

# A NEW METHOD OF DECISION MAKING QUALITY IN A SCIENTIFIC EXPERIMENT

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**Objective** Demonstration of the possibilities of a new multicriteria graph-analytical method for rapid decision-making of "mass centers" for rapid analysis of the results of scientific experimental research.

**Results of work** The work identifies key trends and new areas of decision making quality research through structured systematic review. The systematic analysis carried out includes both a descriptive survey and a thematic synthesis of modern quality management decision-making. The work of domestic and foreign experts on decision support in the course of analysis and processing of an array of statistical experimental data, which is an actual task of optimization for scientific organizations, is researched. In order to facilitate the solution of the problem of the correct choice of the optimal research direction, modern methodologies of multicriteria analysis and quality management have been analyzed. An algorithm for decision-making was created which is based on the apparatus of mathematical statistics and the integration of data, which amplified the influence of both methodologies. The mechanism of choice of criteria of quality of scientific experiment is substantiated; comparison of influence of criteria on research results is made. The confidence intervals of the model construction for the analysis of the obtained results have been determined. The solution of the main task of the work by the graph-analytical method on the basis of the original triangular diagram with the field of probable results and placement of the experimental data on the coordinate grid is proposed. In the end, a new research area was discovered: merging data and providing data to users in a unified form. Although the theory of quality and multicriteria analysis are well developed, this study is one of the few that is carried out in terms of combining all known approaches and cumulative integration to get true results of experiment and decision making.

## **Conclusion**

- The result can be used to assess the quality of decision-making in both scientific experiments and for multidimensional financial, environmental, social and other tasks.
- The graph-analytical decision-making method of the "centers of mass" provides information for further analytical calculations or the creation of simulation models to evaluate the results.
- This contribution provides an initial theoretical basis that will enable practitioners in a short time to collect, analyze and calculate the data obtained in scientific experiments.