

Semiparametric robust mean estimations based on the orderliness of quantile averages

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1 As one of the most fundamental problems in statistics, robust loca-
2 tion estimation has many prominent solutions, such as the symmetric
3 trimmed mean, symmetric Winsorized mean, Hodges–Lehmann es-
4 timator, Huber M-estimator, and median of means. Recent studies
5 suggest that their biases concerning the mean can be quite different
6 in asymmetric distributions, but the underlying mechanisms remain
7 largely unclear. This study establishes two forms of orderliness within
8 a wide range of semiparametric distributions. From this, a sequence
9 of semiparametric robust mean estimators emerges,

semiparametric | mean-median-mode inequality | asymptotic | unimodal
| Hodges–Lehmann estimator

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