

## **Problem Set 7, April 28, 2023**

### **(Newton)**

### **Non-convex**

Solve Exercises 40, 41, 42 from the lecture notes. These exercises are carried over from last week.

### **Newton's Method**

Solve Exercises 48, 50 from the lecture notes.

### **Quasi-Newton Methods**

Solve Exercise 53.

### **Fixed Point Iteration**

The Jupyter notebook in `template/` contains the solution from Lab 03's exercise on fixed point iteration. Recall that we showed that the iterations to find a fix point of the  $g$  function can be seen as taking gradient step on a  $f$  function:

$$x_{t+1} = x_t - \gamma f'(x_t) = g(x_t).$$

Please complete the notebook and adapt the algorithm to use Newton updates

$$x_{t+1} = x_t - \frac{f'(x_t)}{f''(x_t)}.$$