Object Oriented Genetic Algorithm for N variable optimization

Alessandro Brovelli

November 20, 2024

Abstract

An object oriented genetic algorithm was developed in Python. The scope of the code is to optimize (maximize or minimize) a $N \geq 1$ variable fitness function in a provided seach space. It can employ a set of two selection, crossover and mutation methods, set by the user. The algorithm was tested on a 2 dimensional function (Styblinsky-Tang) and a 3 dimensional one. For the former function, settings were tuned for optimal performance with various population sizes, for each combination of evolutionary methods. Finally, a perturbative analysis was carried out to verify the stability around the optimized parameters.

1 Algorithm description

2 Algorithm testing

3 Parametric analysis

4 Conclusions and further developments