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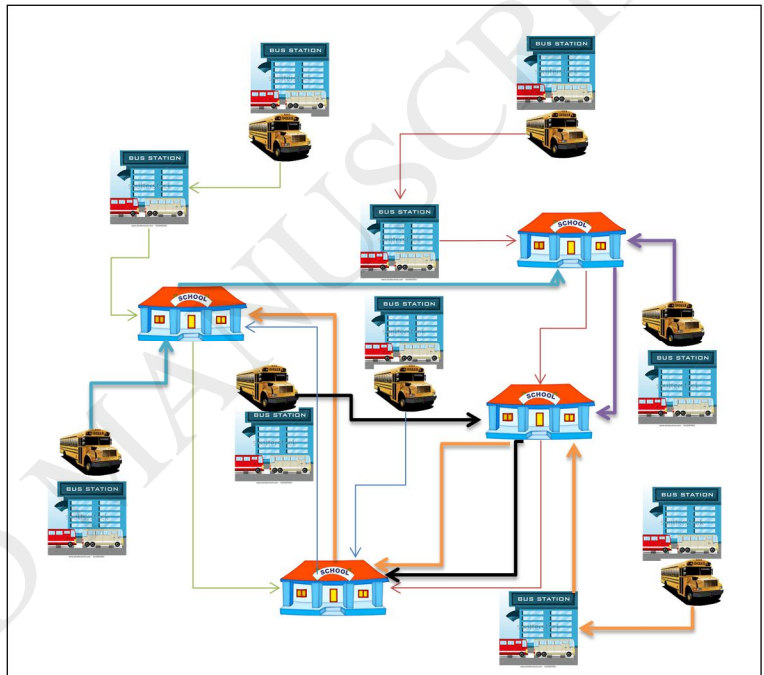
Integration of efficient multi-objective ant-colony and a heuristic method to solve a novel multi-objective mixed load school bus routing model

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Graphical abstract



Highlights:

- Mathematical formulation for mixed load situations for school bus routing problem,
- Proposing a new bi-objective model by optimizing number of buses and average travelling time.
- Developing a bi-objective ant colony algorithm to solve the model efficiently.
- Developing an efficient heuristic method to intensify meta-heuristic method.
- Presenting comprehensive computational results through five sub-sections.

Abstract. In this paper, a novel mixed-load school bus routing problem (MLSBRP) is introduced. MLSBRP assumes that several students from different schools can simultaneously take a ride on the same bus. A bi-objective mixed integer linear programming (BO-MILP) formulation is proposed to model MLSBRP. The objectives are: a) minimizing the number of the buses; and b) minimizing the average riding time of the students. A hybrid multi-objective ant colony

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