

Development and Research of Adaptive Methods of Swarm Intelligence to Scheduling Problems

Pavel Matrenin

Abstract. The paper gives the analysis of the methods of swarm intelligence and a new approach to research and improve the efficiency of these methods in the field of scheduling problems. The proposed approach is based on evolutionary adaptation parameter algorithms to the conditions of each specific task using a genetic algorithm.

Key words: swarm intelligence, adaptation, the ant colony algorithm, particle swarm method, genetic algorithm, scheduling.

REFERENCES

- [1] Tanaev V.S. Teoriya raspisaniy. Mnogostadijnye sistemy/ V.S. Tanaev, Ju.I Sotskov, V.A Strusevich. – M.: Nauka, Gl. red. fiz.-mat. lit., 1989. – 328s.
- [2] Gromicho J. Exponentially better than brute force: solving the job-shop scheduling problem optimally by dynamic programming/ J. Gromicho, J. van Hoorn, F. Saldanha-da-Gama, G. T. Timmer. [Электронный ресурс] URL: <http://dare.uvu.vu.nl/bitstream/handle/1871/37989/Solving%20the%20job-shop%20scheduling%20problem%20optimally%20by%20dynamic%20programming.pdf;jsessionid=9FAC88F6A63C4CAF76B4CEBDEC5B1F62?sequence=2>.
- [3] Beni, G., Wang, J. Swarm Intelligence in Cellular Robotic Systems, Proceed. NATO Advanced Workshop on Robots and Biological Systems, Tuscany, Italy, June 26–30 (1989).
- [4] Pedersen M. Tuning & Simplifying Heuristical Optimization/ Pedersen M. // University of Southampton, School of Engineering Sciences, Computational Engineering and Design Group. 2010. [Электронный ресурс] URL: <http://www.hvass-labs.org/people/magnus/thesis/pedersen08thesis.pdf>
- [5] Dorigo M. The Ant System: Optimization by a colony of cooperating agents/ M. Dorigo, V. Maniezzo, A. Colorni // IEEE Transactions on Systems, Man, and Cybernetics – Part B. 1996. V. 26. No. 1. [Электронный ресурс] URL: <ftp://iridia.ulb.ac.be/pub/mdorigo/journals/IJ.10-SMC96.pdf>
- [6] Matrenin P.V. Optimizacija adaptivnogo algoritma murav'inoj kolonii na primere zadachi kalendarnogo planirovaniya /P.V. Matrenin, V.G. Sekaev// Programmnaja inzhenerija, 2013. №4.
- [7] J. Kennedy and R. C. Eberhart, Particle Swarm Optimization. Proc. of IEEE International Conference on Neural Network, Piscataway, NJ. Pp.. 1942–1948 (1995).
- [8] Adams J., Balas E.,Zawack D. The shifting bottleneck procedure for job shop scheduling// Management Science. 1991. №34. P. 391–401.
- [9] Fisher H., Thompson G. Probabilistic learning combination of local job-shop scheduling rules, in Industrial Scheduling. Prentice-Hall, Englewood Cliffs, N.J., 1963.
- [10] Lawrence S. Supplement to “resource constrained project scheduling: an experimental investigation of heuristic scheduling techniques”// tech. rep., GSIA, Carnegie Mellon University, October 1984.
- [11] Petrov V.A. Planirovanie gibkikh proizvodstvennyh sistem / V.A. Petrov, A.N. Maslennikov, L.A. Osipov. – L.: Mashinostroenie, 1985. – 182s.
- [12] Sekaev V.G. Ispol'zovanie algoritmov kombinirovaniya jevristik pri postroenii optimal'nyh raspisaniy// Informacionnye tehnologii. 2009. №10. S. 61–64.
- [13] Pezzella F., Merelli E. A tabu search method guided by shifting bottleneck for the job shop scheduling problem // European Journal of Operational Research. 2000. №120. P 297–310.
- [14] Frolov E.B. MES-sistemy, kak oni est' ili jevoljucija sistem planirovaniya proizvodstva / E.B. Frolov, R.R. Zagidullin. URL: <http://www.management.com.ua/ims/ims142.html> .

Pavel Matrenin

E-mail: pavel.matrenin@gmail.com.