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A Modification of Dragonfly Algorithm by means of Exploration Behaviour for Single Object Problems

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Heuristic algorithms try to find the optimal value of the function in the solution space by searching randomly with the help of heuristic information in problems with very large search spaces. Heuristic optimization algorithms aim to find solutions that are close to the best when the solution area is very large and mathematical methods can not find the optimum solution. The biggest disadvantage of heuristic optimization algorithms is that they try to find the best local value while getting the best global solutions. A variety of methods have been developed to prevent the local best solution. The Dragonfly Algorithm (DA) is a fairly new heuristic approach. This algorithm refers to the unique and rare intelligent behavior of dragonflies in hunting characteristics. Dragonflies swarming in small groups moves back and forth to hunt. They travel in large groups while migrating. According to DA , the behaviour of swarms follows three primitive principles: Separation; which refers to the static collision avoidance of the individuals from other individuals in the neighbourhood. Alignment; which indicates velocity matching of individuals to that of other individuals in neighbourhood. Cohesion; which refers to the tendency of individuals towards the centre of the mass of the neighbourhood. The main aim of any crawler is to be able to survive. Therefore, the group members must be directed towards food sources. In addition, with this main action, they can be disturbed by their enemies from the outside. If these two behaviors are added, five main factors are used in the location update process. Each of these behaviors is mathematically refined and modeled and applied to the algorithm.[1]

In this study by using DA, flies' escape and nutritional approach behaviors were rearranged according to neighborhood numbers and group behaviors.

The following Unimodal Benchmark functions; Sphere (F1) , Schwefel's 2.22(F2) , Schwefel's 1.20(F3) , Schwefel's 2.21(F4), Rosenbrock(F5) , Step(F6) , Quartic Noise(F7) are tested before and after appliying the modified DA. According to the results, the following performance improvements are obtained ; for F1 function %92 , for F2 function %31 for F3 function %51, for F4 function %40 , for F5 function %99 , for F6 function %83 , for F7 function %75.