A New Approach to R-Estimation

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Traditional R-estimators are defined (and computed) via the minimization of some rank-based objective function. Appealing as it is, this "argmin" definition however is unsatisfactory, not only from a practical point of view (the implementation is numerically unfeasible for high-dimensional parameters), but also from a theoretical point of view (rank-based objective functions are discontinuous, and their monotonicity/convexity properties are all but obvious, so that root-n consistency remains a nontrivial issue).

We therefore rather suggest a rank-based adaptation of Le Cam's one-step construction of locally asymptotically optimal estimators. The proposed estimators are asymptotically equivalent to a random vector which is measurable with respect to the ranks associated with the "true" value of the parameter, hence can be considered as a genuine R-estimator. Under correctly specified densities, they are locally and asymptotically optimal. When based on Gaussian scores, they often uniformly dominate their parametric Gaussian counterparts. And last but not least, they can be computed easily, irrespective of the dimension of the parameter space. Simulations confirm their feasability and excellent finite-sample performances.