

**PROJECTION PURSUIT FOR SMALL SAMPLE SIZE WITH A
LARGE NUMBER OF VARIABLES**

by

Eun-Kyung Lee, Dianne Cook
Iowa State University

March 9, 2004

ABSTRACT

In high-dimensional data, one often seeks to find a few interesting low-dimensional projections which reveal important aspects of the data. Projection pursuit for exploratory supervised classification is for finding separable class structure. Even though the projection pursuit method can bypass the curse of dimensionality, when we have a small number of observations relative to the number of variables, the class structure of the optimal projection can be seriously biased. In this situation, most classical multivariate analysis methods have problems. We discuss how the sample size and dimensionality are related, and we propose a new projection pursuit index that considers the penalty for the projection coefficients and overcomes the problem of small sample size.