COMBINATORY APPROACH IN EXPERIMENT PLANNING

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The design of experiment methods make it possible to reduce the value (time) costs with research of a variety of objects.

Optimal experimental design often requires complex ordering of experiments according to various factors, and such orderings may be based on combinatorial configurations or combinatorial schemes. The effectiveness of planning the experiment largely depends on the correct choice of the combinatorial plan to take into account the influence of external factors [1, 2].

The purpose of the report is to develop a method for building optimal plans for a multivariate experiment. One way to solve this problem is to minimize a number of changes in factor levels while constructing plans of multifactor experiments. The construction of the optimal plans of multifactor experiments can be implemented by the combinatorial optimization method.

The report examines the features of combinatorial plans that take into account the order of alternation of levels of factor changes and proposes a method of their construction. The connection of this problem with the problem of forming codes with minimal changes is shown [3, 4]. A group of transformations that preserve the minimum number of changes is defined. The described method of building plans for a complete multifactorial experiment with a minimum number of changes allows you to build catalogs of the optimal number of factor level changes and to select the optimal option not on the entire set of possible plans, but only among the plans included in the catalog, the number of which is much smaller.

To automate the process of building catalogs of optimal experimental plans with a minimum number of factor level changes and finding the optimal combinatorial experimental plan, software was developed that implements the method described above [5].

References

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