A NEW KIND OF PSO: PREDATOR PARTICLE SWARM OPTIMIZATION

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Submitted: Mar. 17, 2012 ***Accepted: May 11, 2012*** ***Published: June 1, 2012***

Abstract- Today, swarm intelligence is widely used in optimization problems. PSO is one the best swarm intelligence methods. In the method, each particle moves toward the direction in which the best individual and group experience has happened. The most important disadvantage of this method is that it falls in local optima. To fix the problem, a metaheuristic method is proposed in this paper. There has always been a competition between prey and predator in the nature. Little birds often fly in a colony form to run away from birds of prey. Being inspired by the phenomenon, a new particle is added to PSO algorithm known as predator, also a new behavior called "Take flight from predator" is defined. This particle is responsible for attacking the colony of particles so as to prevent the premature convergence. With the predator attack to the colony, particles run away

and again the chance rises for a Global optimum to be gained. The attack just caused particles dispersion and no particle dies. It can be repeated for m times and the optimal point is saved each time. To test the method, 12 benchmark functions were employed and the results were compared to OPSO, VPSO, LPSO, and GPSO methods. Regarding the results, the proposed method had a better performance.

Index terms*: Predator; particle swarm optimization; local optimum; premature convergence.*