ABOUT RESEARCH AND SOLVING THREE-DIMENSIONAL EXTENDED VEHICLE ROUTING PROBLEM[1]

A.F. Valeeva, Y.A. Goncharova, I.S. Koshcheev

Ufa State Aviation Technical University, Ufa
e-mail: aida_val2004@mail.ru

Three-Dimensional Extended Vehicle Routing Problem(3L-EVRP) includes solving of next sub problems: demand prediction of the desired product; calculating rational routes for product delivery by lorries with different capacity (taking into account time windows, planing period, split delivery, multi depot, inhomogeneity of carport) [1]; choosing of items for transportation; packing cylinders and parallelepiped items into containers taking into account weights and palletisation, which should be less then capacity of lorry [2]. Algorithm P-ACO-3L-EVRP on the base of metaheuristic ant colony based on population taking into account some restrictions, was developed for searching rational routes. Evolutionary algorithm $(\lambda + \mu)$ EA3D was developed for solving packing problem. Algorithms, developed for solving problems mentioned above, was combined into one unit, which could be called prototype of transportation logistical system.[2]. Estimation of algorithm efficiency for P-ACO-3L-EVRP и $(\lambda + \mu)$EA3D was obtained by computing on the test cases of OR-library. Time windows, planing period, split delivery, multi depot, inhomogeneity of carport takes into account for vehicle routing problem. Results compared with genetic algorithm (G.Jeon, H.R. Leep, J.Y. Shim), TABU search algorithm (C. Archetti, M.G. Speranza, A. Hertz). Best value of objective function was obtained for four test cases. $(\lambda + \mu)$ EA3D algorithm checked on well known test cases of OR-library, and compared with genetic algorithm(Bischoff, Ratcliff), several kinds of hybrid metaheuristic algorithm (Liang, Lee, Liang). Algorithm shows commensurate results for the best known.

REFERENCES

1. A.Valeeva, Y.Goncharova, I.Koshcheev *Developing of transportation logistic system for 3L-EVR problem. Part 1* Moscow: Information Technology, 2013, vol. 12, pp. 23-28
2. A.Valeeva, Y.Goncharova, I.Koshcheev *Developing of transportation logistic system for 3L-EVR problem. Part 2* Moscow: Information Technology, 2014, vol. 1, pp. 9-14
3. Mhand Hifi, Rym M'Hallah *Approximate algorithms for constrained circular cutting problems.* Computers and Operation Research vol. 31, 2004, pp. 675-694.