Numerical analysis: Assignment 10

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Exercise 1

The code has been implemented in *exercise1.py*. The output of my code is reported in Lst. 1 and in Fig. 1 :

Listing 1: Code output

```
It took 110 iterations to get an error of the residual (abs norm)
of 2.7286568582057953
The least squares solution is point P: [0.85714272 0.71428582];
with the weights: [1.0581167  5.617022   0.94311583 1.8340678 ]
```

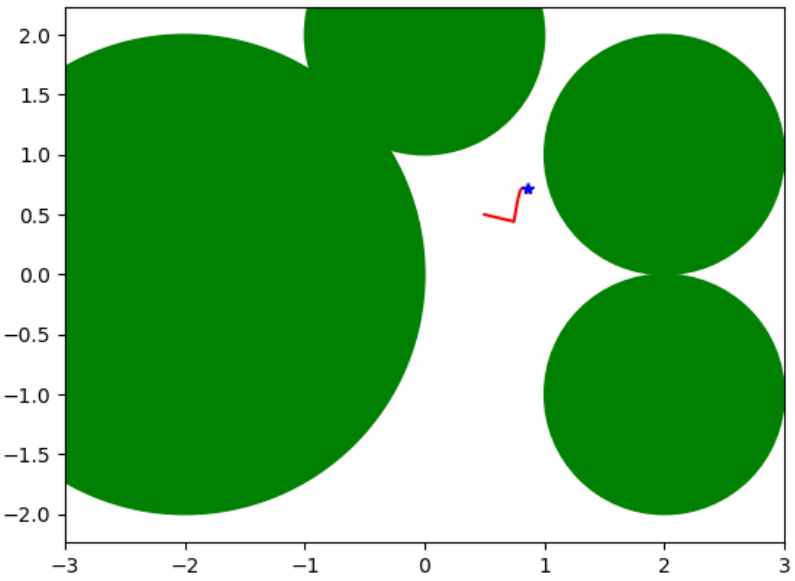

Figure 1: Iterations up to convergence from initial guess [0.5, 0.5]

Observe Image 1 we can see a "90 degree shape" of the path. Because we are using only first order information it's normal to have this kind of path. Figure 2 shows it more closely. If we used second order information we wouldn't see this "90 degree shape" but rather a more "smooth

path" to the least square solution (the black path shows in Figure 2).

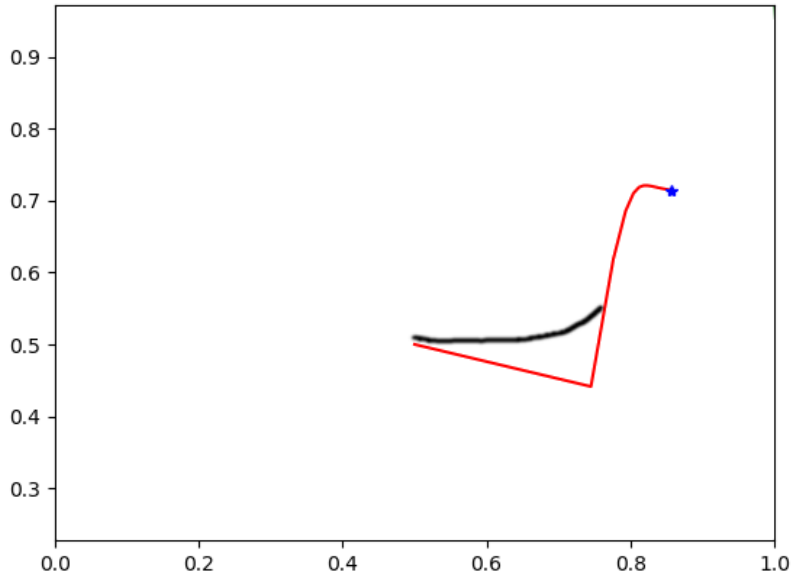

Figure 2: Close-up to the iterations and what the path (more or less) should look like using second order information