

ABOUT DEVELOPMENT OF INTELLECTUAL SYSTEM OF DATA PROCESSING OF INDIRECT EXPERIMENTS. S.G. Valeev, D.M. Yastrebov.

The Ulyanovsk State Technical University, st. Severny venez, 32, Ulyanovsk, russia

One of the most important computing procedures at processing indirect supervision (the data of passive experiment) is the stage of definition (estimation) parameters of mathematical models.

Unfortunately, the traditional approach in the specified areas to estimate the parameters, providing rigidly fixed model and application of a method of the least squares, does not correspond to growing requirements of practice. Separate attempts to leave from frameworks standard principle of the least squares (PLS) are aimed at the decision of private problems and do not provide the system approach to a problem.

As alternative S.G.Valeev's to traditional approach the methodology regression the modeling, providing in problems estimate regression the analysis, check of assumptions, adaptation has been offered in case of their infringements in this or that sequence and supposing presence of the special software - systems of processing of the information, automate process of calculation and the analysis. Regression modeling (RM - the approach) is an adaptive system approach, at which correctness of application of any element of system (sample, model, a method estimate parameters, a method estimate structures, the measure of quality, a set of assumptions) can be subjected to doubt and check with corresponding adaptation under the set script at infringement of the set conditions. The basic problem thus is creation of the corresponding software.

Regression analysis (RA) is one of the most productive methods of the mathematical statistics, allowing to describe multivariate results of supervision. In regression the analysis exists three the basic precisely allocated a stage:

1) The initial mathematical description of results of supervision,

2) Estimating parameters of mathematical model on the basis of a principle of the least squares,

3) Search and a choice of optimum model by criteria of quality.

For today there is a significant set of computing receptions and the means allowing successfully to work in conditions of infringement of separate assumptions. However it is clear, that the problem cannot be resolved by partial updating. Strategy or methodology of the approach is necessary for its decision to the account whenever possible all consequences of non-observance of conditions of the basic assumptions regression the analysis.

Now there are two approaches to realization RA. Both approaches admits, that those or other assumptions are broken and in the pure state the normal circuit to apply it is necessary with care. The methodology of the first approach provides check of assumptions and in case of their infringements use of corresponding adjusting procedures. In the second case (without check of preconditions) or other method of statistical processing (dispersive, covariation analysis, etc.) is applied, or algorithm RA which is taking into account infringements at once of several preconditions is designed. Thus it is considered, that other assumptions are observed.

Within the framework of development and program realization of the first approach in 2001 the program complex system of searching for optimum regression (SSOR) of version 1.0 has been created.

In connection with a wide circulation recently personal computers and platform Windows there is a question on creation of the specialized, in detail focused package SSOR on this platform. The software package available now the SSOR 1.0 realizing the approach regression of modeling (RM-approach) to the decision of problems PLS,

demands the serious updating including: 1) translation into platform Windows; 2) development of base of functions and knowledge; 3) processing and expansions of functional filling; 4) development of language of tasks for managements and formations of scripts of processing; 5) improvement of the interface and means of development according to last achievements in sphere of information technologies.

As the adaptive RM-approach assumes performance of procedures parametrical estimation and structurally-parametrical identification, diagnostics of essential infringement of conditions regression analysis PLS (RA-PLS) and application of adaptive procedures at their detection, the functional block includes programs: plural regress, libraries of criteria of quality of model and diagnostics of infringements, ridge regression,

methods of the characteristic root, the compressed estimations, the step-by-step regress, casual search, etc.

The package SSOR of version 2.0 is intended first of all for reception of optimum models of the data processing used for the forecast and wide application can find at the decision of problems PLS (problems of restoration of dependences) on superfluous indirect supervision in astronomy, heavenly mechanics, geo-and planet- physics and other areas.

In the near future SSOR of version 2.0 is planned to include the managing program in a package on adaptation to infringements RM. The given program will allow to automate process of adaptation to infringements of assumptions regression the analysis, reducing corresponding time and material inputs.