F90, fall 2015, exercise 9

Return by Dec 2.

1. Test the line search by finding the minimum of the function

   $$\sqrt{x} + \sin(x - \sqrt{x})$$

   in the interval $[5, 10]$. Check that you'll get the same solution even if the initial interval is slightly changed.

2. As problem 1, but also the derivative of the function is used.

3. Use the simplex method to find the minimum of the Rosenbrock banana function

   $$f(x, y) = 100(y - x^2)^2 + (1 - x)^2.$$

   Try some different initial values. (The minimum is at $(1, 1)$, but a deep and narrow curved valley makes it difficult to find it.)

4. Use the simplex mthod to fit the line $y = ax + b$ to the data set $(0, 0)$, $(1, 1)$, $(2, 0)$, $(3, 2)$, $(4, 4)$, $(5, 5)$. The criterion of the fit is the L_1 norm, i.e. the residual to be minimized is

   $$R = \sum |y_i - ax_i - b|.$$