Local Bahadur efficiencies of scale-free tests of normality based on a recent characterization

We develop two scale-free tests of normality based on the recent characterization of the symmetric normal law by Ahsanullah, Kibria and Shakil (2014). Both test statistics have an U-empirical structure, but the first one is of integral type, while the second one is of Kolmogorov type. We study the limiting behavior and logarithmic large deviations of these test statistics under the null-hypothesis. Next, we calculate their local exact Bahadur efficiencies for location, skew and contamination alternatives

using the upper bound for exact slopes in terms of Kullback-Leibler information. These efficiencies in many cases are rather high. For instance, we obtain the value 0.977 for the integral test in the case of location and skew alternatives. In our opinion, both tests can be added to the existing set of normality tests due to their high efficiency properties and relative simplicity. This research was supported by the grant of RFBR 16-01-00258 and by the grant SPbGU - DFG 6.65.37.2017.

Testing of normality, U-statistics, Bahadur efficiency, Kolmogorov test.