HRMA: Hyper-Heuristic based on the Random Choice of Move Acceptance Methods

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ABSTRACT

Selection hyper-heuristics are high-level search techniques controlling a set of low level (meta)heuristics, and they are designed with generality in mind being applicable to classes of problems rather than a specific one. The move acceptance and (meta)heuristic selection methods are identified as the crucial components of a selection hyper-heuristic. In this study, we present a novel multi-objective selection approach, referred to as Hyper-Heuristic based on the Random Choice of Move Acceptance Methods (HRMA), which considers three move acceptance methods rather than relying on a single one. The main reasoning behind the approach is that having a set of move acceptance methods at our disposal, even if a random choice among them is made, can enable the overall algorithm to perform better. HRMA manages a set of low-level Multi-Objective Evolutionary Algorithms (MOEAs). The results on DTLZ and WFG benchmark functions and a real-world problem, namely Vehicle Crashworthiness, indicate that HRMA is superior than two other well known selection hyper-heuristics and all individual MOEAs run in isolation.

ACKNOWLEDGEMENTS