

N. Stepanova, S. Wang (Ottawa, Carleton University; Ottawa, Bell Canada). **On Blest-type tests for independence.**

In this talk we discuss efficiency properties of the Blest-type tests for independence. The tests are used for testing independence between components of a bivariate random vector.

Let (X_i, Y_i) , $i = 1, \dots, n$, be a random sample from a continuous distribution with cumulative distribution function (cdf) H and marginal cdfs F and G . Denote by R_i the rank of X_i within X_1, \dots, X_n and by Q_i the rank of Y_i within Y_1, \dots, Y_n . In 2000 Blest [1] proposed a new measure of rank correlation that is sensitive to discrepancies in the small ranks. Blest's correlation coefficient measures the total deviation of cumulative ranks against ranks accumulated in inverse natural order. It is defined as follows:

$$\nu_n = \frac{2n+1}{n-1} - \frac{12}{n^2-n} \sum_{i=1}^n \left(1 - \frac{R_i}{n+1}\right)^2 Q_i.$$

The merit of this rank correlation coefficient consists in greater power of discrimination amongst different reorderings of the data than either Spearman's or Kendall's coefficients. At the same time, ν_n is strongly correlated with both of them. Along with the statistic ν_n , its symmetrized version s_n is considered:

$$s_n = \frac{\nu + \tilde{\nu}}{2} = -\frac{4n+5}{n-1} + \frac{6}{n^3-n} \sum_{i=1}^n R_i Q_i \left(4 - \frac{R_i + Q_i}{n+1}\right),$$

where $\tilde{\nu}_n$ is defined similarly to ν_n with R_i in the place of Q_i and vice versa.

Asymptotic and finite-sample properties of s_n as a test statistic for testing the hypothesis of independence $H_0 : H \equiv FG$ were studied by Genest and Plante [2]. Their study, however, is restricted to several bivariate distributions indexed by a real-valued parameter. Our results presented in [3] are more general. For a wide class of alternatives close to the null hypothesis, Pitman efficiency of the tests based on the statistics ν_n , $\tilde{\nu}_n$, and s_n is calculated. The Blest-type tests are then compared with similar test procedures existing in the literature. Also, the structures of alternatives for which the tests are asymptotically optimal are found.

This research has been supported by an NSERC grant.

СПИСОК ЛИТЕРАТУРЫ

1. *Blest D. C.* Rank correlation — an alternative measure. — *Aust. N. Z. J. Statist.*, 2000, v. 42, p. 101–111.
2. *Genest C., Plante J.-F.* On Blest's measure of rank correlation. — *Can. J. Statist.*, 2003, v. 31, p. 1–18.
3. *Stepanova N., Wang S.* Asymptotic efficiency of the Blest-type tests for independence. — *Aust. N. Z. J. Statist.*, 2008, v. 50(3), p. 217–233.