

FULLY NONPARAMETRIC EMPIRICAL
BAYES ESTIMATION VIA PROJECTION PURSUIT*

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The fully nonparametric formulation of the empirical Bayes estimation problem considers m populations characterized by conditional (sampling) distributions chosen independently by some unspecified random mechanism. No parametric constraints are imposed on the family of possible sampling distributions or on the prior mechanism which selects them. The quantity to be estimated subject to squared-error loss for each population is defined by a functional $T(F)$ where F is the population sampling cdf. The empirical Bayes estimator is based on n iid observations from each population where $n > 1$. Asymptotically optimal procedures for this problem typically employ consistent nonparametric estimators of certain nonlinear conditional expectation functions. In this study a particular projection pursuit algorithm is used for this purpose. The proposed method is applied to the estimation of population means for several simulated sets and one familiar real world data set. Certain possible extensions are discussed.

1. Introduction.

The purpose of this paper is to show how an old idea may be effectively implemented using new technology. The old idea is the notion of fully nonparametric empirical Bayes estimation, which was introduced by the author in a paper (Johns, 1957) directly inspired by the fundamental paper of

The research was supported by the U.S. Office of Naval Research Grant Number N00014-83-K-0472.

AMS 1980 subject classifications. Primary 62G05; Secondary 62J02.

Key words and phrases. Empirical Bayes, nonparametric estimation, projection pursuit, nonlinear regression, multivariate estimation.