# Information on dissertation submitted for the PhD degree of National Research Tomsk State University

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**Title of the thesis:** Algorithms of statistical data processing taking into account additional information and its applications

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# ABSTRACT OF THE DISSERTATION

Algorithms of statistical data process taking into account additional information and its applications describe procedures where multiple autonomous methods are used together to collect data and better analyze them in the sense of improving the quality of classical software.

The aim of the research was to develop new models and algorithms that allow attracting additional information about known quantile of cumulative distribution function to improve the quality of classical algorithms and use them in different fields. New algorithms have a high practical significance for enterprises of various activities and allow achieving augmentation of revenue due to better evaluation of various indicators.

Software applications were developed using Java NetBeans as an IDE, applying Monte-Carlo simulations and bootstrapping.

The results of the research:

1) Statistical properties of the mean value’ estimation modified with known quantile of cumulative distribution function were studied for small sample sizes using the Monte-Carlo simulations;

2) The modified estimator is more precise than the classical sample mean, and it was used in modifications of different algorithms, particularly, in the estimation of trees’ height, calculation of economic order quantity, turnover assets’ ratios, ABC-XYZ analysis;

3) It was suggested a new algorithm of ABC-XYZ analysis containing product deficit information that can be considered as a random right censoring. The method is based on nonparametric Kaplan-Meier estimator and allows finding more precise groups of products;

4) The new software based on the new algorithms was developed. It helps in decision-making in telecommunications, banking, production, accounting, finance, healthcare, large-scale industries, transportation, consumer benefits, etc.

All new algorithms are more accurate and can be used to improve the quality of traditional software, and applicable in database management systems.

This research is the application and development of the research provided by the Department of System Analysis and Mathematical Modelling, Institute of Applied Mathematics and Computer Science, Tomsk State University.