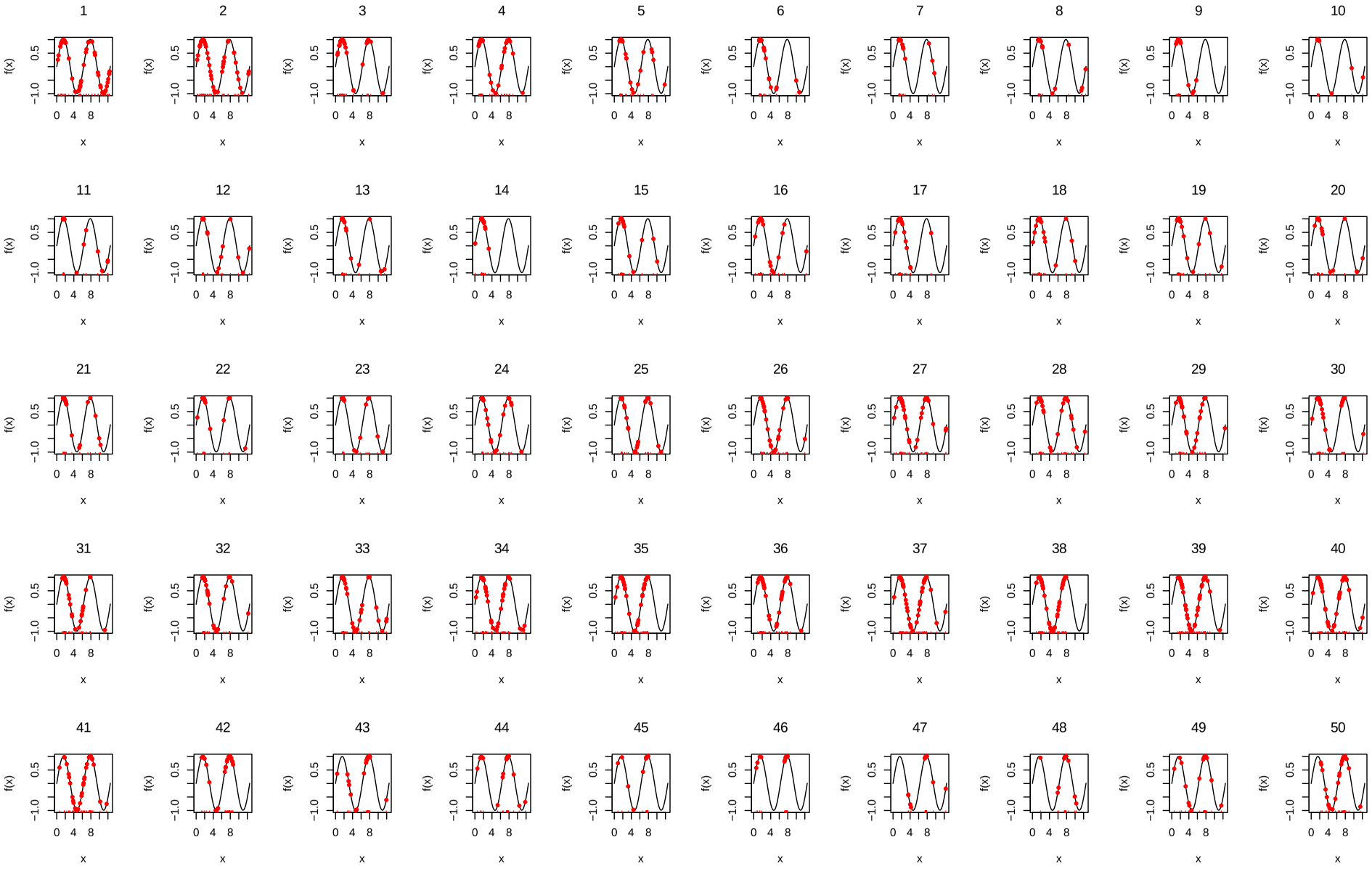
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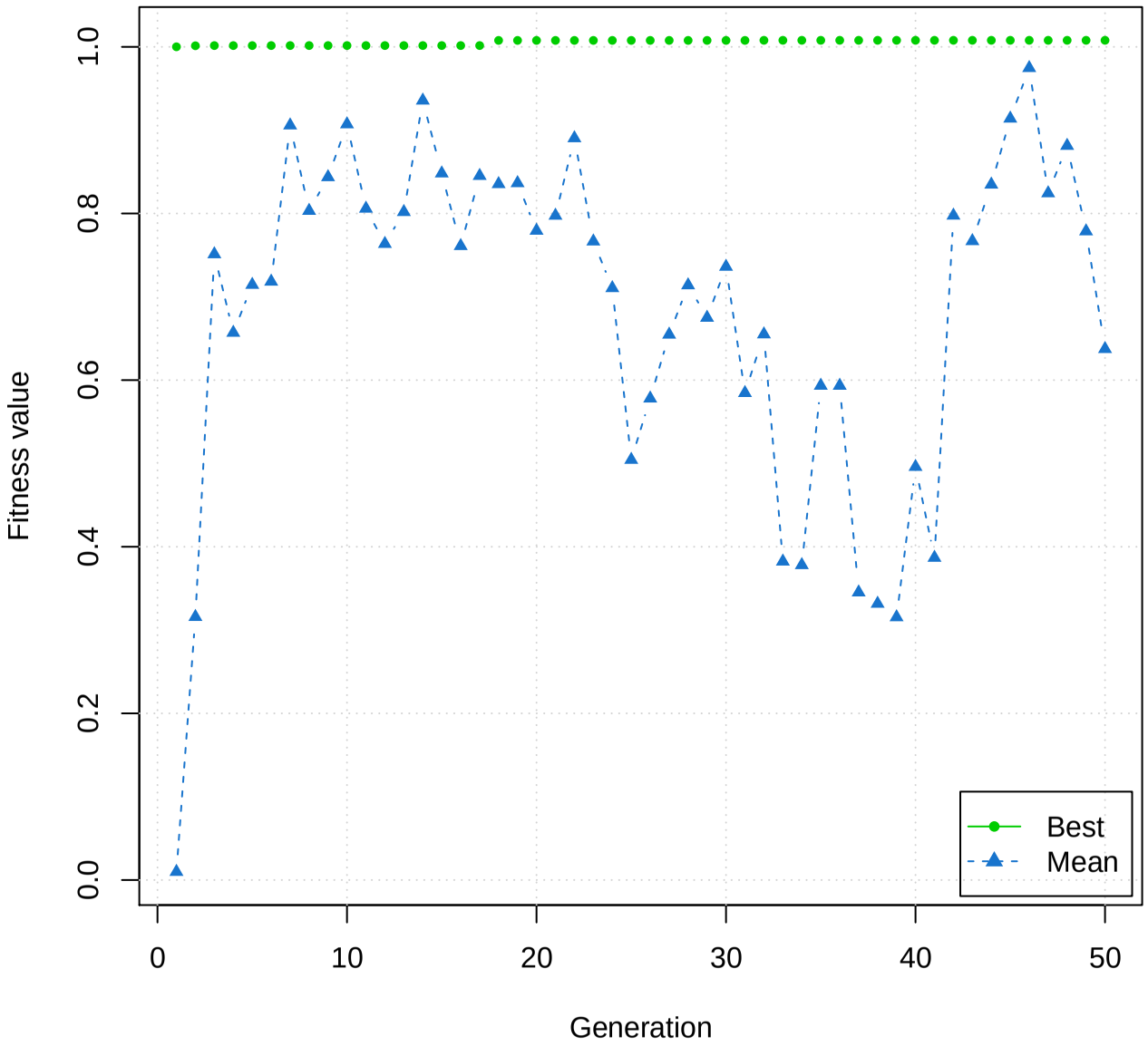
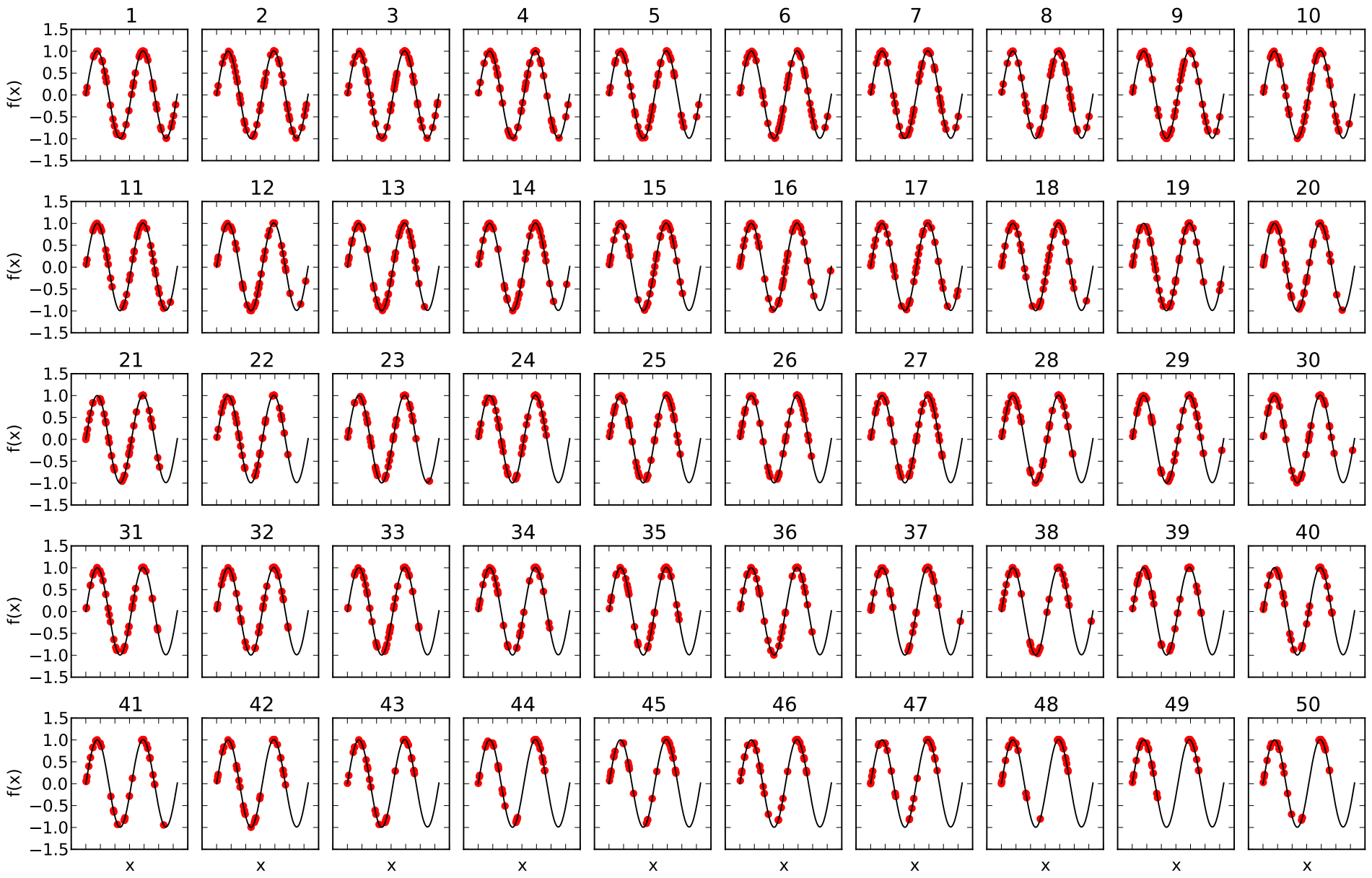
49
50
f(x)
x
0 4 8
−1.0 0.5




```
+-----------------------------------+
|          Genetic Algorithm        |
+-----------------------------------+

GA settings:
Type                  =  real-valued
Population size       =  50
Number of generations =  50
Elitism               =
Crossover probability =  0.8
Mutation probability  =  0.1
Search domain
          x1
Min  0.00000
Max 12.56637

GA results:
Iterations             = 50
Fitness function value = 1.007854
Solution               =
          x1
[1,] 7.854718
```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45
46
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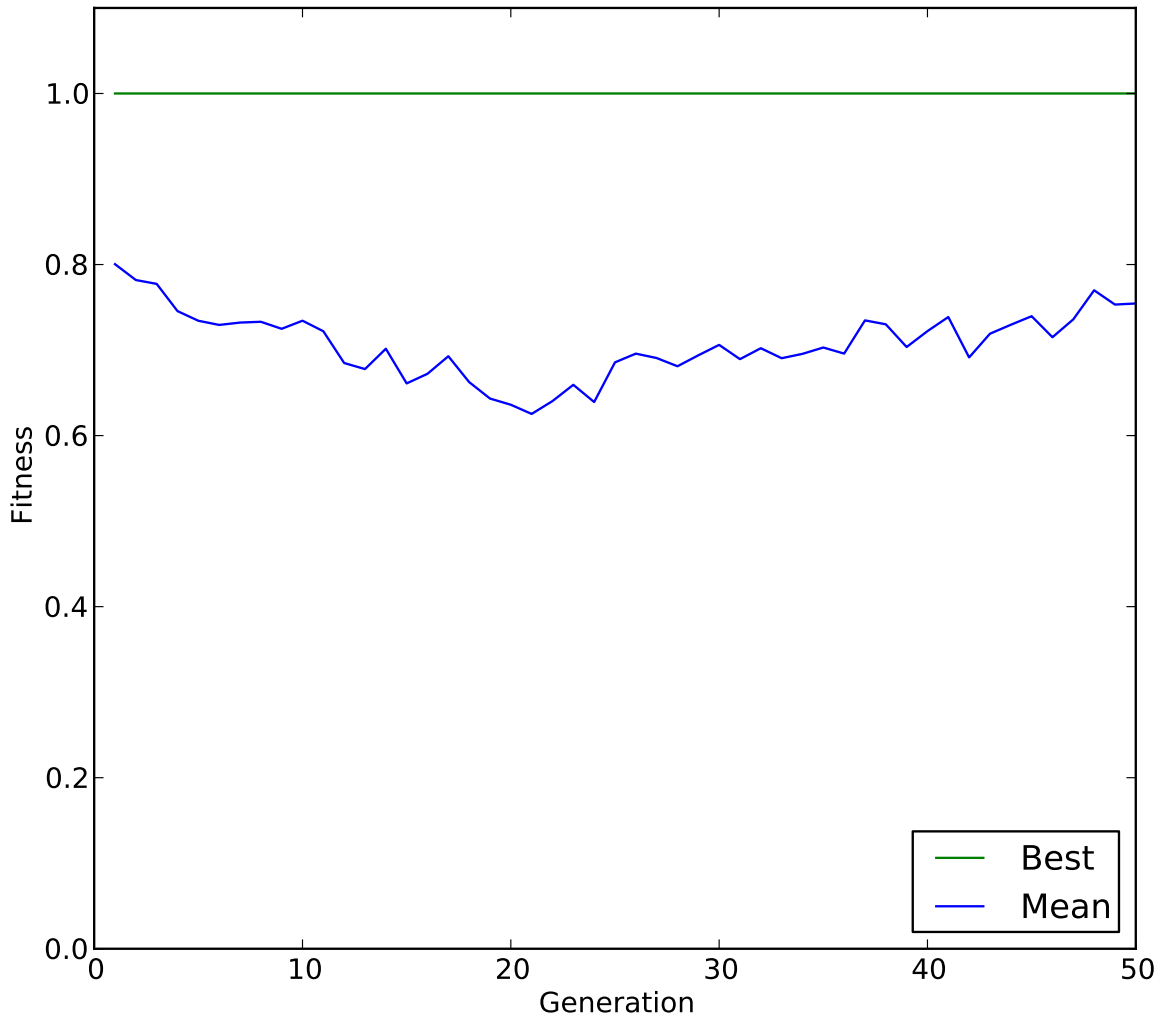
48
49
50
f(x)
x
1.5
1.0
0.5
0.0
−0.5
−1.0
−1.5



My Genetic Algorithm

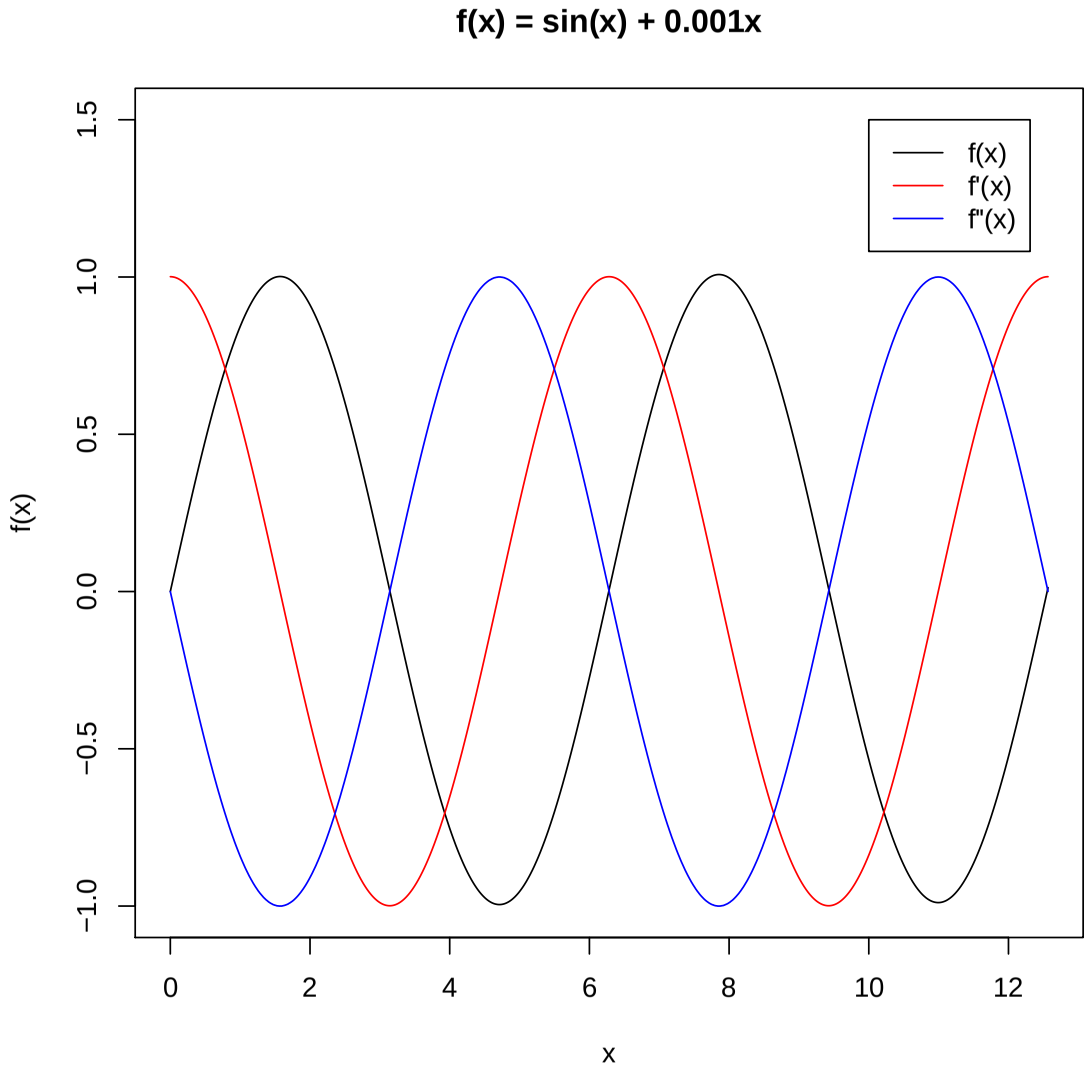
Population Size = 50
Number of Generations = 50
Crossover Probability = 0.20
Search Domain: [0.00, 12.57]
Precision = 2

Results

Fitness = 1.007842
argmax = 7.86

```
My Outputs:
Guess      = 2.000000
Par        = 1.571796
Value      = 1.001571
Iterations = 50
Hessian    = -1.000089
```

```
Optim Outputs:
$par
[1] 1001133

$value
[1] 1002.133

$counts
function gradient
       2        1

$convergence
[1] 0

$message
NULL

$hessian
           [,1]
[1,] -0.9999992
```



```
My Outputs:
Guess      = -2.000000
Par        = -0.666667
Value      = 0.148148
Iterations = 50
Hessian    = -2.000011
```

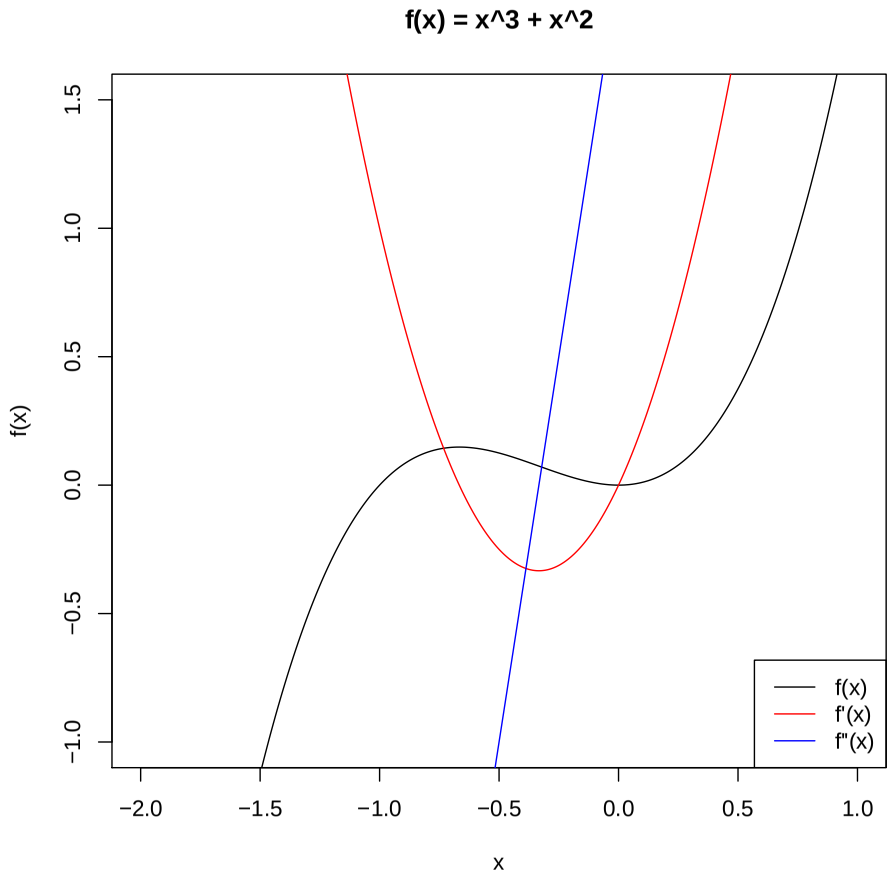
```
Optim Outputs:
$par
[1] -0.6666668

$value
[1] 0.1481481

$counts
function gradient
       3        1

$convergence
[1] 0

$message
NULL

$hessian
          [,1]
[1,] -2.000001
```

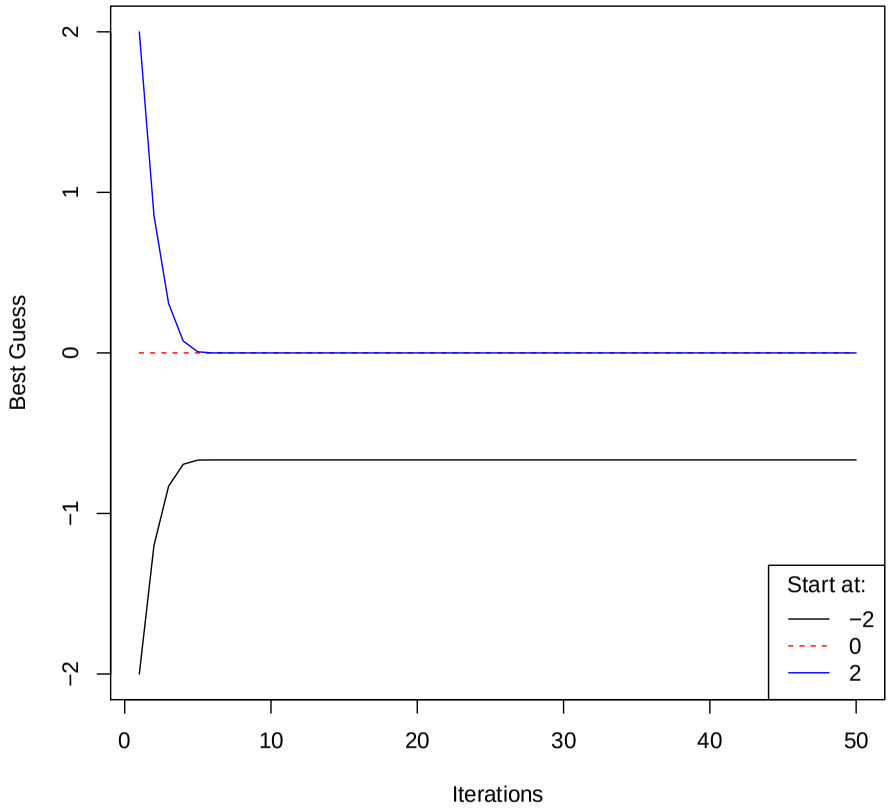
```
My Outputs:
Guess      = 0.000000
Par        = -0.000001
Value      = 0.000000
Iterations = 50
Hessian    = 2.000003
```

```
Optim Outputs:
$par
[1] -5.000001e-07

$value
[1] 2.5e-13

$counts
function gradient
       5        1

$convergence
[1] 0

$message
NULL

$hessian
         [,1]
[1,] 1.999997
```

```
My Outputs:
Guess      = 2.000000
Par        = -0.000001
Value      = 0.000000
Iterations = 50
Hessian    = 2.000003
```

```
Optim Outputs:
$par
[1] -5.000001e-07

$value
[1] 2.5e-13

$counts
function gradient
       5        1

$convergence
[1] 0

$message
NULL

$hessian
         [,1]
[1,] 1.999997
```


f(x) = x^3 + x^2
f(x)
x
−2.0
−1.5
−1.0
−0.5
0.0
0.5
1.0
1.5
f(x)
f'(x)
f''(x)


Best Guess
Iterations
0
10
20
30
40
50
2
1
0
−1
−2
Start at:
−2
0
2