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Modification of the load balancing method in a desktop grid for solving problems of constructing Latin square spectra

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Desktop grid systems can be used for a wide range of combinatorial tasks. Such tasks include, among others, the construction of spectra of Latin squares. The task can be divided into many autonomous subtasks that can be performed on various nodes of a desktop grid. One of the features of the problem of constructing Latin square spectra is the different computational complexity of the subtasks. However, the computational complexity of a particular subtask cannot be determined in advance. The load balancing subsystem handles the distribution of subtasks between nodes. The complexity of such a distribution lies in the fact that the nodes of a desktop grid have different computing power, and they can also periodically and unexpectedly shut down. The main tasks of the load balancing subsystem in such a desktop grid are to reduce the downtime of nodes and increase the probability of calculating a subtask before the node is turned off. The paper discusses modifications to the load balancing subsystem in a desktop grid based on the BOINC platform. It is proposed to use machine learning methods to estimate the complexity of subtasks and the probability of calculating a specific subtask at a specific node. The results of using a modified load balancing subsystem are presented using the example of solving the problem of constructing a spectrum of Latin squares for the number of transversals.

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