



# Swarm Intelligence and Bio-Inspired Computation: 4. Memetic Self-Adaptive Firefly Algorithm

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The “firefly algorithm” (FFA) is a modern metaheuristic algorithm, inspired by the behavior of fireflies. This algorithm and its variants have been successfully applied to many continuous optimization problems. This work analyzes the performance of the FFA when solving combinatorial optimization problems. In order to improve the results, the original FFA is extended and improved for self-adaptation of control parameters, and thus more directly balancing between exploration and exploitation in the search process of fireflies. We use a new population model to increase the selection pressure, and the next generation selects only the fittest between a parent and an offspring population. As a result, the proposed memetic self-adaptive FFA (MSA-FFA) is compared with other well-known graph coloring algorithms such as Tabucol, the hybrid evolutionary algorithm, and an evolutionary algorithm with stepwise adaptation of weights. Various experiments have been conducted on a huge set of randomly generated graphs. The results of these experiments show that the results of the MSA-FFA are comparable with other tested algorithms.

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