

عنوان مقاله:

Chaotic-based Particle Swarm Optimization with Inertia Weight for Optimization Tasks

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خلاصه مقاله:

Among variety of meta-heuristic population-based search algorithms, particle swarm optimization (PSO) with adaptive inertia weight (AIW) has been considered as a versatile optimization tool, which incorporates the experience of the whole swarm into the movement of particles. Although the exploitation ability of this algorithm is great, it cannot comprehensively explore the search space and may be trapped in a local minimum through a limited number of iterations. To increase its diversity as well as enhancing its exploration ability, this paper inserts a chaotic factor, generated by three chaotic systems, along with a perturbation stage into AIW-PSO to avoid premature convergence, especially in complex nonlinear problems. To assess the proposed method, a known optimization benchmark containing nonlinear complex functions was selected and its results were compared to that of standard PSO, AIW-PSO and genetic algorithm (GA). The empirical results demonstrate the superiority of the proposed chaotic AIW-PSO to the counterparts over ۲۱ functions, which confirms the promising role of inserting the randomness into the AIW-PSO. The behavior of error through the epochs show that the proposed manner can smoothly find proper minimums in a timely manner without encountering with premature convergence.

کلمات کلیدی:

PSO-AIW, randomness, chaotic factor, swarm experience, convergence rate

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