Journal of Applied Probability and Statistics
2018, Vol. 13, No. 2, pp. 23-39

BIVARIATE DENSITY ESTIMATION USING NORMAL-GAMMA KERNEL WITH APPLICATION TO ASTRONOMY

Uttam Bandyopadhyay and Soumita Modak
Department of Statistics, Calcutta University
35 Ballygunge Circular Road, Kolkata- 700019, India
Email: ubandyopadhyay08@gmail.com and soumitamodak2013@gmail.com

SUMMARY

We consider the problem of estimation of a bivariate density function with support $\Re \times [0, \infty)$, where a classical bivariate kernel estimator causes boundary bias due to the non-negative variable. To overcome this problem, we propose four kernel density estimators and compare their performances in terms of the mean integrated squared error. Simulation study shows that the estimator based on the proposed normal-gamma kernel performs best. Two astronomical data sets are used to demonstrate the applicability of this estimator.

Keywords and phrases: Bivariate density estimation; Product of classical and gamma kernels; *NG* kernels; Astronomical application.

2010 Mathematics Subject Classification: 62G07.