

Hybridized Simulated Annealing with Chemical Reaction Optimization for Solving to Sequence Alignment Problem

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Abstract : In this paper, a new hybridized algorithm based on Chemical Reaction Optimization and Simulated Annealing is proposed to solve the alignment sequence Problem. The Chemical Reaction Optimization is a population-based meta-heuristic algorithm based on the principles of a chemical reaction. Simulated Annealing is applied to solve a large number of combinatorial optimization problems of general-purpose. In this paper, we propose hybridization between Chemical Reaction Optimization algorithm and Simulated Annealing in order to solve the Sequence Alignment Problem. An initial population of molecules is defined at beginning of the proposed algorithm, where each molecule represents a sequence alignment problem. In order to simulate inter-molecule collisions, the process of Chemical Reaction is placed inside the Metropolis Cycle at certain values of temperature. Inside this cycle, change of molecules is done due to collisions; some molecules are accepted by applying Boltzmann probability. The results with the hybrid scheme are better than the results obtained separately.

Keywords : chemical reaction optimization, sequence alignment problem, simulated annealing algorithm, metaheuristics

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