Title : Automated Spectral Unmixing Using Unsupervised Classification

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Abstract

Automated unmixing is one of the most interesting idea in the spectral mixture analysis. We have data points in the reference space, whose dimension is reduced by the pricnipal component analysis or MNF transformation. Any kind of automated unmixing algorithm self-models the data system by finding endmember points solely based on the distribution of the data points in that reference space, so this algorithm was called as self-modelling technique in chemometrics of analytical chemistry.

The key is how to find the appropriate linear transformation matrix for the diagonal reference coordinate vectors of the reduced space. Many researchers suggested reasonable methods. In this paper, a few automated unmixing algorithms and related sensitivity analysis about the number of required data points to get significant results are suggested. In this algorhtims, transformation matrix is determined by the combination of unsupervised classification, regression analysis, and other intuitive methods to find appropriate facet hyperplanes.