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Multiple sequence alignment based on combining genetic algorithm with chaotic sequences

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ABSTRACT. In bioinformatics, sequence alignment is one of the most common problems. Multiple sequence alignment is an NP (nondeterministic polynomial time) problem, which requires further study and exploration. The chaos optimization algorithm is a type of chaos theory, and a procedure for combining the genetic algorithm (GA), which uses ergodicity, and inherent randomness of chaotic iteration. It is an efficient method to solve the basic premature phenomenon of the GA. Applying the Logistic map to the GA and using chaotic sequences to carry out the chaotic perturbation can improve the convergence of the basic GA. In addition, the random tournament selection and optimal preservation strategy are used in the GA. Experimental evidence indicates good results for this process.

Key words: Multiple sequence alignment; Genetic algorithm; Chaotic sequences; Logistic map

