

FunWork #3

Due on March 11

INSTRUCTIONS:

- The assignment must be typed. Clearly identify the steps you have taken to solve each problem.
 - Whenever you use somebody else's code from the Internet, make sure to give reference/credit to the code source. If you do not reference the source and the grader will find the source, you will be charged with plagiarism, which is a serious offense.
 - Your grade depends on the completeness and clarity of your work as well as the resulting answer.
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Consider the Rastrigin function,

$$f(x_1, x_2) = 20 + \left(\frac{x_1}{10}\right)^2 + \left(\frac{x_2}{10}\right)^2 - 10 \left(\cos\left(\frac{2\pi x_1}{10}\right) + \cos\left(\frac{2\pi x_2}{10}\right) \right).$$

Minimize Rastrigin's function using

1. the steepest descent algorithm;
2. the Powell conjugate gradient algorithm, see page 188 in the textbook for the description of the algorithm;
3. the rank one correction algorithm;
4. the DFP algorithm;
5. the BFGS algorithm.

Connect the successive points with lines or lines with arrows to show clearly the progression of the optimization process. Use two starting points,

$$\mathbf{x}^{(0)} = \begin{bmatrix} 7.5 \\ 9.0 \end{bmatrix} \quad \text{and} \quad \mathbf{x}^{(0)} = \begin{bmatrix} -7.0 \\ -7.5 \end{bmatrix}.$$

In each run, locate the obtained sequence of points on the level sets of f .

Use the Fibonacci line search algorithm to determine the step size. Other line search algorithms will not be accepted. Attach your MATLAB code.