Near-consistent robust estimations of moments for unimodal distributions

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This manuscript was compiled on June 7, 2023

A. Invariant Moments. All commonly used robust location estimators are symmetric, and therefore, asymptotically coincide with the population mean in any symmetric distribution provided that the mean is finite. A γ-weighted Hodges-Lehmann mean ($\mathrm{WHLM}_{k,\epsilon,\gamma,n}$) can achieve consistency for any γ-symmetric distribution with a finite mean. However, it falls considerably short of effectively handling a broad spectrum of other common distributions.