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An Adaptive Step Size for Chaotic Local Search Algorithm

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Abstract: In this paper, a chaotic strategy based on a 2-D chaotic application is proposed. This method reduces the search space of optimized variables and improves the search precision, which has higher search efficiency. In order to solve the problem between fast convergence and low steady-state, a suitable step size control is proposed. The simulation results show that the new algorithm has faster convergence.

Keywords: *chaos; global optimization; evolutionary algorithms; step size control; chaos optimization algorithm.*

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1 Introduction

Chaos is one of the few concepts in mathematics that cannot usually be defined in a word or statement. The study of chaos has been rapidly developed since Lorenz's influential book [7], and Li and York's pioneer paper [8]. R. L. Devaney has been provided one of the most popular and accepted definitions of chaos, in which chaotic systems exhibit a sensitive dependence on the initial conditions, topological transitivity, and dense periodic orbits [2]. Recently, there has been an increasing interest in controlling and utilizing chaos, particularly among the physicists, mathematicians, engineering and technological communities. The noun "chaos" and the adjective "chaotic" are used to describe the time behavior of a system when this behavior is a sensitive dependence on the initial conditions, aperiodic (it never exactly repeats), and apparently random or "noisy". The key word here is apparently. Underlying this apparent chaotic randomness is an order determined, in some sense, by the equation describing the system [7–9,11]. The

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