

Features of Firefly Algorithm Inceasing Females

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SUMMARY

The solution of optimization problems has recently become increasingly important. Most optimization problems are nonlinear with many constraints. Consequently, optimization algorithms must be efficient to find optimal solutions. Stochastic algorithms, one category of optimization algorithms, are efficient optimization algorithms. Stochastic algorithms have a deterministic component and a random component. Almost all algorithms having only a deterministic component are local search algorithms, for which there is a risk of being trapped at local optima. However, the random componet of stochastic algorithms makes it possible to escape from such local optima.

One type of stochastic algorithm is swarm intelligence algorithms, which are based on the behavior of animals and insects. Representative examples are particle swarm optimization (PSO) [1], ant colony optimization (ACO), and the Firefly Algorithm (FA) [2]–[4].

In the conventional FA, all fireflies are unisex. However, in the real world, there are males and females. Animals having variation among individuals have a greater chance of surviving than those without variation. In the case of solving optimization problems, we also consider that variation among individuals will lead to a variety of solutions. These solutions may include the global optimal solution. Therefore, we have proposed a new FA that distinguishes the sex of fireflies [5]. This method is called the firefly algorithm distinguishing between males and females (FADMF). In FADMF, the movements of males and females are defined from their physical differences. Therefore, the movements of males and females are different. We investigate the features of FADMF using 28 well-known benchmark functions.

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