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ON TWO FAMILIES OF TESTS FOR NORMALITY WITH EMPIRICAL DESCRIPTION OF THEIR PERFORMANCES

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Abstract

We discuss two families of tests for normality based on characterizations of continuous distributions via order statistics and record values. Simulations of their powers show that they are competitive to widely recommended tests in the literature.

Keywords: order statistics, record values, U -statistics, normal distributions, exponential distributions, characterizations, goodness-of-fit tests, powers.

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REFERENCES

- [1] A. Cabaña and E.M. Cabaña, *Tests of normality based on transformed empirical processes*, *Methodology and Computing in Applied Probability* **5** (2003) 309–335.
doi:10.1023/A:1026235220018

- [2] M. Csörgő, V. Seshadri and M. Yalovsky, *Some exact tests for normality in the presence of unknown parameters*, Journal of the Royal Statistical Society. Series B **35** (1973) 507–522.
- [3] R. D’Agostino and M. Stephens, *Goodness-of-fit Techniques* (Marcel Dekker, New York, 1986).
- [4] W.C.M. Kallenberg and T. Ledwina, *Data driven smooth tests for composite hypotheses: comparison of powers*, J. Statist. Comput. Simul. **59** (1997) 101–121. doi:10.1080/00949659708811850
- [5] M. Morris and D. Szynal, *Goodness-of-fit tests based on characterizations involving moments of order statistics*, I. J. Pure and Appl. Math. **38** (2007) 83–121.
- [6] M. Morris and D. Szynal, *Some U-statistics in goodness-of-fit tests derived from characterizations via record values*, I. J. Pure and Appl. Math. **46** (2008) 507–582.
- [7] E.S. Pearson, R.B. D’Agostino and K.O. Bowman, *Tests for departure from normality: Comparison of powers*, Biometrika **64** (1977) 231–246. doi:10.2307/2335689
- [8] J.C. Rayner and D.J. Best, *Smooth Tests of Goodness of Fit* (Oxford University Press, New York, 1989).
- [9] D. Szynal, *Goodness-of-fit tests derived from characterizations of continuous distributions*, Banach Center Publications **90** (2010) 203–223. doi:10.4064/bc90-0-14
- [10] D. Szynal and W. Wołyński, *Goodness-of-fit tests for exponentiality and Rayleigh distribution*, I. J. Pure and Appl. Math. **78** (2012) 751–772.
- [11] D. Szynal and W. Wołyński, *Simulation supplement to goodness-of-fit tests derived from characterizations of continuous distributions via record values*, I. J. Pure and Appl. Math. **87** (2013) 629–644.
- [12] H.C. Thode, Jr., *Testing for normality* (Marcel Dekker, Inc. New York, 2002).

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