AN INFORMATION-THEORETIC ALTERNATIVE TO MAXIMUM LIKELIHOOD ESTIMATION METHOD IN ULTRASTRUCTURAL MEASUREMENT ERROR MODEL

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Abstract

In this paper, a data constrained generalized maximum entropy (GME) estimator for the general linear measurement error model is proposed. GME estimation, as developed by (A. Golan, G. Judge and D. Miller A Maximum Entropy Econometrics: Robust Estimation with limited data (Wiley, New York, 1996)), was formulated as a convex mixed-integer nonlinear optimization problem. Shannon entropy measures and its generalization, namely ‘entropy of order r’ by Tsallis and Rényi are briefly discussed. A Monte Carlo comparison is made with the classical maximum likelihood estimation (MLE) method. The results show that, with moderate sample size; the GME outperforms the MLE estimators in terms of mean squared error.

Keywords: Measurement error model, Generalized maximum entropy, Maximum likelihood, Entropy of order r.


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