

GHG Emissions Reduction based on a Heuristic Optimization Approach: an Example of a SBRP Problem

Dejan DRAGAN, Klemen PRAH, Tomaž KRAMBERGER and Maja FOŠNER
University of Maribor/Faculty of Logistics, Celje, Slovenia

Abstract—Since the transport causes about 26% of global CO₂ emissions, the need to reduce greenhouse gas emissions (GHG) is becoming increasingly necessary. To achieve this objective, several approaches were adopted, like for example the employment of alternative sustainable technologies, or the enforcement of changes in driving skills. In contrast with this kind of approaches, an interesting approach is to reduce the vehicle miles of travel (VMT). In this paper, the concept of VMT reduction based on a heuristic optimization approach is introduced. The suitability of this concept has been tested for the School Bus Routing Problem (SBRP). Working mechanisms of the adopted heuristic optimization algorithms are briefly explained. As can be seen from the results, the optimization of bus stops, bus routes and driving schedules can significantly reduce the amount of VMT and consequently the amount of CO₂ emissions.

Key words—Transport Planning, Environment, Heuristic Optimization Approach, School Bus Routing Problem.

AUTHORS

Dejan Dragan, PhD, is the Assistant Professor at the Faculty of Logistics, University of Maribor, Celje, Slovenia (e-mail: dejan.dragan@fl.uni-mb.si).

Klemen Prah, PhD, is the Teaching Assistant at the Faculty of Logistics, University of Maribor, Celje, Slovenia (e-mail: klemen.prah@fl.uni-mb.si).

Tomaž Kramberger, PhD, Vice-Dean, is the Assistant Professor at the Faculty of Logistics, University of Maribor, Celje, Slovenia (e-mail: tomaz.kramberger@fl.uni-mb.si).

Maja Fošner, PhD, Vice-Dean, is the Associated Professor at the Faculty of Logistics, University of Maribor, Celje, Slovenia (e-mail: maja.fošner@fl.uni-mb.si).

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