest and best known statistical tools for multivariate analysis. PCA is often used to identify new meaningful underlying variables through the linear transformation of the original variables. We propose a new plot as a supplementary to the often used scree plot for choosing significant components. This plot is designed to illustrate the stability of the chosen components over realizations of the data generated through the underlying probability mechanism. The bootstrap method is used to generate *pseudo realizations* of the data generated through the underlying probability mechanism. This plot utilizes the property that the eigenvectors associated with multiple roots will not remain stable after the data is being perturbed. An asymptotic analysis and simulations are presented to show the validity of the proposed algorithm on doing dimensional reduction.