STUDY OF CONTINUOUS SEARCH OPTIMIZATION ALGORITHM EFFICIENCY BY PARTICLE SWARM

Yu.V. Yamchenko
A.S. Andrusenko

yamchenko.y.v@yandex.ru

Bauman Moscow State Technical University, Moscow, Russian Federation

Abstract	Keywords
The study presents a stochastic method of direct search — a method of particle swarm. We examined modifications of this method: a ranking FIPS algorithm and the algorithm with the addition of the graph of particles neighborhood. Moreover, we studied the efficiency of the developed knoware and software. The results of the study can be used in choosing the most effective optimization algorithm based on the method of particle swarm	

References

[1] Zakharova E.M., Minashina I.K. Review of multidimensional optimization techniques. *Informatsionnye protsessy* [Information processes], 2014, no. 3, pp. 256–274 (in Russ.).

[2] Fisher F.N. Problemy identifikatsii v ekonometrii [Identification problem in econometrics]. Moscow, Finansy i statistika Publ., 1978. 223 p. (in Russ.).

[3] Chia-Nan K., Ying-Pin C., Chia-Ju W. An orthogonal-array based particle swarm optimizer with nonlinear time-varying evolution. *Applied Mathematics and Computation*, 2007, vol. 191, no. 1, pp. 272–279. DOI: 10.1016/j.amc.2007.02.096

[4] Qi H., Ruan L.M., Shi M., An W., Tan H.P. Application of multi-phase particle swarm optimization technique to inverse radiation problem. *Journal of Quantitative Spectroscopy & Radiative Transfer*, 2008, vol. 109, no. 3, pp. 476–493. DOI: 10.1016/j.jqsrt.2007.07.013

[5] Hamdy A. Taha. Operations research: an introduction (7th Edition). Prentice Hall, 2002. (Russ. ed.: Vvedenie v issledovanie operatsiy. Kn. 2. Moscow, "Vil'yams" Publishing house, 2005. 912 p.)

[6] Jie J., Han Ch., Zeng J. An extended mind evolutionary computation model for optimizations. *Applied Mathematics and Computation*, 2007, vol. 185, no. 2, pp. 1038–1049. DOI: 10.1016/j.amc.2006.07.037

[7] Karpenko A.P., Seliverstov E.Yu. Global unconstrained particle swarm optimization on graphics processors with CUDA arhitecture. *Nauka i obrazovanie. MGTU im. N.E. Baumana* [Science and Education of the Bauman MSTU], 2010, no. 4, pp. 188–191 (in Russ.). DOI: 10.7463/0410.0142202

[8] Kennedy J., Eberhart R.C. Particle swarm optimization. *Proc. of IEEE Int. Conf. on Neural Networks*. Vol. 4. Australia, IEEE Service Center, Piscataway, NJ. 1995, pp. 1942–1948.

[9] Karpenko A.P., Seliverstov E.Yu. Review of the particle swarm optimization method (PSO) for a global optimization problem. *Nauka i obrazovanie. MGTU im. N.E. Baumana* [Science and Education of the Bauman MSTU], 2009, no. 3 (in Russ.). DOI: 10.7463/00309.0116072

[10] Karpenko A.P. Sovremennye algoritmy poiskovoy optimizatsii. Algoritmy, vdokhnovlennye prirodoy [Modern search optimization algorithms. Algorithms, inspired by nature]. Moscow, Bauman MSTU Publ., 2014. 446 p. (in Russ.).

Yamchenko Yu.V. — Bachelor of the Department of Computer-aided design, Bauman Moscow State Technical University, Moscow, Russian Federation.

Andrusenko A.S. — Bachelor of the Department of Computer-aided design, Bauman Moscow State Technical University, Moscow, Russian Federation.

Scientific advisors — A.P. Karpenko, Dr. Sci. (Phys.- Math.), Head of the Department of Computer-aided design, Bauman Moscow State Technical University, Moscow, Russian Federation.; V.V. Sokolyanskiy, Assoc. Professor of the Department of Economics and business, Bauman Moscow State Technical University, Moscow, Russian Federation.