



(1)

Scatter programming

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Abstract:

The core of artificial intelligence and machine learning is to get computers to solve problems automatically. One of the great tools that attempt to achieve that goal is Genetic Programming (GP). As alternatives to GP, Scatter Programming (SP) is proposed in this paper. One of the main features of SP is to exploit local search in order to overcome some recently addressed drawbacks of GP, especially its highly disruption of its main operations; crossover and mutation. This work shows that SP has promising performance and results in solving machine learning problems.

Keywords:

Genetic programming , Local search programming , Machine learning , Meta-heuristic programming , Scatter programming

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(2)

Multi-Objective Transit Route Network Design as Set Covering Problem

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Abstract:

Many past researchers have ignored the multi-objective nature of the transit route network design problem (TrNDP), recognizing user or operator cost as their sole objective. The main purpose of this study is to identify the inherent conflict among TrNDP objectives in the design process. The conventional scheme for transit route design is addressed. A route constructive genetic algorithm is proposed to produce a vast pool of candidate routes that reflect the objectives of design, and then, a set covering problem (SCP) is formulated for the selection stage. A heuristic algorithm based on a randomized priority search is implemented for the SCP to produce a set of nondominated solutions that achieve different tradeoffs among the identified objectives. The solution methodology has been tested using Mandl's benchmark network problem. The test results showed that the methodology developed in this research not only outperforms solutions previously identified in the literature in terms of strategic and tactical terms of design, but it is also able to produce Pareto (or near Pareto) optimal solutions. A real-scale network of Rivera was also tested to prove the proposed methodology's reliability for larger-scale transit networks. Although many efficient meta-heuristics have been presented so far for the TrNDP, the presented one may take the lead because it does not require any weight coefficient calibration to address the multi-objective nature of the problem.

Keywords:

Meta-heuristics multi-objective problem set covering problem transit route network design

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