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A Novel Guided Search Based Multi-Objective Evolutionary Algorithm

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Abstract : Solving Multi-objective Optimization Problems requires faster convergence and better spread. Though existing Evolutionary Algorithms (EA's) are able to achieve this, the computation effort can further be reduced by hybridizing them with innovative strategies. This study is focuses on converging to the pareto front faster while adapting the advantages of Strength Pareto Evolutionary Algorithm-II (SPEA-II) for a better spread. Two different approaches based on optimizing the objective functions independently are implemented. In the first method, the decision variables corresponding to the optima of individual objective functions are strategically used to guide the search towards the pareto front. In the second method, boundary points of the pareto front are calculated and their decision variables are seeded to the initial population. Both the methods are applied to different constrained and unconstrained multi-objective test functions. It is observed that proposed guided search based algorithm gives better convergence and diversity than several well-known existing algorithms (such as NSGA-II and SPEA-II) in considerably less number of iterations.

Keywords : boundary points, evolutionary algorithms (EA's), guided search, strength pareto evolutionary algorithm-II (SPEA-II)
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