

# EARIN Lab 3 Report

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April 12, 2023

## 1 Exercise Variant 2 - "Rastrigin function"

Our task was to write a program that optimizes Rastrigin function:

$$f(x, y) = 20 + (x^2 - 10 \cos(2x)) + (y^2 - 10 \cos(2y))$$

Using Evolutionary Strategy  $(\mu, \lambda)$  (later referred as  $ES(\mu, \lambda)$ )

Program can be ran by installing python, moving to project directory and issuing command:

```
python main.py
```

There are 6 parameters we can (but do not have to) change:

1. Number of parents (default equal to 5)
2. Size of population (default equal to 20)
3. Mutation Strength (default equal to 0.1)
4. Number of generations (default equal to 100)
5. Minimal Value (default equal to -5.12)
6. Maximal Value (default equal to 5.12)

To set parameters values user can add those flags to program run:

```
-nop --number_of_parents [number]  
-sop --size_of_population [number]  
-ms --mutation_strength [number]  
-nog --number_of_generations [number]  
-min --min_value [number]  
-max --max_value [number]
```

Order of those parameters does not matter, user can provide none, one, or any number of arguments

Exemplary use (settings all values to default values):

```
python main.py -nop 5 -sop 20 -s 0.1 -i 100 -min -5.12 -max 5.12
```

To print help info about program user can issue help flag:

```
python main.py -h
```

## **2 Implementation**

## **3 Results**