

ABSTRACT

Thesis: 121 p., 16 tables., 40 images., 2 appendixes, 11 sources.

ARTIFICIAL LIFE, CELLULAR AUTOMATONS, CONWAY'S GAME OF LIFE, COMPUTATIONS ON GPU, OPENCL.

Object of this thesis is conditions and characterization of an environment, in which untrivial objects resembling living beings in their behaviour can exist and germinate.

The goal of this work is simulation of such environment on existing hardware while giving necessary for research instruments to its user.

The cellular automata "Game Of Life" with stochastic modification was chosen as the studied environment. An algorithm and a software intended for modelling this modification of the "Game Of Life" on hardware computation accelerator and optimized for usage for computation making computations on graphics accelerators of the CUDA architecture was developed. A marking method for objects in cellular automata was developed. A corresponding label composing binary operator was invented for this purpose and its correctness for this purpose was proven.

A fundamental distinction with other artificial life experiments consists in that object's selection conditions are not defined directly, but follows from the world's it exists in and its environment.

This work gives a convenient instrument for research of the stochastic modification of the "Game Of Life". It also can be easily adapted for research of other cellular automatas.