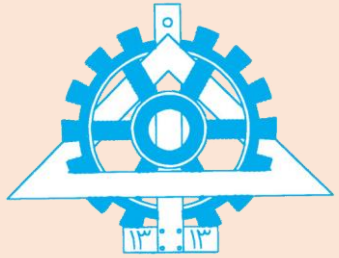


مبانی یادگیری ماشین

Intro to Machine Learning

بابک نجار اعرابی

دانشکده مهندسی برق و کامپیوتر دانشگاه تهران

نیم سال اول سال تحصیلی 1403-04

موضوع این جلسه

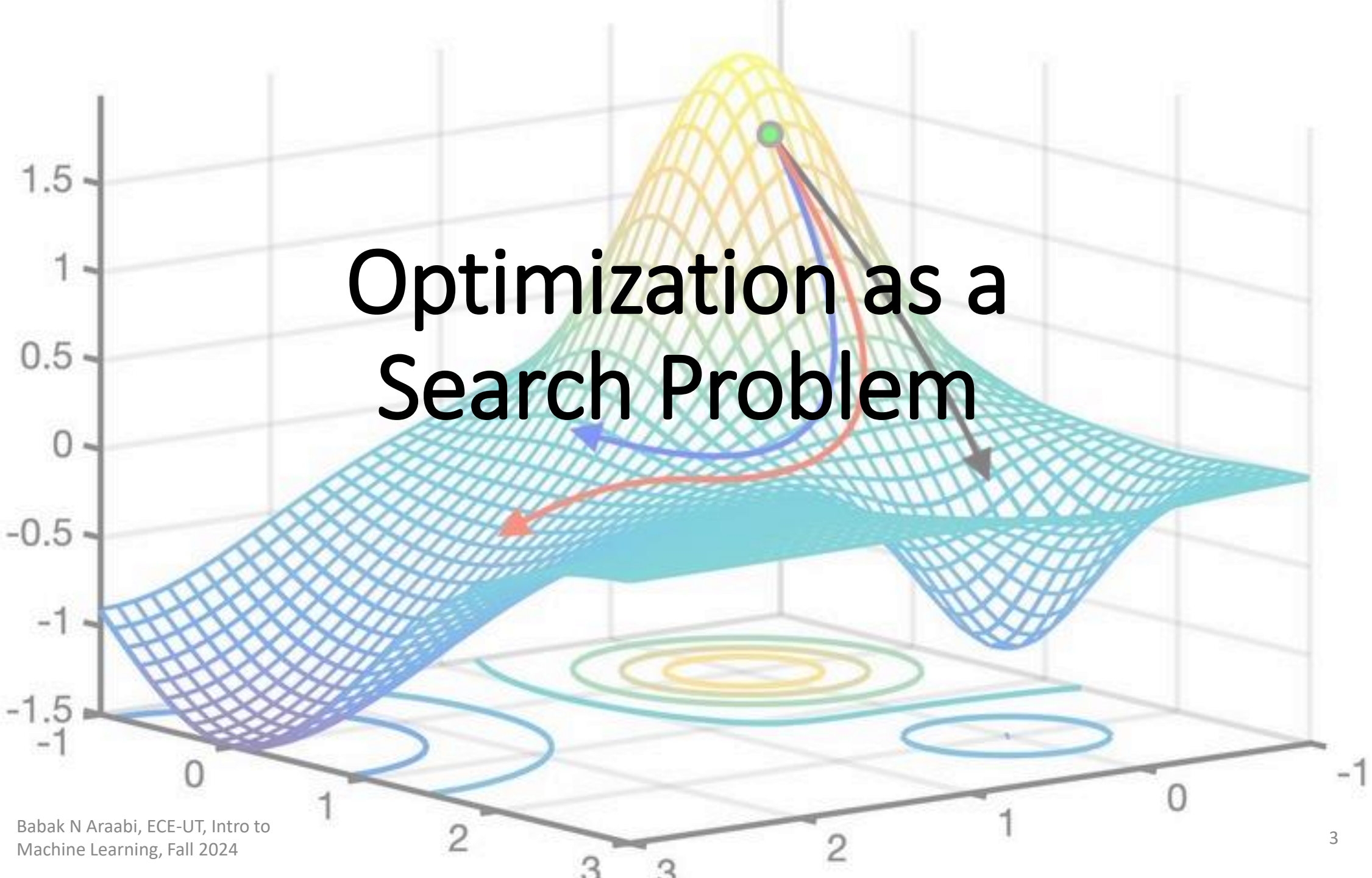
مروری بر روش های بهینه سازی

جلسه پنجم

Babak Nadjar Araabi
School of Electrical & Computer Eng
University of Tehran

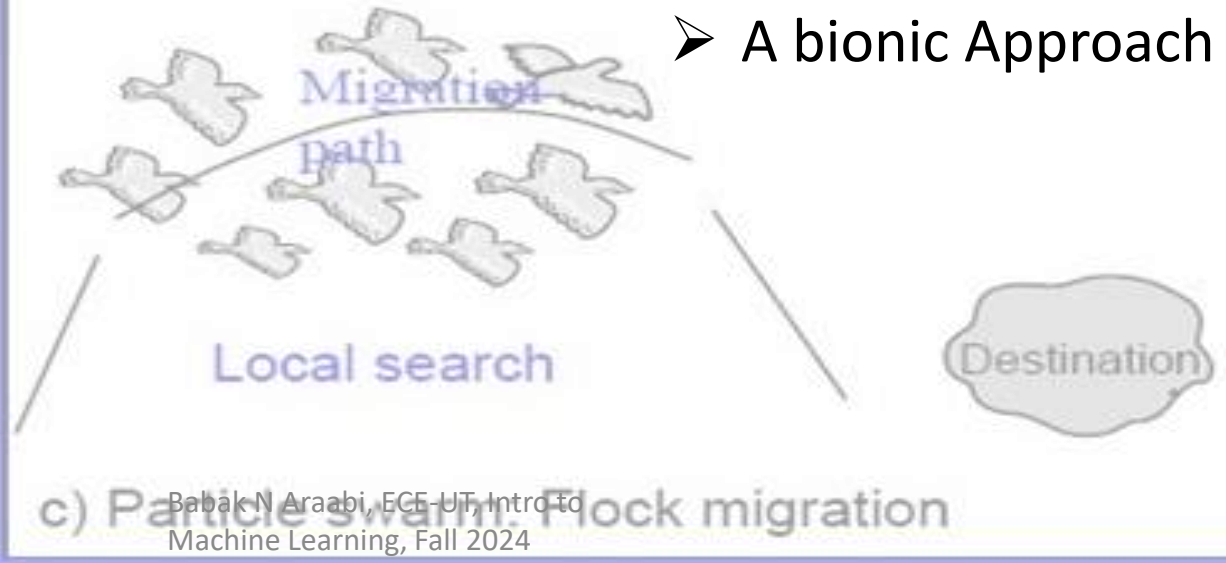
ECE-UT - Fall 2024

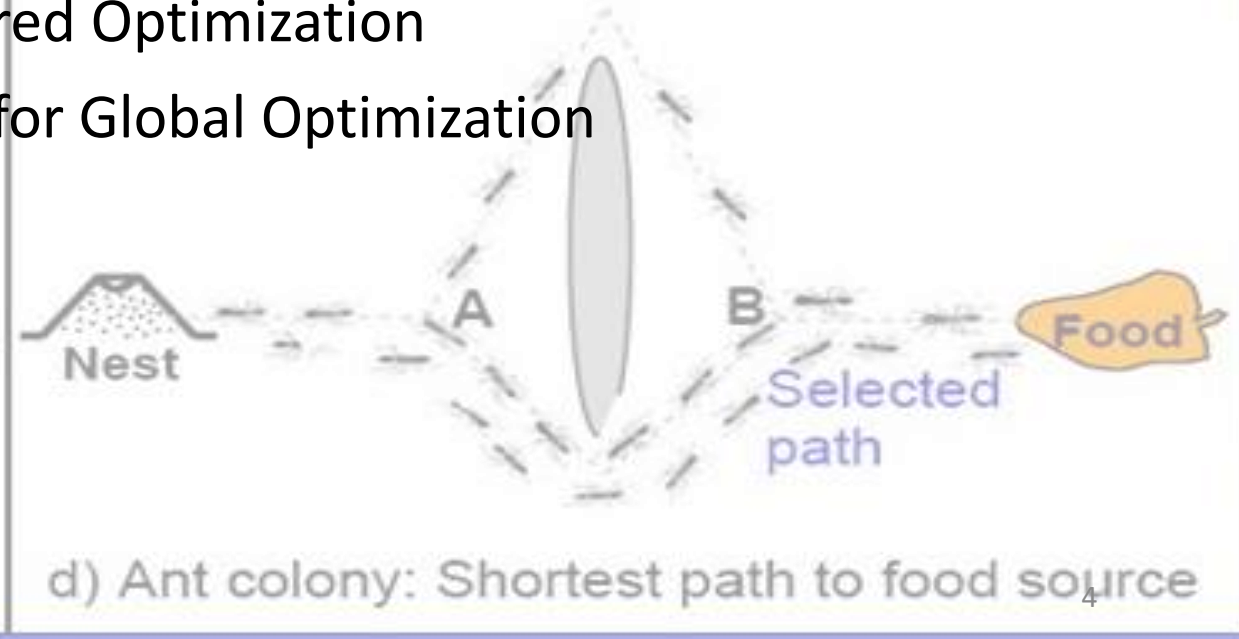
Optimization as a Search Problem



Let Mimic Nature for Optimization

- Nature Inspired Optimization
- A bionic Approach for Global Optimization





Two Basic Idea for Global Search

- We need some random search to achieve global optimum
- It is not good to confine to the deterministic algorithms
- We need some hill climbing to get to the global minimum
- It is not good to go descent at every step

Simulated Annealing

for Global Optimization

https://en.wikipedia.org/wiki/Simulated_annealing

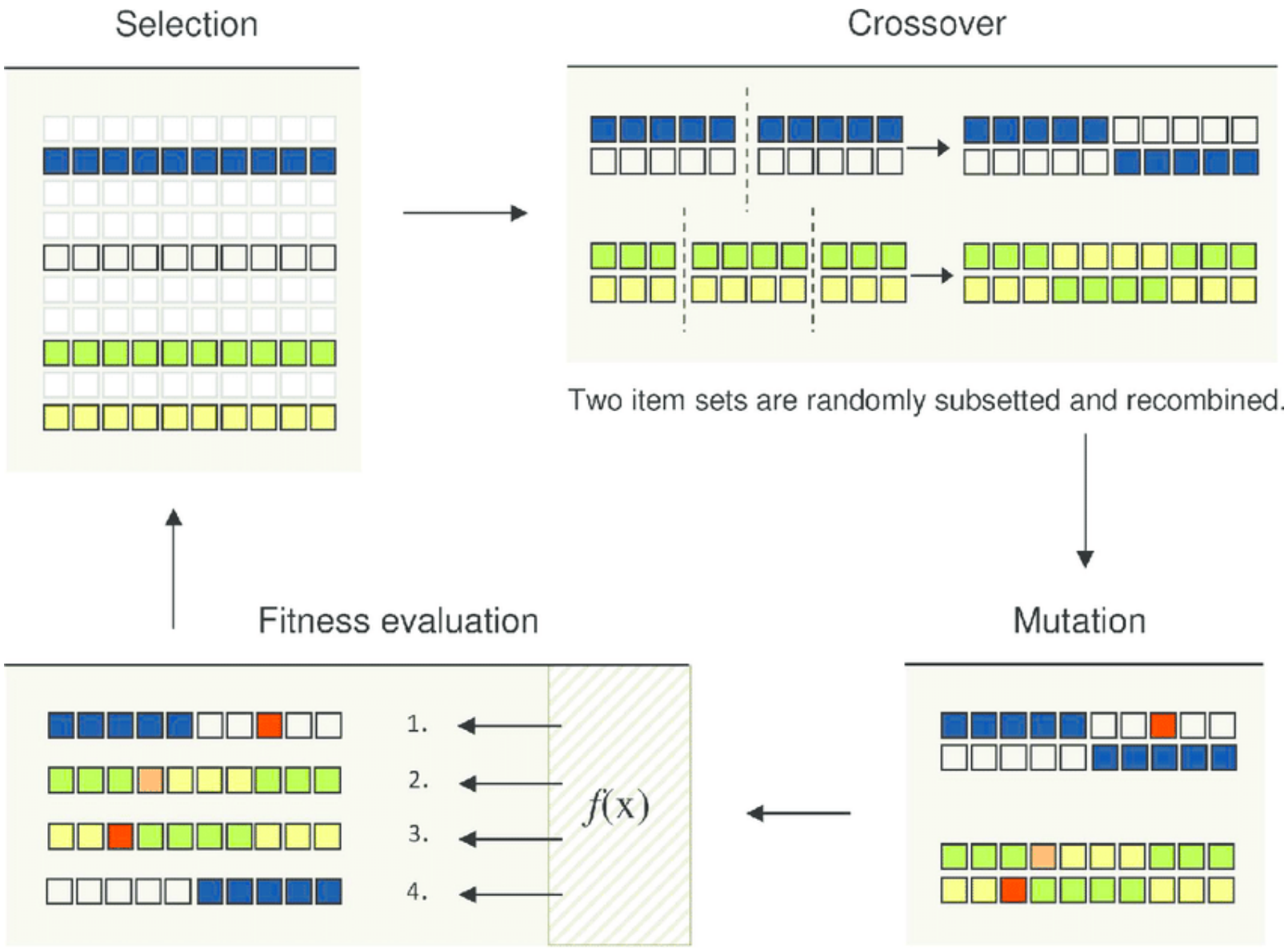
Genetic algorithm

for Global Optimization

https://en.wikipedia.org/wiki/Simulated_annealing

GA

Survival of Most Fitted

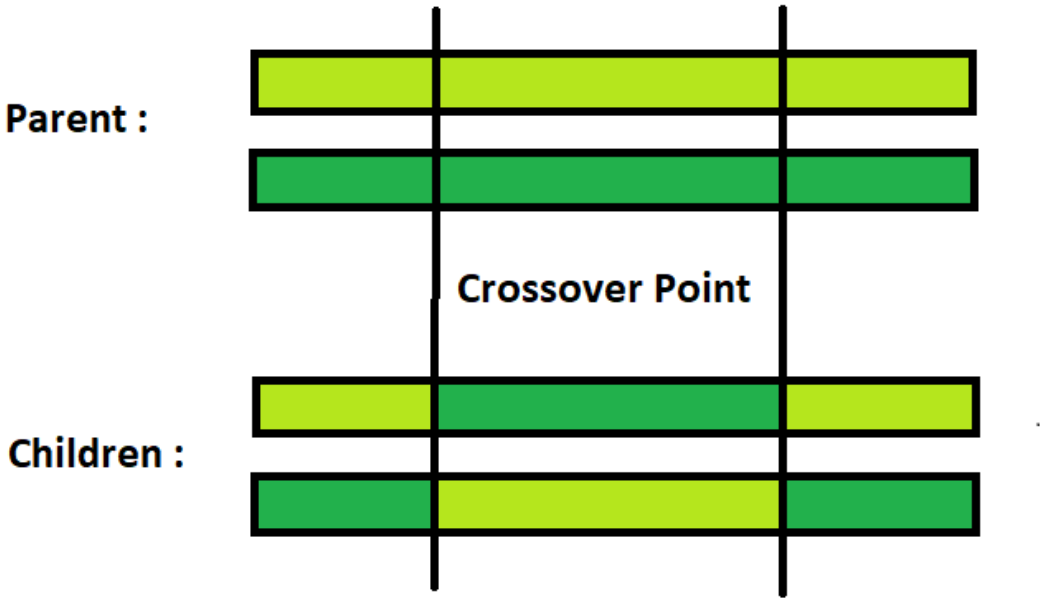


combine the genetic information of two parents to generate new offspring

Population Size

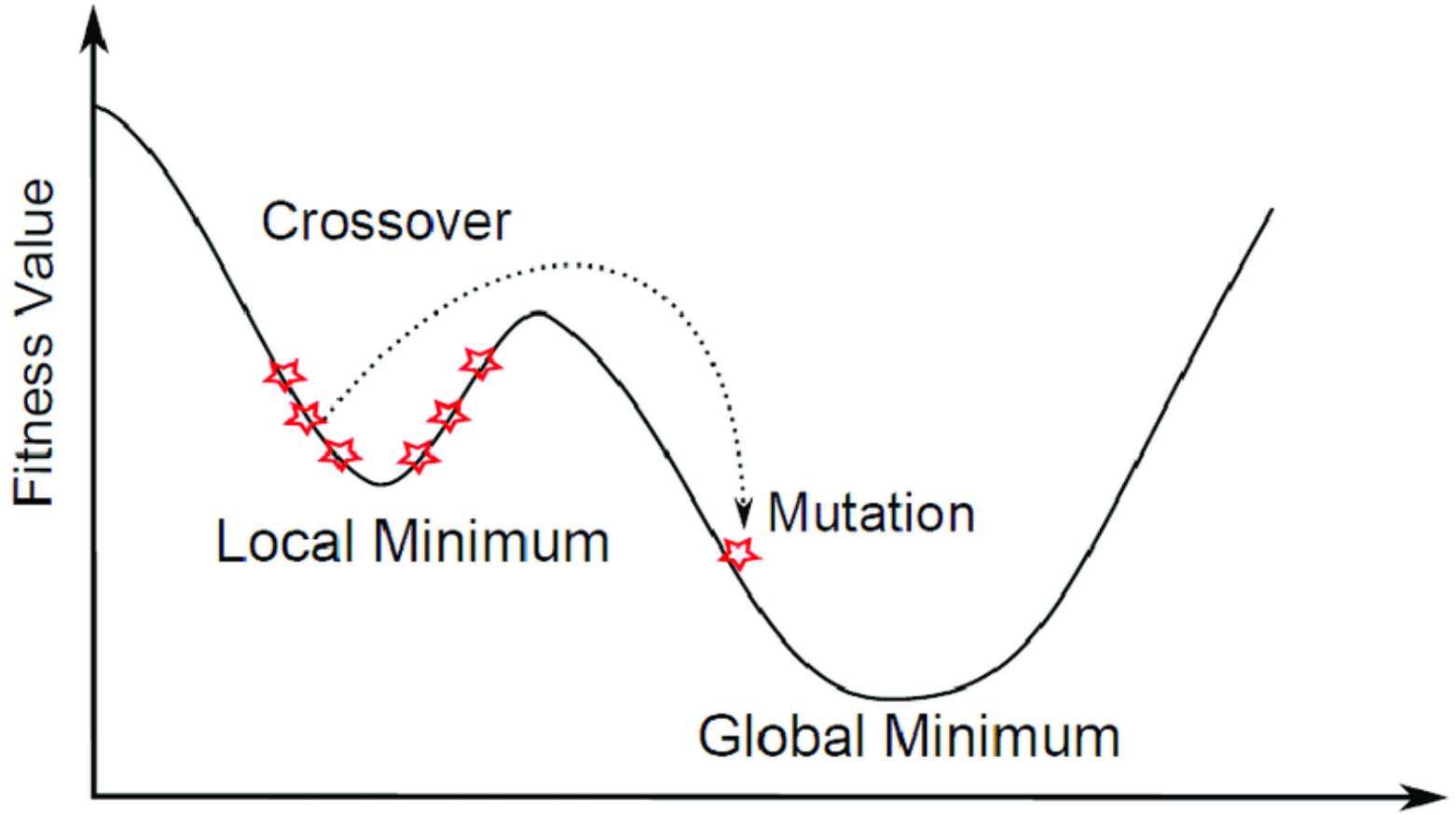
Genetic Diversity

Crossover



Chromosome1	11011|00100|110110
Chromosome2	10101|11000|011110
Offspring1	11011|11000|110110
Offspring2	10101|00100|011110

Two Point Crossover


Fitness Value
Crossover
Local Minimum
Mutation
Global Minimum

برای استفاده از الگوریتم‌های ژنتیک، بایستی پارامترهای زیر تعیین شوند:

- انتخاب ساختار کروموزوم
- انتخاب تابع برازش
- انتخاب احتمال جهش P_M و احتمال تقاطع P_C

Combination of Different Search Methods

for Global Optimization

https://en.wikipedia.org/wiki/Simulated_annealing