SOFTWARE IMPLEMENTATION FEATURES OF PARALLELIZATION IN DISCRETE DYNAMIC MODELS CONSTRUCTION PROCESS

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The article is devoted to the analysis of the software implementation features of parallelization in discrete dynamic models construction process based on graphical multi-core processors.

Construction of dynamic models is a complex optimization problem which is difficult to solve in a reasonable time, even with the use of modern computer technology. So the creation of methods for building models that would provide the required performance and could be implemented on the available computer technology is important. Parallelization of the computational process which reduces the complexity of the algorithm is one of such methods.

SIMD-architecture was used for the task of parallelization. This architecture allows one to perform the same command stream for many data streams. Efficiency of the use of graphics processors for the discrete dynamical models construction task is justified. Using graphics processors for non-graphical computing is an emerging area of research. Technology CUDA and GPU NVIDIA was used for this software implementation. The benefits of CUDA are shown in the article. This technology works on a large number of video processors NVIDIA, improves programming model of GPU, simplifies it and adds a lot of possibilities. The model of parallel computation using this technology is considered.

Features of the memory and copy data between graphical and central processors are analyzed because performance of applications depends on the speed of work with memory. The synchronization use in the program is analyzed. The generalized scheme of discrete dynamic models construction using GPU is shown.

New software for discrete dynamic models construction which uses GPUs is characterized by lower time complexity as opposed to sequential.

Keywords – GPU, CUDA, parallel computing, parallelization, discrete dynamic models