Probabilities for Asymmetric P-Outside Values

Pavlina K. Jordanova

Faculty of Mathematics and Informatics, Konstantin Preslavsky University of Shumen, Bulgaria

Abstract

Since 2017 Jordanova and co-authors investigate probabilities for p-outside values and determine their explicit forms in many particular cases. They show that they are closely related to the concept for heavy tails. Tukey's boxplots are very popular and useful in practice. In particular, the relative frequencies for observing a data point in different sections of the boxplot can help the practitioners to find the exact probability distribution of the underlying random variable. These open the door for work with distribution sensitive estimators which can be more accurate, especially for small sample investigations. All these methods, however, suffer from the disadvantage that they use inter quantile range in a symmetric way. This study gives greater influence of asymmetry on analysis of the tails of the distributions. New theoretical and empirical boxplots and characteristics of the tails of the distributions are suggested. The theoretical asymmetric p-outside values functions do not depend on the center and the scaling factor of the distribution, and do not need existence of moments. Therefore, they are appropriate for comparisons of the tails of the distribution, and estimation of the parameters, which govern their tail behaviour.

Keywords: Heavy-tailed distributions, Extremal index estimation.