THE TRAVELLING SALESMAN PROBLEM SOLUTION USING THE BRANCHES AND BORDERS METHOD

Elizaveta Kopylova

Student of Samara State University of Economics

Samara, Russia

Daria Nikolayeva

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 article discusses the possibility of reducing the products' transportation logistics costs by finding the most profitable way to move. Since the courier is necessary returning to the departure point, this necessitates the traveling salesman problem solution. Various algorithm parts have been reviewed and improved by a number of researchers. However, the full modern version of the problem's solution has not been presented before. This article presents an improved method's algorithm and its application. A step-by-step algorithm for the traveling salesman problem is described using the branch and boundary method. The algorithm includes six steps: table creation, table reduction, the lower boundary calculation, branching, estimates calculation, the branch tree construction. Further, the authors made the calculation according to the described algorithm of possible courier's ways of the company's products delivery to the actual addresses in 10 Russian cities. The optimal route and its maximum duration are determined, while the logistics costs are significantly reduced. The obtained results showed that the search for solutions is carried out

qualitatively and efficiently by using the branch and boundary method, while the method itself is not labor-intensive.

Keywords: traveling salesman problem; graph theory; branch and boundary method; Hamilton path; Hamilton cycle.

JEL codes: C 02; C 65.

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Contact

Elizaveta Kopylova

Samara State University of Economics

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

kopylowa.elizaveta@yandex.ru

Daria Nikolayeva

Samara State University of Economics

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

ms.dnik25@gmail.com

Elena V. Buntova

Samara State University of Economics

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

lena-buntova1@yandex.ru