ABSTRACT

Explanatory note size – 83 pages, contains 24 illustrations, 30 tables, 3 applications, 17 references.

Topicality. Regression analysis is an important tool for finding regularities between the results of any experiments, regardless of the field in which it would be applied. There is still no universal method for solving the problem of multivariate linear regression, which includes finding input variables that significantly affect the value of the output variable, which would be guaranteed to be more effective than other universal methods. Therefore, the problem of effectively solving the problem of building a multidimensional linear regression given by redundant description is relevant both in theory and in application, since such models are widely used in special information systems for various purposes (medical diagnostic systems, classification systems, and the like).

In most statistical packages, the curve estimation procedure produces curve estimation regression statistics and corresponding plots for many different models (linear, logarithmic, inverse, quadratic, cubic, power, S-curve, logistic, exponential, etc.). It is important to plot the data to determine which model to use for each dependent variable. If the variables appear to be linearly related, a linear regression model can be used.

The aim of the study. The main goal is to create software for solving the problem of multidimensional linear regression given by redundant description on the basis of a new method, which would differ from the existing ones in terms of theory and in terms of the effectiveness of its construction in practical problems.

The object of research: software for solving the problem of constructing a multivariate linear regression given by redundant description.

The subject of research: efficiency of a new method of constructing multivariate linear regression given by redundant description.

To achieve this goal, the **following tasks** were formulated:

‒ critical analysis of existing algorithms for solving the problem of multidimensional linear regression;

‒ comparative analysis of existing software systems;

‒ creation of a new method for solving the problem of multivariate linear regression;

‒ creating a software product that implements the proposed method.

The scientific novelty of the results of the master's thesis lies in the fact that a new modernized method of constructing a multivariate linear regression given by redundant description was developed, as well as effective software that implements the proposed method. Software efficiency is achieved through parallelization of calculation processes, which allows to optimize the operation execution time of programs as well as speeding up their performance.

The practical significance of the obtained results is that the developed software can be used in the creation of modern information systems that use multidimensional linear regressions as mathematical models.

Relationship with working with scientific programs, plans, topics. Work was performed at the Department of Informatics and Software Engineering of the National Technical University of Ukraine «Kyiv Polytechnic Institute. Igor Sikorsky».

Approbation. The scientific provisions of the dissertation were approved at the Third All-Ukrainian Scientific and Practical Conference of Young Scientists and Students "Software Engineering and Advanced Information Technologies" (SoftTech2022). Section of the Department of Informatics and Software Engineering. November 23-25, 2022. Kyiv: 2022.

Publications. The scientific provisions of the dissertation were published in:

1) Pavlov O.A., Golovchenko M.M., Ryvych M.M. Method for estimating coefficients for linear terms of multivariate polynomial regression given by redundant description. Adaptive automatic control systems. Kyiv: NTUU "KPI", 2022. Volume 1. No. 40, pp. 110–117.

2)   Pavlov O.A., Golovchenko M.M., Revych M.M., Drozd V.V. Research on the effectiveness of the method of constructing a multivariate linear regression given by redundant description. Materials of the Third All-Ukrainian Scientific and Practical Conference of Young Scientists and Students "Software Engineering and Advanced Information Technologies" (SoftTech2022). Section of the Department of Informatics and Software Engineering. November 23-25, 2022. Kyiv: 2022.