**Robust estimations from distribution structures**

***Johon Li Tuobang****1,2,3*

**[tuobangli@berkeley.edu]**

1 Technion-Israel Institute of Technology, Haifa 32000, Israel

2 Guangdong Technion-Israel Institute of Technology, Shantou 515063, China

3 University of California, Berkeley, US

*Abstract should be written in English and should not exceed 300 words. Use 11-point type in Times New Roman font.*

Descriptive statistics for parametric or nonparametric models are generally sensitive to departures, gross errors, and/or random errors. Here, we explored semiparametric methods to classify distributions to reveal the underlying mechanisms of current robust estimators. Further deductions explain why the Winsorized mean typically has smaller biases compared to the trimmed mean and why the Hodges-Lehmann estimator and Bickel-Lehmann spread are the optimal nonparametric location and scale estimator in terms of variance and robustness. From the distribution structures, a series of new estimators were deduced. Some of them 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 presentation sheds light on the understanding of the common nature of probability distributions and the measures of them.