

**FEATURES OF CONSTRUCTION OF DIFFERENT
MODIFICATIONS OF A CLASS OF POLYARGUMENT SYSTEMS
METHODS FOR SOLVING OF MULTI-DIMENSIONAL PROBLEMS
OF THERMOPHYSICS**

**Yurchuk Vladimir Leonidovich, Prokopov V.G.,
Sherenkovskiy Ju.V., Fialko N.M.,**

*Institute of Engineering Thermophysics, NAS of Ukraine,
Kiev, 2a M. Kapnist st., tel +38 (044) 456-91-71, nmfialko@ukr.net*

Improving the efficiency of modeling multidimensional heat transfer processes is associated with the need to develop special methods that have high adaptive properties in terms of the multi-dimensionality factor.

The purpose of the work is to substantiate the possibility of constructing various modifications of the class of polyargument systems methods (MPS), oriented to solving multidimensional problems of thermophysics.

Results. The methodology for constructing the MPS is based on three starting positions: 1. The elimination of the need to use any a priori elements in the sought solution and the determination of all the information necessary for the construction of a solution, based only on the given mathematical formulation of the problem. 2. Implementation of the completeness of the functional display of the initial information in the reduced problem. 3. Reduction of a multidimensional problem to special one-dimensional problems.

It is noted that the source of the diversity of the MPS are the differences that occur in the implementation of these initial provisions. Firstly, these are differences related to the different degrees of the actual implementation of these provisions, and, secondly, the differences arising from the possibility of using different means in their implementation. It is shown that the differences of the first type give rise to two main subclasses of MPS - the methods of complete and incomplete polyargument systems. As for the differences of the second of these types, the possibility of constructing a set of subsequent modifications of the MPS is based primarily on the variety of forms of representation of the solution of the multidimensional problem and the procedure for its reduction. The indicated variety of forms of representation underlies the corresponding subclasses of methods — direct and recurrent MPS. The variety of reduction procedures leads to integral MPS, methods of coordinate lattices and combined (integro-collocation) MPS.

Conclusions: The main provisions of the construction of a class of methods of polyargument systems are presented and the sources of the variety of their modifications are considered.