Report

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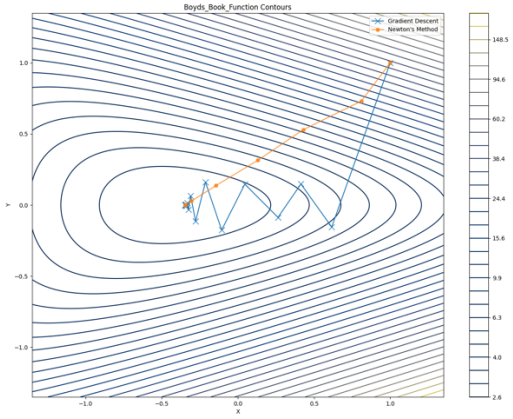
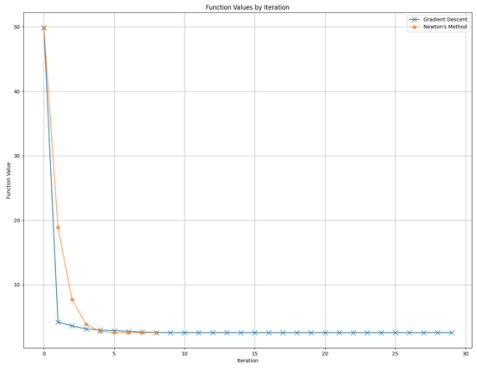
Function from Boyd's Book





Last Iteration Data

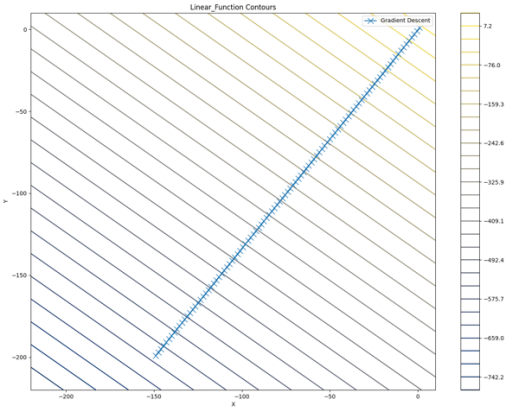
Gradient Descent:

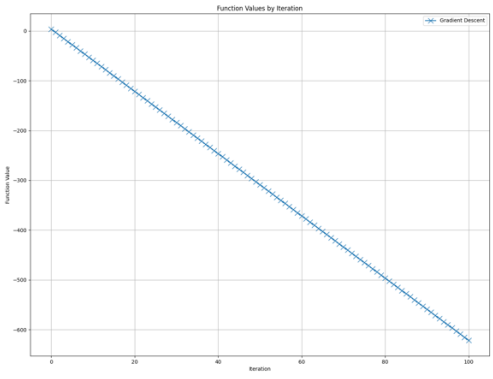
```
Iteration 29: x = [-3.46572886e-01 -9.76799665e-07], f(x) = 2.559266696664345
Boyds_Book_Function finished Gradient Descent. Success: True
```

Newton Method:

```
Iteration 8: x = [-3.4657359e-01  6.8068946e-12], f(x) = 2.5592666966582156
Boyds_Book_Function finished Newton Method. Success: True
```

Linear Function f(x) = [1.5, 2]^T * x



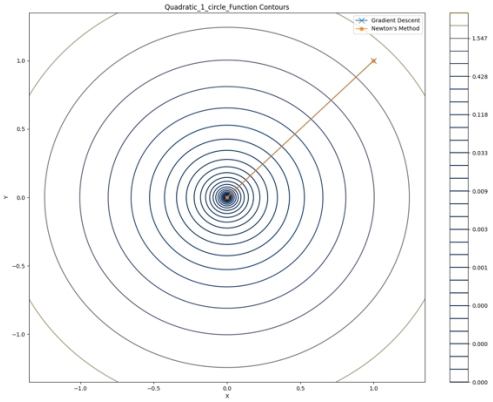


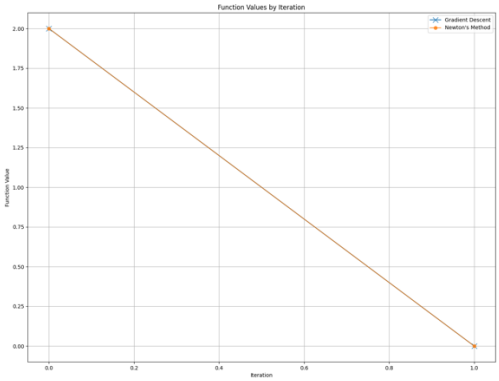
Last Iteration Data

Gradient Descent:
```
Iteration 100: x = [-149. -199.], f(x) = -621.5
Linear_Function finished Gradient Descent. Success: False
```

Newton Method: Missing purposefully

Quadratic Function #1 Circle



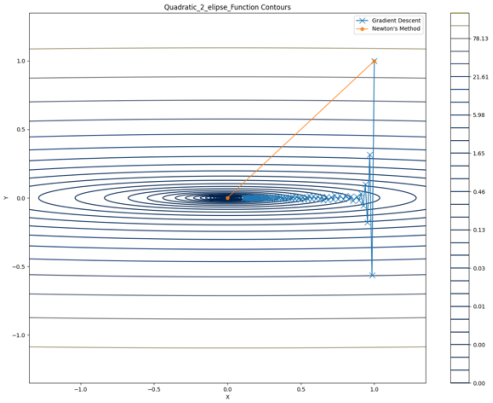


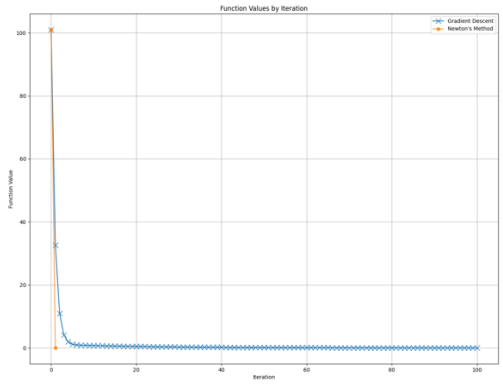
Last Iteration Data

Gradient Descent:
```
Iteration 1: x = [0. 0.], f(x) = 0.0
Quadratic_1_circle_Function finished Gradient Descent. Success: True
```

Newton Method:
```
Iteration 1: x = [0. 0.], f(x) = 0.0
Quadratic_1_circle_Function finished Newton Method. Success: True
```

Quadratic Function #2 Ellipse



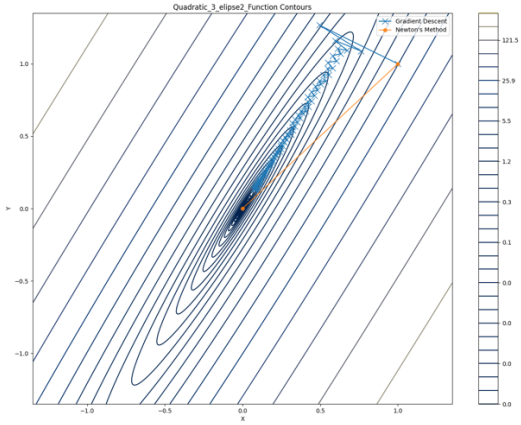


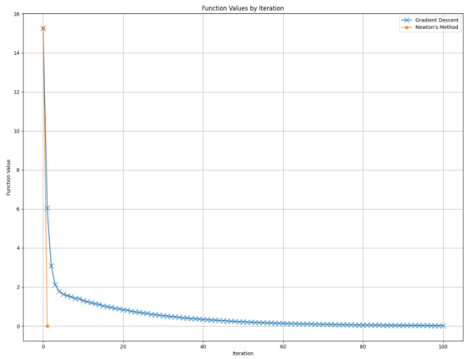
Last Iteration Data

Gradient Descent:
```
Iteration 100: x = [0.11271997 0.0008856 ], f(x) = 0.012784220095399295
Quadratic_2_elipse_Function finished Gradient Descent. Success: False
```

Newton Method:
```
Iteration 1: x = [0. 0.], f(x) = 0.0
Quadratic_2_elipse_Function finished Newton Method. Success: True
```

Quadratic Function #3 Rotated Ellipse



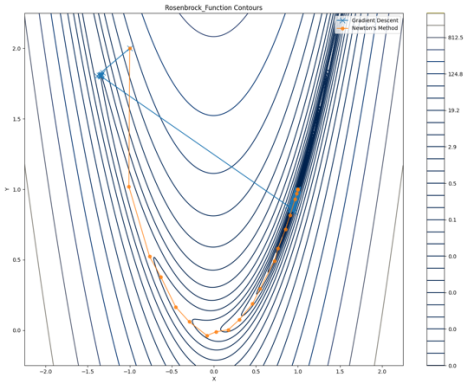


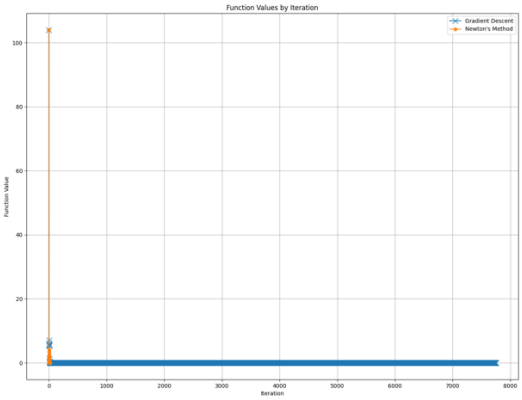
Last Iteration Data

Gradient Descent:
```
Iteration 100: x = [0.07682763 0.13062022], f(x) = 0.02311258419270041
Quadratic_3_elipse2_Function finished Gradient Descent. Success: False
```

Newton Method:
```
Iteration 1: x = [ 6.66133815e-16 -2.22044605e-16], f(x) =
4.7341985675661585e-29
Quadratic_3_elipse2_Function finished Newton Method. Success: True
```

Rosenbrock Function





Last Iteration Data

Gradient Descent:

```
Iteration 7751: x = [0.99989437 0.99978771], f(x) = 1.1267173492101773e-08
Rosenbrock_Function finished Gradient Descent. Success: True
```

Newton Method:

```
Iteration 21: x = [1. 1.], f(x) = 6.668339839446365e-30
Rosenbrock_Function finished Newton Method. Success: True
```

GITHUB LINK:
https://github.com/omri9195/Optimization_Python