Lab Assignment 4: Optimization for Machine Learning

Dr. Md Abu Talhamainuddin Ansary

Write python codes of steepest descent method with inexact line search technique for the following functions:

(1) $f : \mathbb{R}^2 \to \mathbb{R}$ is defined by $f(x) = 4x_1^2 - 3x_1x_2 + 2x_2^2 - x_1 + 2x_2$ with $n = 25 + r$ and $x^0 = (R, R + 1)$ where R is the last two digits of your roll number.

(2) $f : \mathbb{R}^n \to \mathbb{R}$ is defined by $f(x) = x_1 + \frac{2}{|I|}\sum_{i\in I}(x_i - \sin(6\pi x_1 + i\pi/n))^2$ where $I = \{x = 1, 2, \ldots, n : i \; mod \; 2 = 1\}$ with $n = 25+r$ and $x^0 = (1, \ldots, 1)$ where r is the last digit of your roll number.

(3) $f : \mathbb{R}^n \to \mathbb{R}$ is defined by $f(x) = x_1 + \frac{2}{|I|}\sum_{i\in I}(x_i - \sin(6\pi x_1 + i\pi/n))^2$ where $I = \{x = 1, 2, \ldots, n : i \; mod \; 2 = 0\}$ with $n = 25+r$ and $x^0 = (1, \ldots, 1)$ where r is the last digit of your roll number.