自适应视野和步长的混沌人工鱼群算法

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摘 要：针对基本人工鱼群在搜索过程中易陷入局部最优问题，提出一种混沌行为的人工鱼群改进算法.首先，引入服从均匀分布的 Logistic 混沌序列，使鱼群的种群初始化和搜索过程具有混沌行为的随机性和遍历性特点，提高全局搜索能力；其次，将个体鱼之间的平均点距作为鱼群种群多样性的衡量指标，使人工鱼的视野和步长根据种群多样性的变化进行自适应调节，避免由于视野和步长为定值而导致的前期收敛速度快，而后期收敛缓慢且易在搜索位置点附近产生震荡的问题.实验结果表明，改进后人工鱼群算法，能克服局部极值，搜索结果更接近测试函数的理论值.

关键词：人工鱼群；均匀分布；混沌序列；平均点距；自适应视野

Adaptive visual field and step length of chaotic artificial fish swarm algorithm

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Abstract：In order to solve the problem of local optimum in searching the basic artificial fish swarm, an improved artificial fish swarm algorithm with chaotic behavior is proposed. First, the Logistic chaotic sequence with uniform distribution was introduced to make the initial and search process of the fish population have the characteristics of randomness and ergodicity of chaotic behavior, and improve the global search ability. Second, the average distance between individual fish as indicators of fish species diversity, make the vision and step of artificial fish can adaptively adjust according to the variation of species diversity, avoid due to vision and step for the fixed value of early convergence speed, and the late slow convergence and easy reverberate in the search location near the point of the problem. The experimental results show that the improved artificial fish swarm algorithm can overcome the local extremum and the search result is closer to the theoretical value of the test function.

Key words：artificial fish swarm;uniform distribution; chaotic sequences; average point distance; adaptive field of vision

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