An interactive method for multiobjective routing problems

Delgado-Antequera Laura*[1,2], Francisco Ruiz[2], and Germán Gémar[2]

[1]Departamento de Economía Aplicada (Matemáticas), Universidad de Málaga – Spain
[2]UNIVERSIDAD DE MÁLAGA – Spain

Abstract

The aim of most of the multi-objective routing problems is to design a metaheuristic strategy capable of generating the most accurate approximation of the Pareto set in the shortest time. However, merely a few studies focus on how to deal with the decision making process afterwards. In real life situations, this becomes an additional problem, since the decision maker (DM) needs to select only one feasible solution, according to his/her preferences. Several researches propose different approaches to build a solution taking into account the preferences of the DM within a Decision Support System. In recent years, Geographical Information Systems (GIS) have been incorporated to these strategies to enable the DM to actively participate on the construction phase.
In this context, we propose a graphical user interface (GUI) that facilitates the information exchange between the analyst and the decision maker in a multi-objective vehicle routing problem, where a valid approach to the Pareto Set has been externally generated. This GUI incorporates a trade-off free interactive method that allows the DM to freely explore and learn along the process from the given set of feasible solutions. To conclude, we show the performance of this methodology for a multi-objective waste collection problem in Málaga, although it could perfectly apply for any other multi-objective VRP.

Keywords: Multiobjective VRP, Waste collection problem, Interactive method, GUI.

*Speaker