Ivan Brezina
Zuzana Čičková
Juraj Pekár

APPLICATION OF EVOLUTIONARY APPROACH TO SOLVING VEHICLE ROUTING PROBLEM WITH TIME WINDOWS[1]

***Abstract:** This article deals with approach to solving the vehicle routing problem with time windows (VRPTW) that is based on evolutionary algorithms. Because the vehicle routing problem with time windows belongs to the group of NP-hard problems, the use of optimisation techniques seems to be relatively complicated; therefore nowadays many researchers turn their attention to the application of alternative computational techniques that are inspired by evolutionary biology. Besides the unconstrained problems with continuous variables, the evolutionary algorithms may be used also for dealing with constrained problems with discrete variables; however, their use requires the techniques that enable to decode a candidate solution into the problem solution so that all given criteria are met. The authors present their own approach to coding and decoding the VRPTW that enables to use a lot of evolutionary techniques.*

***Keywords:** vehicle routing problem with time windows, evolutionary algorithms*

JEL: C 6, C 61, C 63

Introduction

Recently most discussed problems related to the depletion of non-renewable resources that are necessary for car propulsion, therefore they increase the cost (oil crisis, gas crisis), result in an increased interest in the development of instruments that enable the optimisation. The efficiency can be also increased by force of quantitative approaches that are aimed at optimization of physical distribution of the goods and distribution costs. Related optimization problems are routing and scheduling problems: shortest path problem, travelling salesman problem, vehicle routing problem, fixed schedule problem, pick-up and delivery problem, etc.