Nonlinear Dynamics and Systems Theory, **20** (4) (2020) 365–373

An Enhanced Bi-Directional Chaotic Optimization Algorithm

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Received: June 20, 2020; Revised: October 5, 2020

Abstract: Based on the improved chaos searching strategy, an enhanced Bi-directional chaotic optimization algorithm (EBCOA)is proposed in this study. A Lozi chaos mapping is used as a chaos generator to produce a chaos variable. In the process of EBCOA, and in order to make the chaos search more efficient, a new sub-step local chaos optimization method is proposed and a global search is done to find the current optimal solution in a certain range, and then a fine search reduces the space of optimized variables. Compared with the algorithm of traditional chaos search, the proposed algorithm is more accurate and can respond quickly. Simulation and experimental results confirm the efficiency of the proposed algorithm.

Keywords: *chaos; global optimization; chaotic map; chaos optimization algorithm.*

Mathematics Subject Classification (2010): 34D45, 70K55.

1 Introduction

In the field of mathematics, physics and engineering science, it is well recognized that chaos theory can be applied as a very useful technique in practical application. Chaos is aperiodic behavior in a deterministic system which exhibits sensitive dependence on initial conditions, and thus provides great diversity based on the ergodic property of the chaos phase, which transits every state without repetition in certain ranges. Chaos is a term used to describe behavior that is seemingly random, but has an underlying mathematical order to it [1–5]. Chaos is very common in nature, but is often mistaken for random behavior. It is generated through a deterministic iteration formula. Due to

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