Abstract

The aim of this work is the investigation of goodness of fit tests for multinomial distributions based on two families of divergence measures, namely the Csiszár's $\phi-$divergence class of measures (Csiszár, 1963; Ali and Silvey, 1966) and the $\Phi-$divergence class of measures (Mattheou and Karagrigoriou, 2009).

For comparing the various goodness of fit tests the asymptotic distribution, which is known to be chi-square, (Cressie and Read, 1984; Zografos et. al., 1990; Mattheou and Karagrigoriou, 2009) and the empirical distribution of all test statistics under investigation are obtained and at the same time the appropriate critical values (percentiles) are evaluated. For the comparison of the goodness of fit test statistics, samples from trinomial distributions are used and both size and power of each test for various alternative hypotheses are calculated.

Furthermore, we focus on a new family of divergence tests which is based in what we call Csiszár's $\Phi_{1,a}$-divergence family of measures. This new family of test statistics is indexed by a positive parameter "a" and in this work we attempt to identify optimum values of "a" in order to improve the accuracy of the associated goodness of fit tests.

Key words and phrases. Divergence measures; goodness of fit tests; multinomial populations; test statistics.