AEM 685: Homework # 6

Important: Please work independently. You are allowed to use Matlab, Maple, Mathematica, your notes and books.

Minimize the following problem using Genetic algorithm (GA) method but with the surrogate model obtained using three different techniques.

$$Minimize\ f(x_1, x_2) = 3 * \sin(0.5 + 0.25x_1x_2) * \cos(x_1)$$

Sub to: $0 \leq x_1 \leq 5$

$$0 \leq x_2 \leq 8$$

1) Use 'Radial basis functions' as given in the lecture notes, 'Lecture-10-21-2015' to fit the surrogate model. Use Latin hypercube sampling to generate samples, start with the minimum number of samples and predict the RMS error, sum of square error, standard error, R^2 and adjusted R^2 values. Improve the definition of the surrogate model by adding more samples iteratively by observing the RMS error, sum of square error, standard error, R^2 and adjusted R^2 values. (40 points)

2) Use 'Ordinary Kriging' and adaptive sampling to get the optimal solution. Start with the minimal number of samples. By utilizing 'Expected Improvement criteria' as given in 'Lecture-10-26-2015', improve the robustness of the surrogate mode and improve the optima iteratively. (60 points)