Ann Inst Stat Math (2012) 64:167–192
DOI 10.1007/s10463-010-0313-6

Multivariate density estimation using dimension reducing information and tail flattening transformations for truncated or censored data

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Received: 4 June 2009 / Revised: 4 December 2009 / Published online: 6 October 2010

Abstract This paper introduces a multivariate density estimator for truncated and censored data with special emphasis on extreme values based on survival analysis. A local constant density estimator is considered. We extend this estimator by means of tail flattening transformation, dimension reducing prior knowledge and a combination of both. The asymptotic theory is derived for the proposed estimators. It shows that the extensions might improve the performance of the density estimator when the transformation and the prior knowledge is not too far away from the true distribution. A simulation study shows that the density estimator based on tail flattening transformation and prior knowledge substantially outperforms the one without prior knowledge, and therefore confirms the asymptotic results. The proposed estimators are illustrated and compared in a data study of fire insurance claims.

Keywords Censoring · Champernowne · Counting process theory · Multiplicative correction · Nonparametric estimation · Truncation