

# Project 1

May 4, 2010

The following homework assignment should be submitted in writing no later than Tuesday, 25/5/2010. No delays are permitted, unless they are both justified and pre-approved by me. You may submit the project in pairs.

1. Write an R function that implements the the Broyden-Fletcher-Goldfarb-Shanno (BFGS) method for unconstraint minimization.
2. Consider the function

$$f(x, y) = e^x(4x^2 + 2y^2 + 4xy + 2x + 1) .$$

Write an R function that computes the function and the gradient of the function.

3. Implement the function you wrote in 1 in order to find the minimum of the function in 2. Compare the implementation you wrote of the BFGS algorithm to the one implemented by the R function `optim` (use the argument `method="BFGS"` in the function).
4. Plot the function and draw the steps of the BFGS algorithm on the plot.