

# THE NON-PARAMETRIC INTERVAL ESTIMATOR FOR THE ANALYSIS OF ENVIRONMENTAL DATA

*Valeriy A. Barannik*

*Kharkiv State Academy of Municipal Economy, Ukraine*

## ABSTRACT

Data treatment is the routine procedure to get valuable information on environmental processes. The simple statistical estimations, both parametrical and non-parametrical, are widely used in practice to evaluate parameters that characterize the quality of different environmental compounds. The interval estimations (confidence interval) are especially useful for making inferences. The actual problem is in that if intrinsic distribution is unknown and sample size is low then there is no suitable method for reliable interval estimations of parameters.

The non-parametric method for the interval estimations of environmental parameters is offered based on Monte-Carlo procedure. It does not impose any limits on the sample size or sample distribution. Instead, it is supposed that minimum and maximum values of the population are known. This approach looks like bootstrapping that uses the Monte-Carlo procedure but unlike it enables to obtain the improved confidence interval, even for the small size sample. Monte-Carlo algorithm includes statistical trials that are carried out with two piece-wise linear approximations of the integral that represents the evaluated parameter. The Monte-Carlo method also enables to restore the thin structure of *a posteriori* probability distribution of estimated parameter for the small size sample.

The properties of the proposed Monte-Carlo method are compared with those of the bootstrapping. Some examples of application to the problems of hydrological parameter assessments are also presented and specific conditions of it application are discussed.