

Optimization – Laboratory 4

Newton and gradient methods

The function in Section 4.3 is given by the number assigned in the column **P4** from the status.

Requirements:

I. Newton method

- Draw the contour plot of the function in Matlab.
- Calculate 3 steps on paper for the *Newton method*.
- Implement in MATLAB the *Newton method* and either the *modified Newton method* or the *Levenberg-Marquardt algorithm* and display the minimum point obtained.
- Draw the points obtained by the two methods on the contour plot. Compare the two trajectories.

II. Steepest descent method

- Draw the contour plot of the function in Matlab.
- Calculate 3 steps on paper for *Steepest descent method* with fixed (constant) step (at choice).
- Implement in MATLAB the *Steepest descent method* with fixed step (at choice) and variable step (using the line search you implemented in the last assignment) and display the minimum point obtained.
- Draw the points obtained by the two implementations of the steepest descent on the contour plot. Compare the trajectories to those obtained in the previous item.

Hint: The tolerance for line search should be at least 10 times lower than the tolerance of the method.