

732A90: Computational Statistics

Computer lab6 - Group11

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Question 1: Genetic algorithm

In this exercise we are going to perform one-dimensional maximization by using a genetic algorithm.

1.

Firstly, we define the function `f()` as

$$f(x) := \frac{x^2}{e^x} - 2 \exp(-(9 \sin x)/(x^2 + x + 1)).$$

2.

Secondly, we define a function `crossover()`, that takes two scalars x and y as inputs, and returns a child as $\frac{x+y}{2}$.

3.

Thirdly, we define the function `mutate()`, that performs the integer division $x^2 \bmod 30$, for a scalar input x .

4.

Further, we will create a function with the parameters `maxiter` and `mutprob`.

i

Plots function `f` in the range from 0 to 30. Do you see any maximum value?

5.

Question 2: EM algorithm

1.

2.

3.

4.

Appendix

```
knitr::opts_chunk$set(echo = FALSE)
# R version
RNGversion('3.5.1')
#1.1
f <- function(x){
  return(x^2/exp(x) - 2*exp(-1*(9*sin(x)) / (x^2 + x + 1)))
}

#1.2
crossover <- function(x,y){
  return((x+y) / 2)
}

#1.3
mutate <- function(x){
  return(x^2 %% 30)
}
# R version
RNGversion('3.5.1')
# Packages
```