

Project No.3

Introduction to nondeterministic methods and genetic algorithms

1. Introduction

The main objective of this project is to test the efficiency of nondeterministic methods and genetic algorithms. Moreover, the results obtained using the aforementioned methods are to be compared with the results obtained in Project No.1.

Prerequisites:

- OptiM software & OptiM guidebook
- Dev-Cpp compiler
- Files attached to Project No.1

2. Exercise No. 1

Task:

Find the minimum of a 2nd degree function.

Data:

The set of files gathered in the compressed file 1_Paraboloid.zip. The archive is comprised of the full structure of catalogues and all files necessary to run the OptiM software.

Results:

Use nondeterministic methods (i.e. Monte Carlo method and Genetic Algorithms) following the guidelines from the OptiM guidebook. The report should include:

- Presentation of the results obtained using the Monte Carlo method and Genetic Algorithms.
- Comparison between the obtained results and the results gained using the attached Excel file.
- Comparison between the obtained results and the results gained during re-optimisation with a changed number of runs in MC method or with a changed population and resolution in AG
- Comparison between the settings and iteration number and the obtained results.
- Conclusions.

3. Exercise No. 2

Task:

Find the minimum of a 4th degree function with 2 variables. Local minimum problem.

Data:

The set of files gathered in the compressed file 3_Wielomian_4.zip. The archive is comprised of the full structure of catalogues and all files necessary to run the OptiM software.

Results:

Use nondeterministic methods (i.e. Monte Carlo method and Genetic Algorithms) following the guidelines from the OptiM guidebook. The report should include:

- Presentation of the results obtained using the Monte Carlo method and Genetic Algorithms.
- Comparison between the obtained results and the results gained using the attached Excel file.
- Comparison between the obtained results and the results gained during re-optimisation with a changed number of runs in MC method or with a changed population and resolution in AG
- Comparison between the settings and iteration number and the obtained results.
- Conclusions.

4. Exercise No. 3

Task:

Optimise your own function.

Results:

Use nondeterministic methods (i.e. Monte Carlo method and Genetic Algorithms) following the guidelines from the OptiM guidebook. The report should include:

- Presentation of the results obtained using the Monte Carlo method and Genetic Algorithms.
- Comparison between the obtained results and the results gained during re-optimisation with a changed number of runs in MC method or with a changed population and resolution in AG
- Comparison between the settings and iteration number and the obtained results.
- Conclusions.