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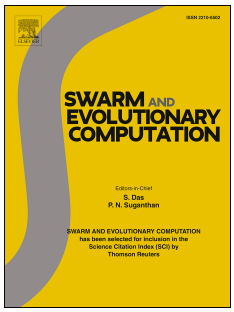

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Stability Analysis of Artificial Bee Colony Optimization Algorithm ☆

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Abstract

Theoretical analysis of swarm intelligence and evolutionary algorithms is relatively less explored area of research. Stability and convergence analysis of swarm intelligence and evolutionary algorithms can help the researchers to fine tune the parameter values. This paper presents the stability analysis of a famous Artificial Bee Colony (ABC) optimization algorithm using von Neumann stability criterion for two-level finite difference scheme. Parameter selection for the ABC algorithm is recommended based on the obtained stability conditions. The findings are also validated through numerical experiments on test problems.

Keywords: Artificial Bee Colony (ABC) Algorithm, Stability Analysis, Finite Difference Scheme, Parameter Selection, Stable Range

1. Introduction

Over past few years, algorithms taking inspiration from natural phenomena have attracted researchers. Particle Swarm Optimisation (PSO) algorithm [1], Artificial Bee Colony (ABC) optimization algorithm [2], Differential Evolution

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