Approximations of minimum risk regression estimator

Jan Picek[1] **and Jana Jurečková**[2]

[1] *Technical University of Liberec, Czech Republic*
[2] *Charles University in Prague, Czech Republic*

Abstract

The minimum risk equivariant estimator (MRE) of the regression parameter vector in the linear regression model enjoys the finite-sample optimality, but its calculation is difficult, with an exception of few special cases. We study some possible approximations of MRE, with distribution of the errors being known or unknown: A finite-sample approximation uses the Hájek–Hoeffding projection or the Hoeffding-van Zwet decomposition of an initial equivariant estimator, a large-sample approximation is based on the asymptotic representation of the same. We illustrate the finite sample behavior of the proposed approximation on simulated data.

Keywords

Asymptotic representation, Hájek–Hoeffding projection, Hoeffding–van Zwet decomposition Maximal invariant, Minimum risk equivariant estimator.

References

Hájek, J. (1968). Asymptotic normality of simple linear rank statistics under alternatives. *Ann. Math. Statist. 39*, 325–346.

Hoeffding, W. (1961). *The Strong Law of Large Numbers for U-statistics.* Inst. of Statistics Mimeo Series No 302, University of North Carolina, Chapel Hill.

Jurečková, J. and Milhaud, X. (1999). Characterization of distributions in invariant models. *J. Statist. Plann. Inference 75*, 353–361.

Jurečková, J. and Picek, J. (2009). Minimum risk equivariant estimator in linear regression model. *Statist. Decisions 27*, 37–54.