

改进的基于平滑函数的全局优化进化算法

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摘要 为了解决进化算法在求解全局优化时易陷入局部极小点的问题, 引入了平滑函数, 利用目前最好点来消除比其差的局部极小点; 设计了适合该平滑函数的杂交算子, 利用平滑函数与种群的关系寻找实值函数的下降方向。设计了一个变异算子, 增加了种群的多样性。在此基础上, 设计了一个求解全局优化问题的高效进化算法, 并从理论上证明了其全局收敛性, 从数值上验证了其有效性。

关键词 [人工智能](#) [平滑函数](#) [全局优化](#) [进化算法](#) [全局收敛性](#)

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Abstract In order to make the evolutionary algorithms escape from local minima in solving global optimization problems, a smooth function was introduced. This function can eliminate all such local optimal which are worse than the optimal solutions found so far. Taking the properties of the smooth function into consideration, a crossover operator was designed which can find the descent direction of the real function by using the relationship between the smooth function and the population. A mutation operator was constructed to increase the diversity of the population. Finally, an evolutionary algorithm for global optimization problems was proposed. The global convergence of the proposed algorithm is theoretically verified and its effectiveness is demonstrated by numerical simulations for all test functions.

Key words [artificial intelligence](#) [smooth function](#) [global optimization](#) [evolutionary algorithm](#) [global convergence](#)

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