



TED UNIVERSITY
CMPE-421
PRESENTATION

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Genetic Algorithms with Natural Selection Theory

GABONST for Optimization
Problems

GENETIC ALGORITHMS



INTRODUCTION

What are Genetic Algorithms (GA)?

- Nature-inspired metaheuristic algorithms solving complex optimization problems by simulating Darwin's natural selection theory.

Why is GABONST Unique?

- It introduces a novel approach to balance exploration and exploitation for better optimization.
- To improve traditional GA performance using the GABONST algorithm.

How GAs Work

1. *Initial Population: Randomly generated chromosomes.*
2. *Selection: Chooses chromosomes based on fitness values.*
3. *Crossover: Combines two parents to produce new offspring.*
4. *Mutation: Alters genes to increase diversity.*

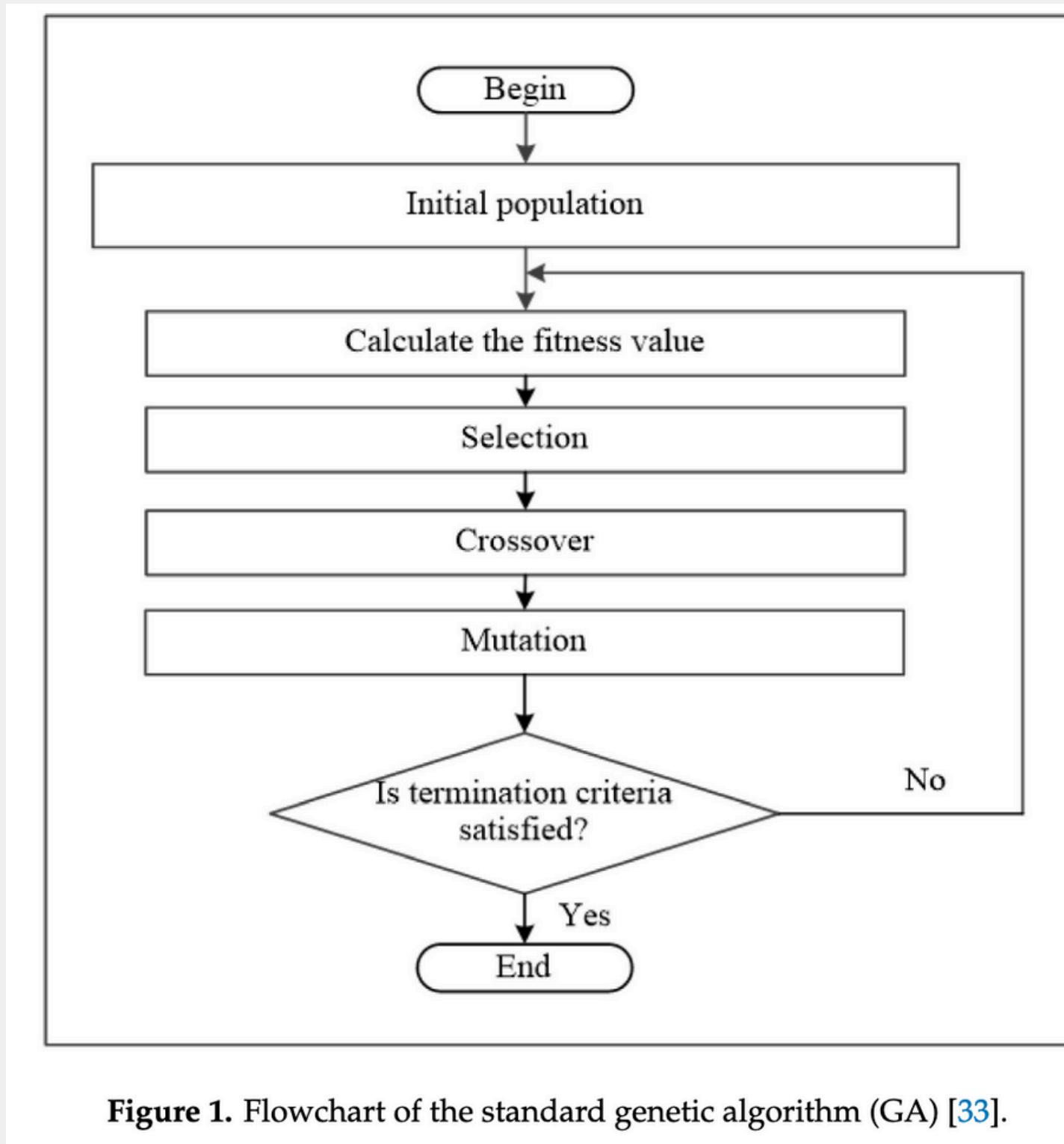


Figure 1. Flowchart of the standard genetic algorithm (GA) [33].

- **Initial Population**
- **Calculate the Fitness Value**
- **Selection**
- **Crossover**
- **Mutation**

GABONST Approach

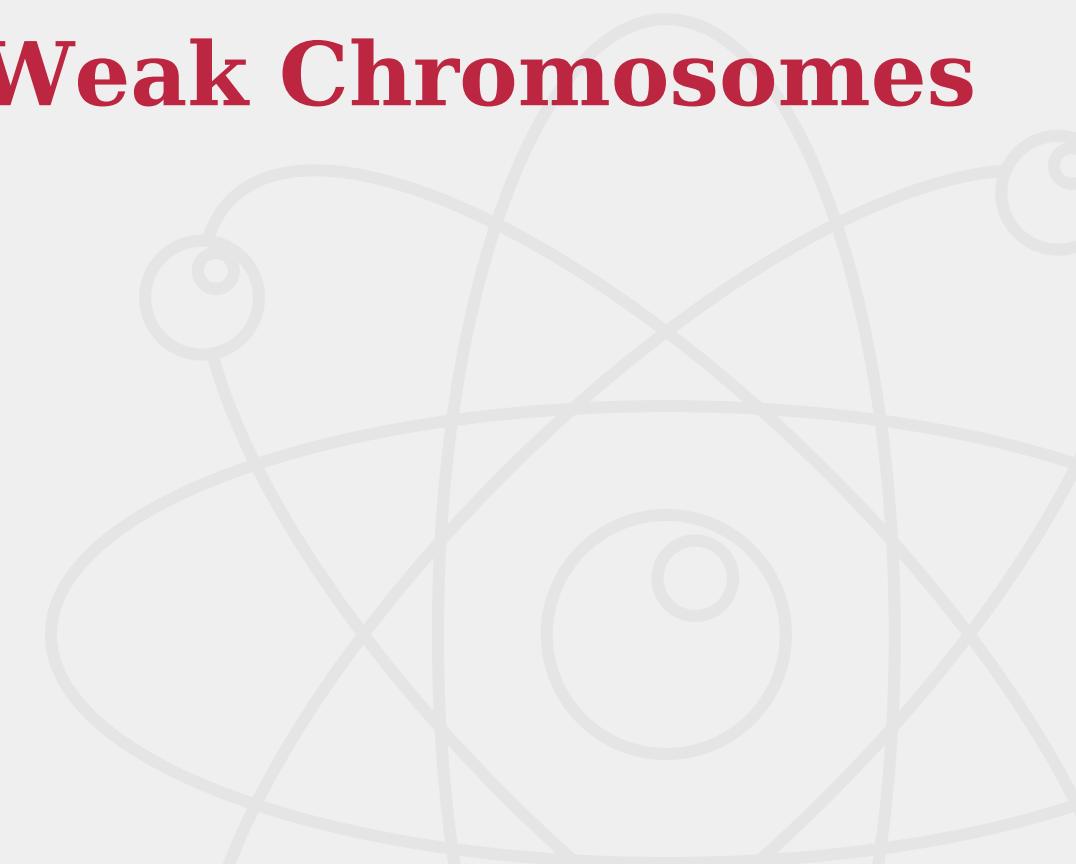


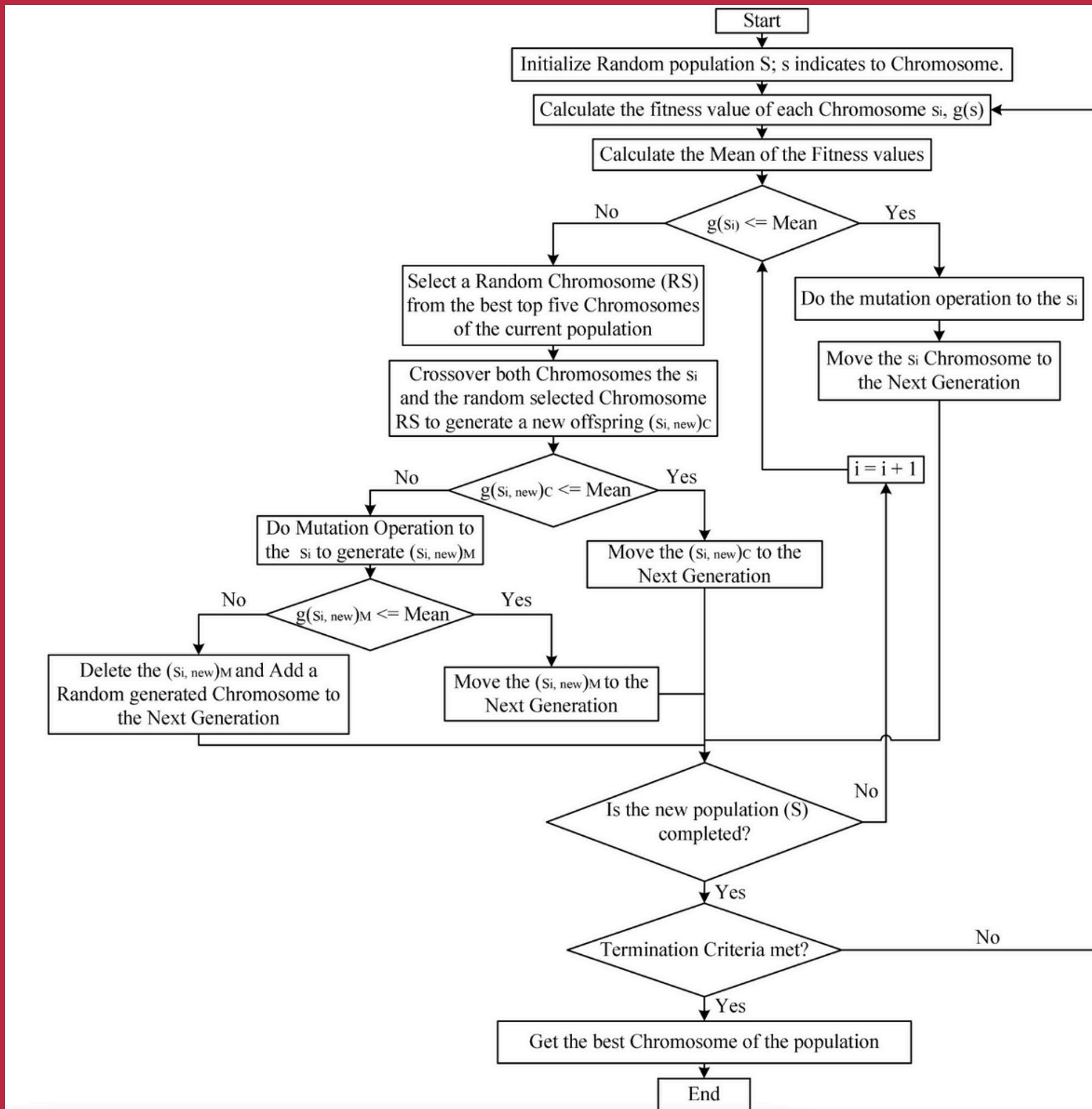
Inspired by Darwin's natural selection theory to enhance GA's performance.

How It Works

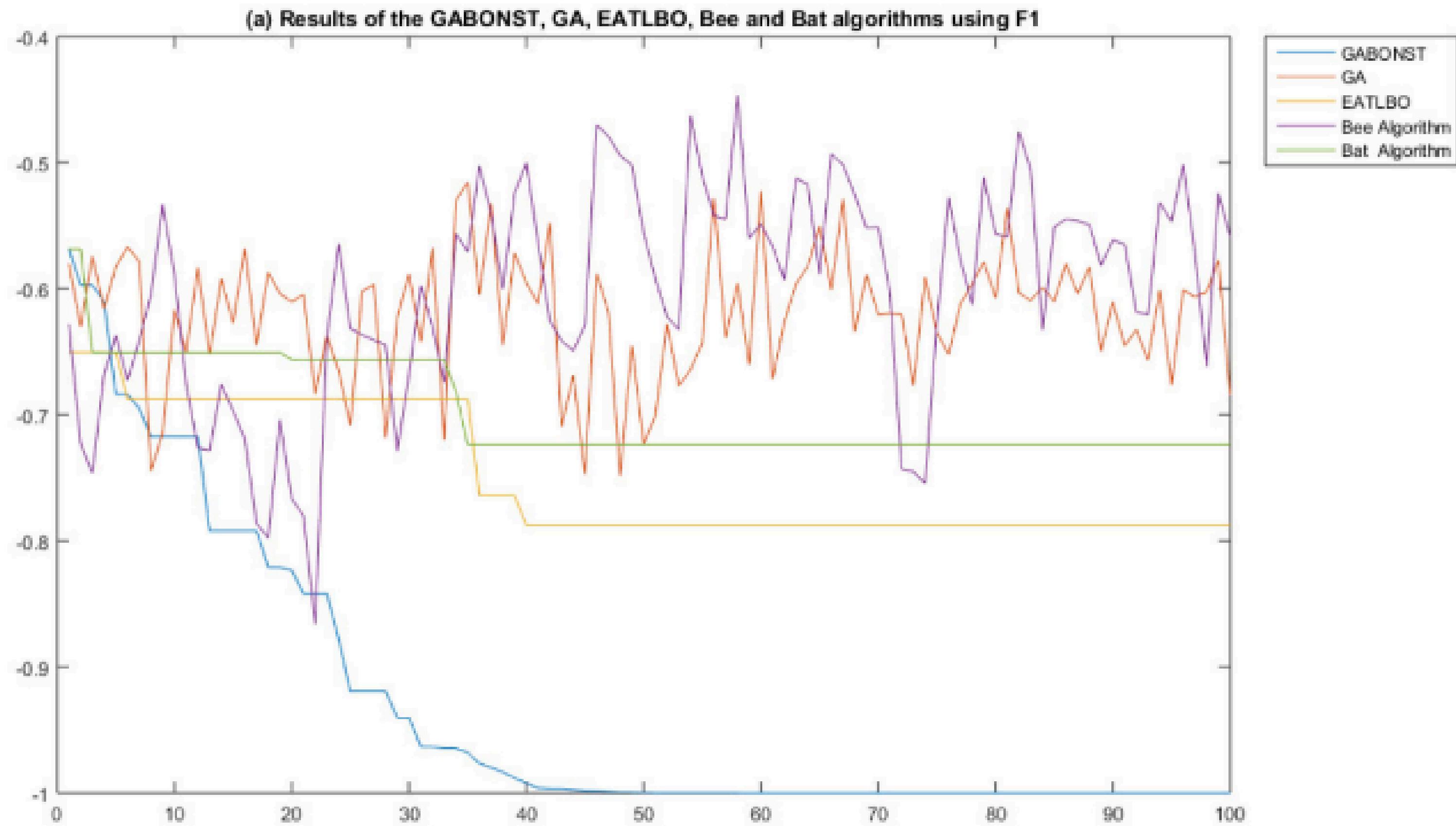
Environmental Effect

Two Chances for Weak Chromosomes Replacement

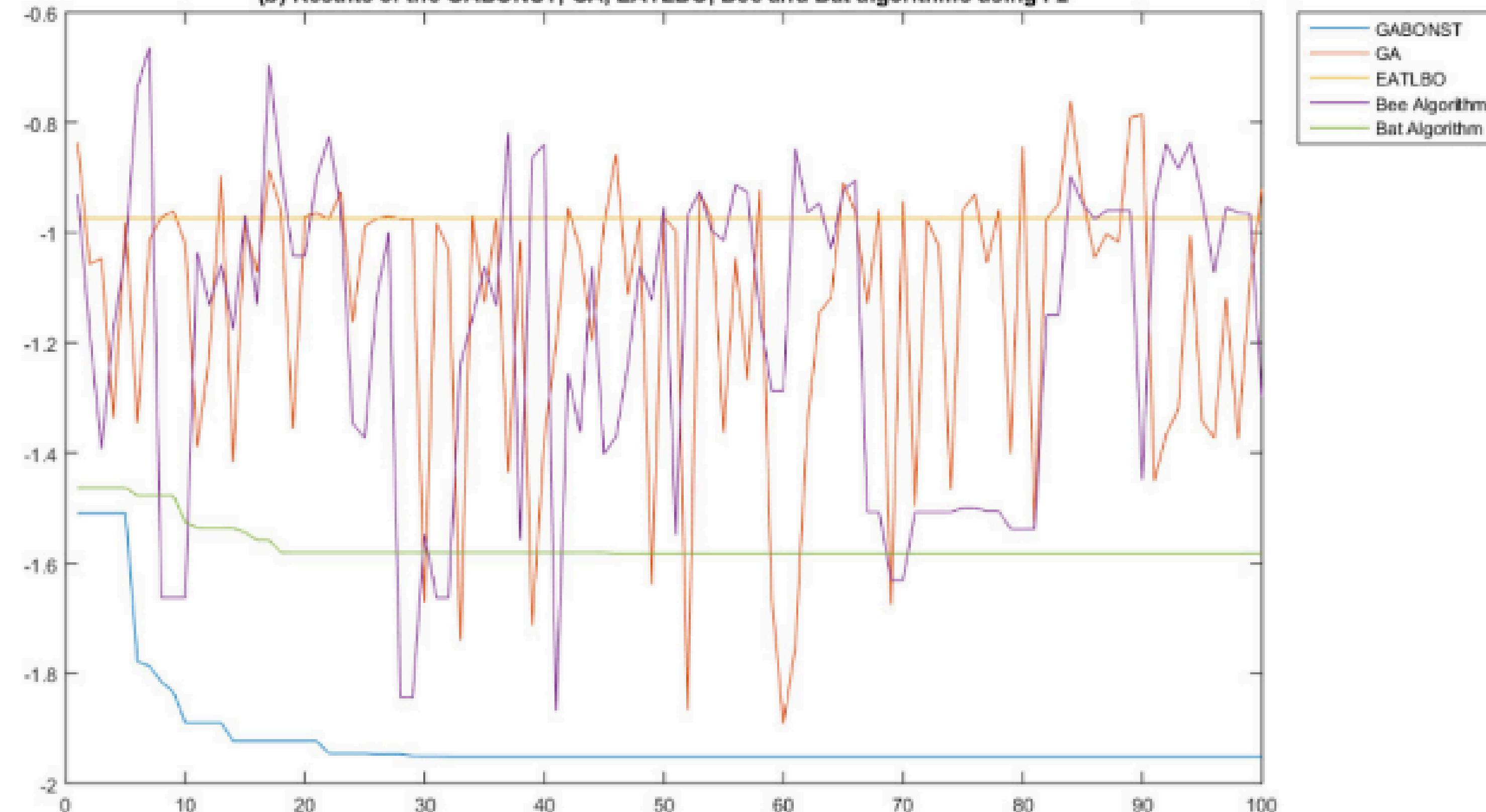




Experimental Results



(b) Results of the GABONST, GA, EATLBO, Bee and Bat algorithms using F2



Conclusion

**Exploration and exploitation
Effective in diverse applications**

Future Work

- **Investigate new selection criteria for crossover operations.**
- **Test GABONST in other optimization scenarios.**