Cellular automata constitutes a unique approach to the modeling of complex systems. The major phase of their development in continuum mechanics came in the late 80s, but the closer inspection of their macroscopic limit revealed that it does not accurately correspond to hydrodynamic equations.
Besides the Lattice-Boltzmann model, various other approaches to improve LGCA have emerged.
The main focus of our research is on the Pair-interaction cellular automaton.
In this thesis, we propose the non-deterministic variant of this automaton, and we compare it with its predecessor on the simulations of the "exploding cube", Taylor-Green vortex and fully developed turbulence.
The results for the non-deterministic automaton seem quiet reasonable, but derivation of the hydrodynamic equations is necessary to conclude in what extent it solves the problem with anisotropic viscosity.