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Chaos in New 2-d Discrete Mapping and Its Application in Optimization

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Abstract: In this paper, we propose a new map which is a combination of the Hénon and Lozi maps. We analyze the proposed map numerically and with the aid of bifurcation plots. On the other hand, and as an example of application of this new map, we are going to use it in the chaotic optimisation algorithm. To prove the efficiency of this map, we use numerical results throughout the paper.

Keywords: *chaos optimization; test functions; Hénon map; Lozi map.*

Mathematics Subject Classification (2010): 34H05, 34K35.

1 Introduction

Recently, a large number of complex nonlinear optimization problems are solved using chaotic optimization algorithms [2–6]. In such cases, traditional algorithms [7–10] may not often produce the desired outcomes and therefore alternate methods must be employed.

For the last few decades, researchers have focused on developing hybrid algorithms by combining heuristic algorithms with chaos searching techniques to solve a non-linear system of equations and optimization problems such as the chaotic Monte Carlo optimization, chaotic BFGS, chaotic particle swarm optimization, chaotic genetic algorithms, chaotic harmony search algorithm, chaotic simulated annealing, gradient-based methods and so on [11–13]. Due to the non-repetition of chaos, the chaotic optimization algorithm can carry out overall searches at higher speeds than the stochastic ergodic searches that depend on probabilities.

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