MONTE CARLO TEST OF NORMALITY
BASED ON DISTANCE

Nelson de Almeida PEREIRA FILHO¹
Daniel Furtado FERREIRA²

ABSTRACT: The normal probability distributions describing the behavior of many real-life phenomena in various fields of science. When one considers a random sample of a population, in the univariate case, it is common to assume that the data or residuals of the model are normally distributed. Graphs such as histograms and Q-Q plots are quite effective, but subjective, to check the normality. However, this is not enough to assure the normality of the data or the residuals of some fitted model. There are several tests of normality in the literature. Among them, the Shapiro-Wilk is considered to pursue optimal properties. However, this test is computationally applicable to a number of observations up to 5,000. This paper aims to propose a univariate normality test, based on distances between the observed values of the sample order statistics and the expected values of the standard normal order statistics, that can be applied to any sample sizes with no theoretical restrictions. The distribution of the test statistic was obtained by Monte Carlo simulation. The results of power and type I error rates, allow the conclusion that the proposal test is generally more efficient than the Shapiro-Wilk test and does not have the practical limitation of being restricted to size up to 5,000.

KEYWORDS: Normality; distances; power; Shapiro-Wilk.

¹ Instituto Federal da Bahia - IFBA, Departamento de Ciências Aplicadas, CEP: 40110-150, Salvador, BA, Brasil. E-mail: nelson@ifba.edu.br
² Universidade Federal de Lavras - UFLA, Departamento de Ciências Exatas - DEX, Caixa Postal 3037, CEP: 37200-000, Lavras, MG, Brasil. E-mail: danielff@dex.ufla.br. Bolsista CNPq.