ASSIGNMENT 2

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Link to all Codes: Github

Introduction

Differential Evolution: These algorithms overcome the disadvantages faced by Genetic Algorithms. Every candidate has its mutant vector with which its crossover is done and the resultant is called a trial vector. Selection of this trial vector as the next iteration of the respective candidate depends upon Elitism.

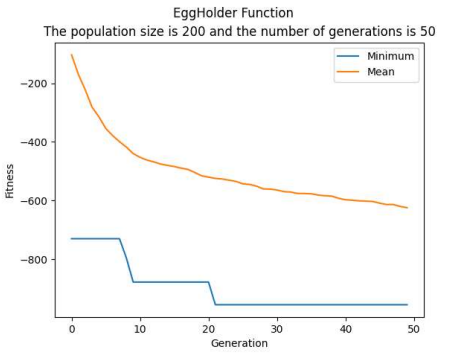
Particle Swarm Optimization: In these class of algorithms, each candidate maintains its individual identity and travels through the solution space through exchange of information

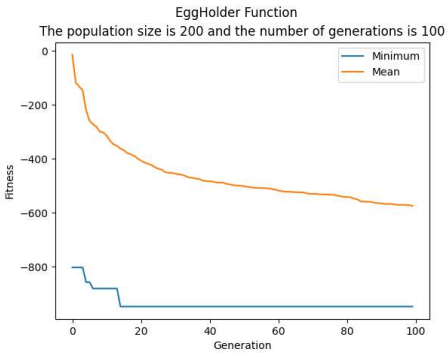
Comparision

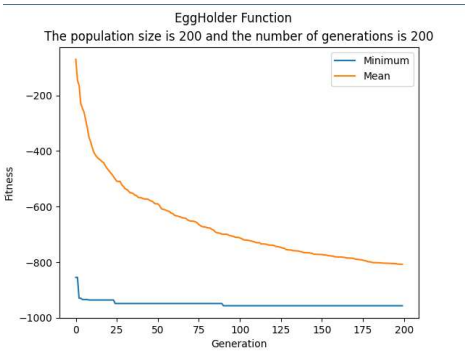
EggHolder:-959.6407				**HolderTable Function:-19.2085**			
	NUMBER OF GENERATIONS						
POPULATION SIZE		**50**		**100**		**200**	
	20	**-950.778591591233 9**	**-18.8764184131889 08**	**-955.971944891347 9**	**-19.18171712633 8736**	**-949.9606426718 97**	**-19.20844463431 8635**
	50	**-934.011834441406 1**	**-18.8764184131889 08**	**-956.198658908717 3**	**-19.20660096967 0674**	**-954.9008672137 268**	**-19.20844463431 8635**
	100	**-933.594402437273 9**	**-19.1694865467657 3**	**-957.241706260202 2**	**-19.20703192710 531**	**-952.7334280730 804**	**-19.20850239615 0905**
	200	**-945.046175738673 4**	**-19.1819744643852 7**	**-957.911682560621 2**	**-19.20808265521 4888**	**-957.1791077649 787**	**-19.20850239615 0905**

Differential Evolution

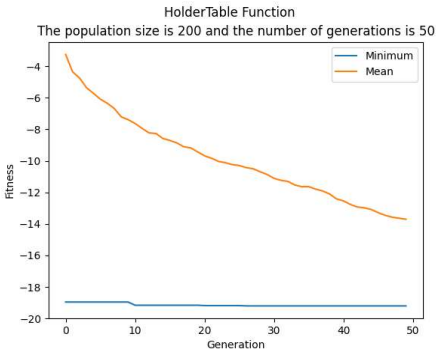
EggHolder Function with population size of 200 and 50,100 and 200 generations:

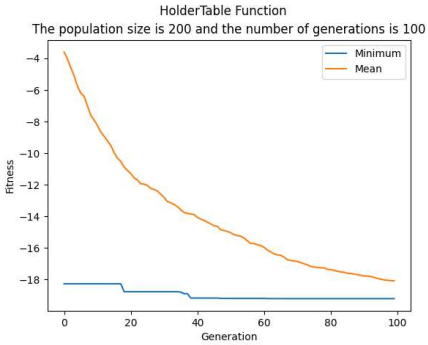


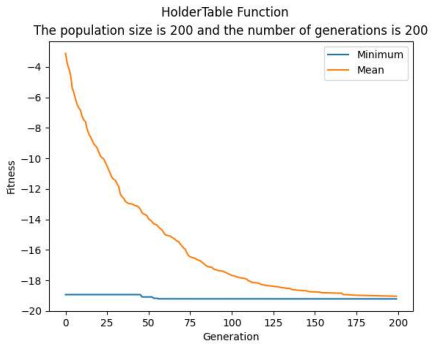




HolderTable Function with population size of 200 and 50,100 and 200 generations:

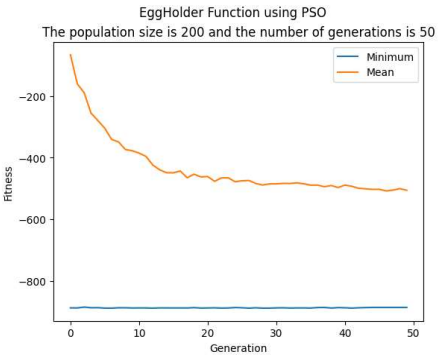


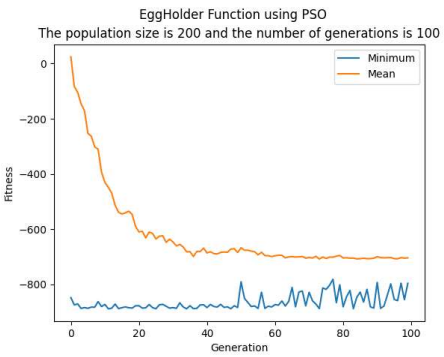


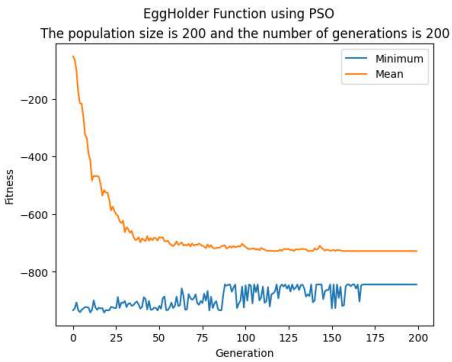


Particle Swarm Optimization:

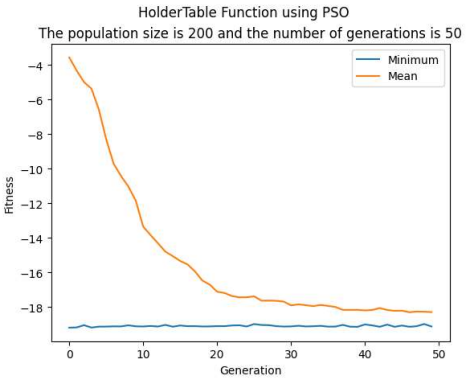
EggHolder Function with population size of 200 and 50,100 and 200 generations:

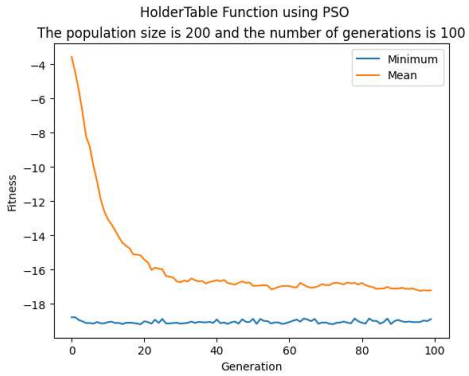


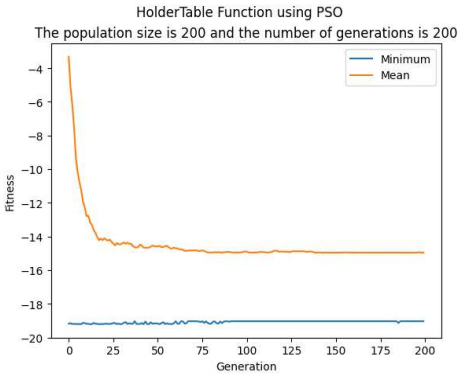




HolderTable Function with population size of 200 and 50,100 and 200 generations:







Observations:

- The pace of convergence towards the optimal solution depends on the initial assignments
- Increasing population increases the chances of getting the most minimum value quickly but also slows down the pace of the convergence of mean of all the candidates towards that minimum(in majority of the cases).
- Increasing the Iterations/Generations increases the chances of convergence given that the initial assignment of coordinates remain the same.
- PSO is generally computationally more expensive than Differential Evolution algorithms. However PSO can find better solutions that Differential Evolution algorithm.