New Statistical Perspectives about Singular Value Decomposition

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Abstract

Singular value decomposition (SVD) is a very important tool for multivariate analysis and dimension reduction, especially for high-dimensional data. However its importance in statistics has been somehow overlooked so far because of a better known sibling - principal component analysis (PCA). I shall discuss the connections between the two, and argue that SVD is more fundamental and hence deserves more attention. I shall then describe a general framework to regularize SVD, which leads to several new statistical approaches for multivariate analysis and functional data analysis. The new approaches will be illustrated through simulations and real examples.