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Cultural Algorithm with Improved Local Search for Optimization Problems

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Abstract: In this paper we propose an optimization algorithm for global optimization problems. The proposed algorithm is named (CA-ImLS) and is based on Cultural Algorithms and an improved local search approach for optimization over large-scale continuous spaces. In this paper, Cultural Algorithm and an improved sub-regional local search method are hybridized to form CA-ImLS. The original Cultural Algorithm is extended to have five parallel local searches that are rooted to its knowledge sources in the belief space component. This directs the search in multi-directions and improves the capability of its problem solvers in obtaining better-quality solutions. The distribution of new search agents is based on the success of the knowledge sources in which each knowledge source has its own local search for generating new agents with better fitness values and enhanced diversity to avoid stagnation. Experimental results are given for a set of benchmark optimization functions. Results indicate an average improvement of 2%-83% over the basic Cultural Algorithm framework.