Lu, Weifeng; Tao, Wenyin; Gu, Rui
Improved cuckoo search algorithm based on proportional integral control.  (Chinese. English summary) Zbl 07448778

Summary: Cuckoo search algorithm has a simple structure with few parameters; in addition, it is quite robust to local optimum traps. Considering these and other advantages, it has been widely used in fields of electric power and biomedicine. In this study, an improved cuckoo search algorithm based on proportional integral (PI) control is proposed to address the shortcomings of the basic cuckoo search algorithm, such as weak local search ability and low optimization accuracy. By introducing the integral term, a PI controller is formed to enhance the local search ability of the algorithm and reduce steady-state errors in the system. Theoretical analysis is performed to obtain the conditions for convergence of the algorithm. Furthermore, our simulation results indicate that the proposed algorithm has improved order of accuracy and rate of convergence than other cuckoo search algorithms.

MSC:
68T20  Problem solving in the context of artificial intelligence (heuristics, search strategies, etc.)
90C59  Approximation methods and heuristics in mathematical programming

Keywords:
PI control; cuckoo search algorithm; steady-state error