USING MATHEMATICAL METHODS OF DYNAMIC PROGRAMMING FOR ORGANIZING DELIVERY SYSTEM

Anastasia Dolgova

Student of Samara State University of Economics

Samara, Russia

Darya Romanova

Student of Samara State University of Economics

Samara, Russia

Elena V. Buntova

Candidate of pedagogical science, Assistant Professor in

Samara State University of Economics

Samara, Russia

Abstract. The paper considers the question of organizing a goods delivery system from the producer (warehouse) to the consumer in the aspect of solving the minimizing transport costs problem using one of the dynamic programming methods to find the optimal solution. The article analyzes the scientific literature about the effectiveness of using dynamic programming methods to solve the delivery system organization problem. Two basic enterprises data analysis is carried out: a firm engaged in sanitary ware sale, which need to deliver the goods from the warehouse to a remote area of Samara; and a company engaged in the production and supply of meat, which is located near the city, and need to choose the route of products delivery to the city. Then a mathematical model is constructed; and the task of optimizing the delivery system at the enterprises is solved with its help, the found solution meets the requirement of minimizing the delivery cost. The study object described in this article is the dynamic programming method. The research subject is the solution of the goods delivery problem using the dynamic programming method. The article emphasizes the advantages and limitations of the dynamic programming method for finding the optimal route.

Keywords: dynamic programming; optimal solution; goods delivery; delivery cost minimization; transport routes optimization.

JEL codes: C 10; C 61.

References

1. Buntova, E.V. Application of the theory of automata in the process of intensification of information technologies // Proceedings of the Institute of Control Systems of SSEU. 2017. No. 1 (15). Pp. 329-332.

2. Sutyagina, N.I. The method of dynamic programming when making a microeconomic decision // Vestnik NGIER. 2014. No. 11 (42). C.2.

3. Vakulina, G.M.; Timofeeva, G.A. Dynamic Programming Using Fuzzy Logic in Planning Investment Projects // Izvestia Ural State University of Economics and Management. 2014. №2 (52) .C.3.

4. Shramko, A.P. Instrumentation of dynamic programming in the optimization of the regional transport system. // Mir transport. Volume 15, №5. 2017. pp. 138-145

5. Buntova, E.V. Applied Mathematics // Kinel. 2015. P.102.

6. Tari, F.G. A Hybrid Dynamic Programming for Solving Fixed Cost Transportation with Discounted Mechanism // Journal of Optimization. 2016. Article number: UNSP 8518921.

7. Hao, C.; Yue, Y. Optimization on Combination of Transport Routes and Modes on Dynamic Programming for a Container Multimodal Transport System / Conference: 6th International Conference on Green Intelligent Transportation System and Safety (GITSS) Location: Beijing, PEOPLES R CHINA: JUL 02-06, 2016. Book series: Procedia Engineering. Volume: 138. P.: 382-390.

8. Wang, X.-dong; Feng, J.; Niu, W.; et al. Goods Distribution Based on Simulation Annealing and Dynamic Programming / Conference: 9th International Conference on Natural Computation (ICNC) Location: Shenyang, PEOPLES R CHINA: JUL 23-25, 2013. P.: 793-797.

9. Zhao, H.; Huang, D. Random Choice of Logistics Distribution Route Based on Dynamic Programming / Conference: 2nd International Conference on Materials and Products Manufacturing Technology (ICMPMT 2012) Location: Guangzhou, PEOPLES R CHINA: SEP 22-23, 2012. Book series: Advanced Materials Research. Volume: 605-607 P.: 2493-2496.

10. Cho, J.H.; Kim, H.S.; Choi, H.R. An intermodal transport network planning algorithm using dynamic programming-A case study: from Busan to Rotterdam in intermodal freight routing // Applied Intelligence. 2012. Volume: 36, Issue: 3. P.: 529-541.

11. Buntova, E.V. Mathematical models in economics. // In the collection: Science of the XXI century: actual directions of development. Materials of the International Correspondence Scientific and Practical Conference. 2015. P. 989-992.

12. Bellman, R. Applied problems of dynamic programming. Ripol Classic, 2013. P.24-25.

13. Vasiliev, F.P. Optimization methods: Kn.2 New edition, revised. and additional. M .: МЦНМО, 2011. P.17-19

14. Lezhnev, A.V. Dynamic programming in economic problems. Moscow: Binom, Laboratory of Knowledge. 2010. P.77.

15. Subbotin, A.I.; Chentsov, A.G.; Krasovskiy N.N. Optimization of the guarantee in management tasks. Science, Heads. Ed. Physics and Mathematics Literature, 1981. P.31.

Contact

Anastasia Dolgova

Samara State University of Economics

141, Sovetskaya Armiya str., Samara, Russia, 443063

Kristil686@gmail.com

Darya Romanova

Samara State University of Economics

141, Sovetskaya Armiya str., Samara, Russia, 443063

daria_romanova1999@mail.ru

Elena V. Buntova

Samara State University of Economics

141, Sovetskaya Armiya str., Samara, Russia, 443063

lena-buntova1@yandex.ru