

Near-consistent robust estimations of moments for unimodal distributions

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1 **A. Invariant Moments.** All popular robust location estima-
2 tors, such as the trimmed mean, Winsorized mean, Hodges-
3 Lehmann estimator, Huber M -estimator, and median of means,
4 are symmetric. As shown previously, a γ -weighted Hodges-
5 Lehmann mean ($\text{WHLM}_{k,\epsilon,\gamma}$) can achieve consistency for the
6 population mean in any γ -symmetric distribution with a fi-
7 nite mean. However, it falls considerably short of consistently
8 handling other common distributions.

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