

## Optimized Algorithm for Particle Swarm Optimization

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**Abstract :** Particle swarm optimization (PSO) is becoming one of the most important swarm intelligent paradigms for solving global optimization problems. Although some progress has been made to improve PSO algorithms over the last two decades, additional work is still needed to balance parameters to achieve better numerical properties of accuracy, efficiency, and stability. In the optimal PSO algorithm, the optimal weightings of  $(\sqrt{5} - 1)/2$  and  $(3 - \sqrt{5})/2$  are used for the cognitive factor and the social factor, respectively. By the same token, the same optimal weightings have been applied for intensification searches and diversification searches, respectively. Perturbation and constriction effects are optimally balanced. Simulations of the de Jong, the Rosenbrock, and the Griewank functions show that the optimal PSO algorithm indeed achieves better numerical properties and outperforms the canonical PSO algorithm.

**Keywords :** diversification search, intensification search, optimal weighting, particle swarm optimization

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