Two semi-parametric empirical Bayes estimators

Wei Pan, Thomas A. Louis

Division of Biostatistics, School of Public Health, University of Minnesota, Minneapolis, MN

Abstract

Parametric empirical Bayes (PEB) may perform poorly when the assumed prior distribution is seriously invalid. Nonparametric empirical Bayes (NEB) is more robust since it imposes no restriction on the prior. But compared with the PEB, the NEB may be inefficient for small to medium samples, due to the large variation and under-dispersion of the NPMLE of the prior. Using Monte Carlo simulations we compare two semi-parametric estimators designed to strike a trade-off between efficiency and robustness: a weighted average of the PEB and NEB and a kernel smoother of the NPMLE. Both estimators depend on likelihood cross-validation for choosing appropriate parameters. For illustration we reanalyze two data sets from Efron and Morris (1975).

Key Words: Cross-validation; James-Stein estimator; Smoothing; Mixtures; Nonparametric methods.