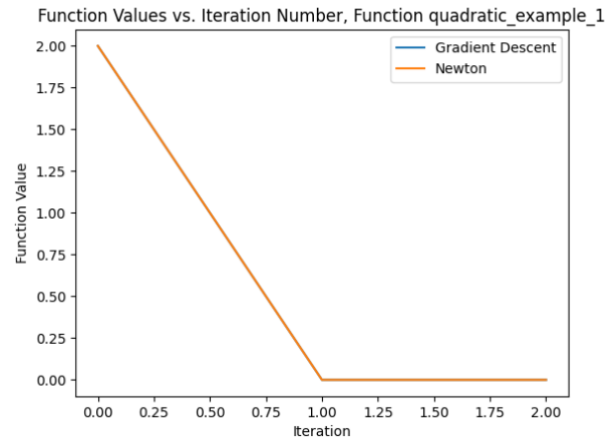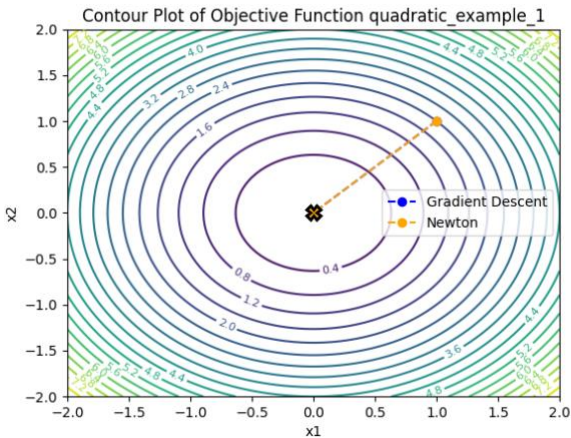# EX1 programming
Numerical Optimization with Python

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May 2024
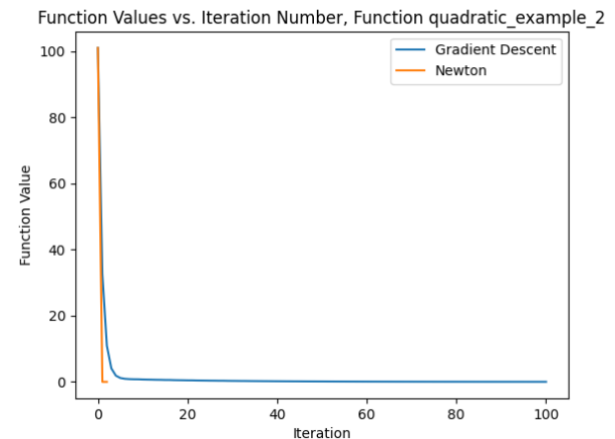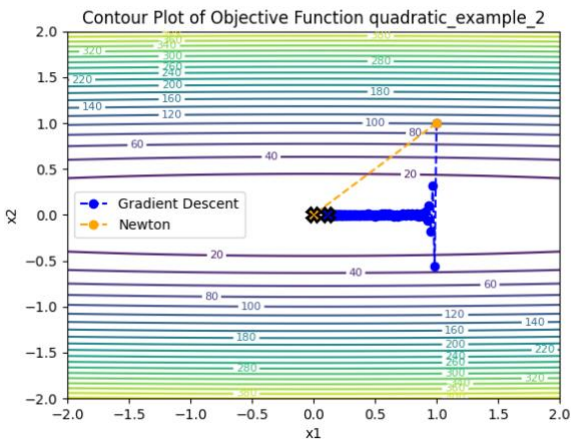
[Link](#) to Github

1. Quadratic example 1: Circles
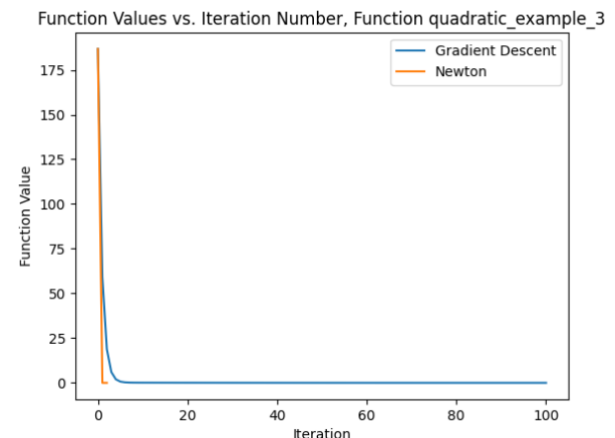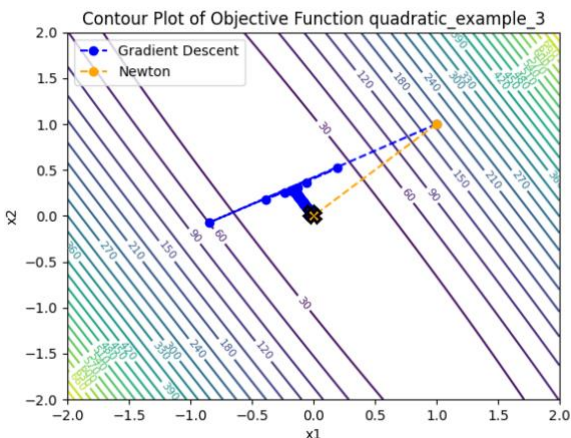
Last iteration, quadratic_example_1, gradient_descent, iteration 2: current location = [0. 0.], current objective value = 0.0, success flag = True
Last iteration, quadratic_example_1, newton, iteration 2: current location = [0. 0.], current objective value = 0.0, success flag = True
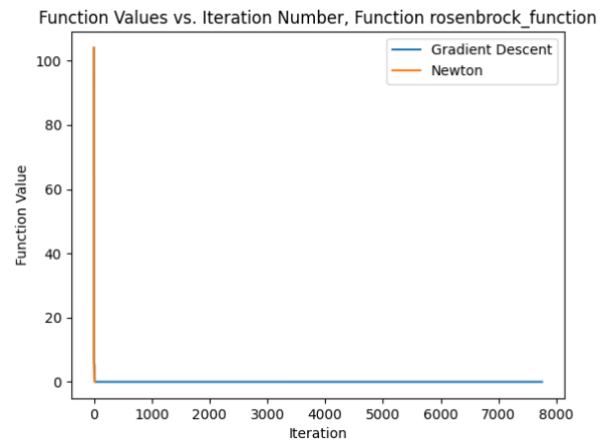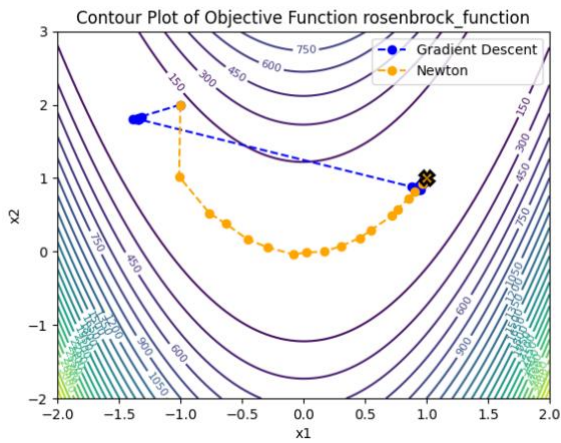
2. Quadratic example 2: Aligned Ellipses

Last iteration, quadratic_example_2, gradient_descent, iteration 100: current location = [0.11271997 0.0008856], current objective value = 0.013360223501345091, success flag = False
Last iteration, quadratic_example_2, newton, iteration 2: current location = [0. 0.], current objective value = 0.0, success flag = True

3. Quadratic example 3: Rotated Ellipses

Last iteration, quadratic_example_3, gradient_descent, iteration 100: current location = [-0.02068459 0.03646722], current objective value = 0.0018462569446314487, success flag = False
Last iteration, quadratic_example_3, newton, iteration 2: current location = [2.36658272e-30 5.91645679e-31], current objective value = 1.4464607747263816e-28, success flag = True
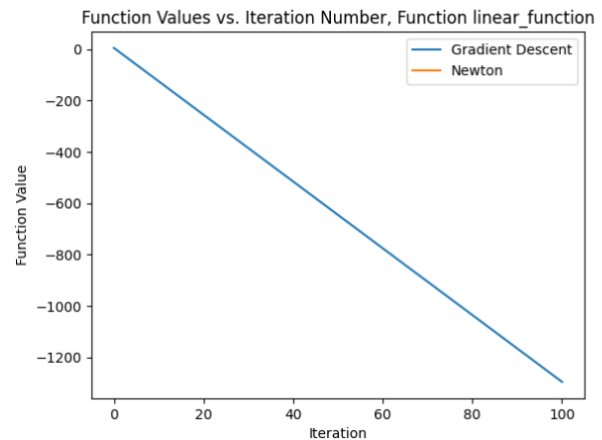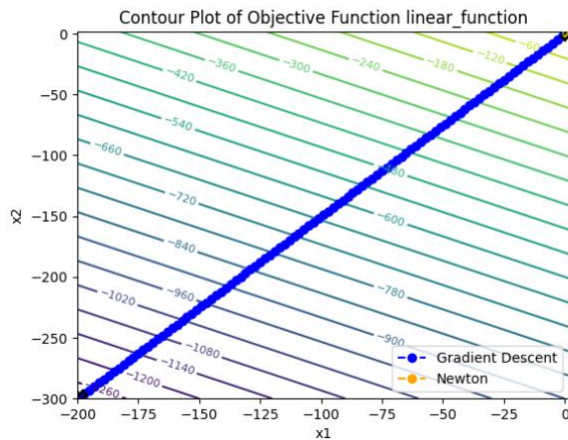
4. Rosenbrock function:

Last iteration, rosenbrock_function, gradient_descent, iteration 7751: current location = [0.99989437 0.99978771], current objective value = 1.1267921607675336e-08, success flag = True

Last iteration, rosenbrock_function, newton, iteration 21: current location = [1. 1.], current objective value = 2.7300933598972337e-16, success flag = True
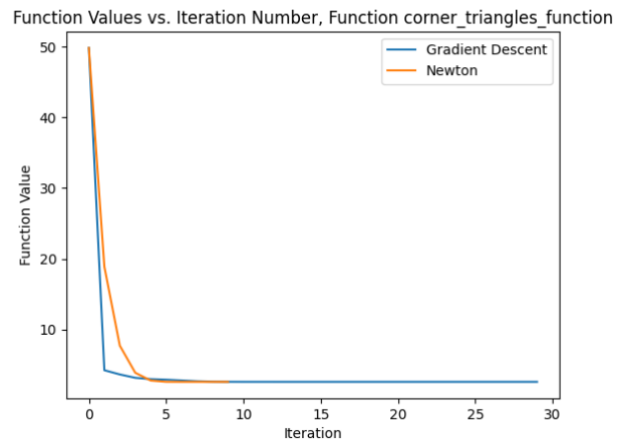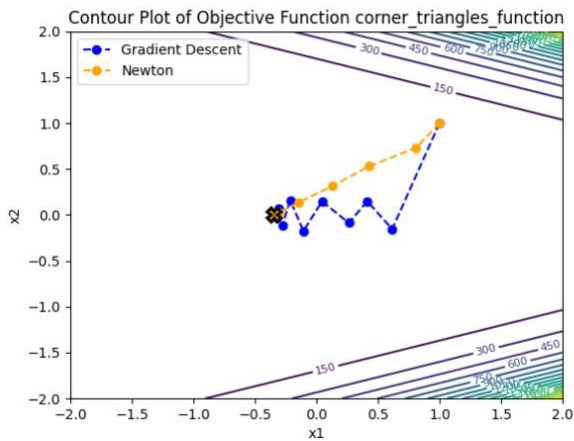
5. Linear function:

Last iteration, linear_function, gradient_descent, iteration 100: current location = [-199. -299.], current objective value = -1282.0, success flag = False
Non singular Hessian matrix at iteration 0, Newton solver failed
Last iteration, linear_function, newton, iteration 0: current location = [1 1], current objective value = 5, success flag = False

6. Corner triangles function:

Last iteration, corner_triangles_function, gradient_descent, iteration 29: current location = [-3.46572886e-01 -9.76799665e-07], current objective value = 2.5592666966646647, success flag = True

Last iteration, corner_triangles_function, newton, iteration 9: current location = [-3.46573590e-01 1.00843947e-17], current objective value = 2.5592666966582156, success flag = True