Pairwise-rank-likelihood methods for the semiparametric transformation model

Tao Yu

National University of Singapore
E-mail: stayt@nus.edu.sg

Abstract: In this paper, we study the linear transformation model in the most general setup. This model includes many important and popular models in statistics and econometrics as special cases. Although it has been studied for many years, the methods in the literature either are based on kernel-smoothing techniques or make use of only the ranks of the responses in the estimation of the parametric components. The former approach needs a tuning parameter, which is not easily optimally specified in practice; and the latter approach may be {less accurate and computationally expensive}. In this paper, we propose a {pairwise rank likelihood} method {and extend it to a score-function-based method. Our methods estimate} all the unknown parameters in the linear transformation model, and we {explore the theoretical properties of} our proposed estimators. Via extensive numerical studies, we demonstrate that {our methods are} appealing in that the estimators are not only robust to the distribution of the random errors but also {in many cases more accurate} than those of the existing methods.