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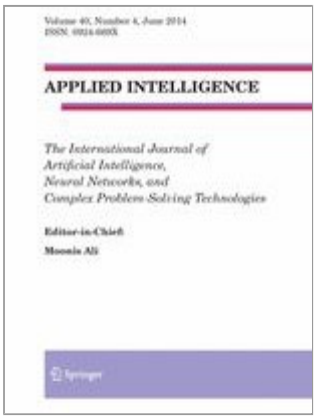
CDEPSO: a bi-population hybrid approach for dynamic optimization problems

Abstract

Many real-world optimization problems are dynamic, in which the environment, i.e. the objective function and restrictions, can change over time. In this case, the optimal solution(s) to the problem may change as well. These problems require optimization algorithms to continuously and accurately track the trajectory of the optima (optimum) through the search space. In this paper, we propose a bi-population hybrid collaborative model of Crowding-based Differential Evolution (CDE) and Particle Swarm Optimization (PSO) for Dynamic Optimization Problems (DOPs). In our approach, called CDEPSO, a population of genomes is responsible for locating several promising areas of the search space and keeping diversity throughout the run using CDE. Another population is used to exploit the area around the best found position using the PSO. Several mechanisms are used to increase the efficiency of CDEPSO when finding and tracking peaks in the solution space. A set of experiments was carried out to evaluate the performance of the proposed algorithm on dynamic test instances generated using the Moving Peaks Benchmark (MPB). Experimental results show that the proposed approach is effective in dealing with DOPs.



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