

Nonlinear Optimization

Homework #8

(Due on June 3, 2020)

Computational assignment (Mini-project):

Using your favorite (available) code for solving unconstrained minimization problems, combined with Penalty and Augmented Lagrangian methods, solve (numerically) the optimization problems described in Problems **1b)** and **3)** from Homework 7. For problem **1b)**, consider the objective function $-f(x) = x_1^2 + x_2^2 + 16x_3^2$, instead of $f(x)$.

Try any combination you like. However, you should compare at least once the behavior of the Penalty (pure) method with the Augmented Lagrangian method. Report not only the obtained approximate solutions but also the obtained approximate Lagrange multipliers based on the theoretical results in our Notes. Of course, it is important to report the number of iterations required by the external method (Penalty or/and Augmented Lagrangian) as well as the iterations required by your favorite internal method. Recall that pictures (when possible) are very welcome. Explain and justify whatever you do and every decision you make.