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**A single front genetic algorithm for parallel multi-objective optimization in dynamic environments.**

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Summary: This paper proposes a new parallel evolutionary procedure to solve multi-objective dynamic optimization problems along with some measures to evaluate multi-objective optimization in dynamic environments. These dynamic optimization problems appear in quite different real-world applications with actual socio-economic relevance. In these applications, the objective functions, the constraints, and hence, also the solutions, can change over time and usually demand to be solved online whilst the size of the changes is unknown. Although parallel processing could be very useful in these problems to meet the solution quality requirements and constraints, to date, not many parallel approaches have been reported in the literature. Taking this into account, we introduce a multi-objective optimization procedure for dynamic problems that are based on PSFGA, a parallel evolutionary algorithm previously proposed by us for multi-objective optimization. It uses an island model where a process divides the population among the remaining processes and allows the communication and coordination among the subpopulations in the different islands. The proposed algorithm makes an exclusive use of non-dominating individuals for the selection and variation operator and applies a crowding mechanism to maintain the diversity and the distribution of the solutions in the Pareto front. We also propose a model to understand the benefits of parallel processing in multi-objective problems and the speedup figures obtained in our experiments.

*Keywords:* parallel multi-objective optimization; dynamic optimization problems; parallel evolutionary algorithms; neuro-dynamic programming
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