Statistical simulation as the solution of problems in testing composite hypotheses with nonparametric goodness-of-fit tests

B.Yu. Lemeshko (Invited talk)

In the case of testing composite hypotheses, the limiting statistic distributions of nonparametric goodness-of-fit tests depend on a number of factors: the kind of distribution corresponding to the tested hypothesis; the number and the type of estimated parameters; the estimation method used; sometimes, a specified value of parameter. Ignoring this problem of testing composite hypotheses leads to incorrect statistical inference.

It is impossible to solve such a great number of arising problems in the framework of the analytical approach. At the same time the Monte-Carlo methods with the usage of parallelization of computational processes enable to simulate the empirical distribution of the test statistic with the required accuracy, and then to build approximate models of limiting distributions. Such study of statistic distributions can be carried out interactively (during performed statistical analysis).

On the basis of the results, obtained with the use of statistical simulation, the textbook on the application of nonparametric goodness-of-fit tests (Kolmogorov, Kuiper, Watson, Cramer-von Mises-Smirnov, Anderson-Darling and Zhang tests) has been developed. It includes a number of tables of percentage points and models of statistic distributions. This textbook will be useful to engineers, scientists, experts in various fields, who face the need of statistical analysis of the results of experiments, as well as to university teachers and students.

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