

Near-consistent robust estimations of moments for unimodal distributions

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This manuscript was compiled on June 6, 2023

Descriptive statistics for parametric models currently rely heavily on the accuracy of distributional assumptions. Here, leveraging the structures of parametric distributions and their central moment kernel distributions, a class of estimators, consistent simultaneously for both a semiparametric distribution and a distinct parametric distribution, is proposed. These efficient estimators are robust to both gross errors and departures from parametric assumptions, making them ideal for estimating the mean and central moments of common unimodal distributions. This article also illuminates the understanding of the common nature of probability distributions and the measures of them.

The potential biases of robust location estimators in estimating the population mean have been noticed for more than two centuries (1), with numerous significant attempts made to address them.

Theorem .1.

Proof.

□

1. CF Gauss, *Theoria combinationis observationum erroribus minimis obnoxiae*. (Henricus Dieterich), (1823).