Numerical solution of mean field problem with limited management resource

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Here we propose the computational algorithm for the formulation of MFG problem with the limited management resource during control realization. The Mean Field equilibrium leads to a coupled system of two parabolic partial differential equations: Fokker-Planck-Kolmogorov and Hamilton-Jacobi-Bellman ones with an additional constraint in the form of the inequality. Based on the Karush-Kuhn-Tucker theorem [1], this statement is reduced to finding the saddle point of the Lagrangian with an additional condition of complementary slackness. To approximate the problem, the (Euler-Lagrange) difference schemes are used, which is presented in [2]. An iterative algorithm is presented for solving the obtained discrete problem with justification of the convergence of its elements. The convergence of the algorithm as a whole is illustrated by a numerical example.

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On the accuracy of semi-discrete central-upwind schemesO. A. Kovyrkina^{1,2}, A. Kurganov³, V. V. Ostapenko^{1,2}¹*Lavrentyev Institute of Hydrodynamics SB RAS*²*Novosibirsk State University*³*Southern University of Science and Technology, Shenzhen, China**Email: olyana@ngs.ru*

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On the basis of the method proposed in [1], we studied the accuracy of the second-order semi-discrete finite-volume central-upwind scheme [2] in calculations of shocks propagating with variable velocity. It is shown that in the shock influence domain, the scheme orders of the integral and local convergence decrease to the first one, while on the smooth solutions this scheme has the second order of accuracy. Test calculations are presented.

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