

عنوان مقاله:

General Relativity Search Algorithm for Optimization in Real Numbers Space

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خلاصه مقاله:

This paper introduces a novel evolutionary optimization algorithm inspired by General Relativity Theory (GRT). This optimization method is called General Relativity Search Algorithm (GRSA). In GRSA, a population of particles (agents) is considered in a space free from all external non-gravitational fields. These agents evolve toward a position with least Action. Based on GRT, a system of particles has conserved mass and each of them moves along geodesic trajectories in a curved spacetime. According to physical action principle, a system of particles goes to a position with minimum action. By inspiring these notions, GRSA will make solution agents move toward the optimal point of an optimization problem. Performance of the proposed optimization algorithm is investigated by using several standard test functions. Effectiveness and abilities of the algorithm to solve optimization problems is shown through a comparative study with two well-known heuristic search methods, Genetic Algorithm (GA) and Particle Swarm Optimization (PSO). Numerical simulation results demonstrate the efficiency, robustness and convergence speed of GRSA in finding the optimal solution of different benchmark functions.

کلمات کلیدی:

Evolutionary Algorithms, Optimization, General Relativity Theory, test functions

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