

# Deterministic optimization assignment

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The *Rosenbrock's function* is:

$$f(x_1, x_2) := 100(x_2 - x_1^2)^2 + (1 - x_1)^2.$$

The exercise consists in solving the problem of minimizing  $f$  over  $\mathbb{R}^2$  starting at the point  $(-1.5, -1)$ . Is this point a good seed?

Compare the three different methods below by explaining towards which point do they converge, and how many iterations are required.

(Where) Is  $f$  convex? Are the points obtained a global minimum?

Methods *to program*:

- (a) the (standard plain) Steepest Descent (Gradient) Method,
- (b) the Conjugate Gradient Method, and
- (c) Levenberg–Marquardt.