Report on Testing
Particle Swarm Optimization Parameters
Using Sphere/Parabola Function

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Introduction:

Based on the movement if bird folks, Particle Swarm Optimization (PSO) is a method which is used to maximize the value of a function by testing candidate parameter locations and improving their values relative to their neighbors. This report shows a series of tests ran on a PSO script to optimize the parameters of an n-dimensional Sphere/Parabola benchmark function.

Number of PSO runs : 4

PSO Performance : The actual global minimum of the function is 0. For dimensions 2 and 3, the PSO performed perfectly, i.e, the best fitness is found to be 0 for both cases. Also, for Dim 20, the best fitness was Zero. However, for 30 dimensions the PSO gave the best fitness as 1.4251e-18

Code Runtime for different dimensionalities:

nDim = 2: 10.997673 seconds

nDim = 3: 16.796010 seconds

nDim = 20: 30.763779 seconds

nDim = 30: 14.875025 seconds

Software and Specifications:

All computational methods have been performed using Matlab R2021b release on a machine with specifications listed as below:

CPU: Intel i5-1035G1 1.00 GHz

CPU Clock Speed: 1190MHz

RAM: 8 GB

Number of Processing Cores: 4