Benchmarks for Dynamic Multi-objective Optimisation

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Abstract

When algorithms solve dynamic multi-objective optimisation problems (DMOOPs), benchmark functions should be used to determine whether the algorithm can overcome specific difficulties that can occur in real-world problems. However, for dynamic multi-objective optimisation (DMOO) there are no standard benchmark functions that are used. This article proposes characteristics of an ideal set of DMOO benchmark functions, as well as suggested DMOOPs for each characteristic. The limitations of current DMOOPs and studies of dynamic multi-objective optimisation algorithms (DMOAs) are highlighted. In addition, new DMOO benchmark functions with complicated Pareto-optimal sets (POSs) and approaches to develop DMOOPs with either an isolated or deceptive Pareto-optimal front (POF) are introduced to address identified limitations of current DMOOPs.