SYDE/BME 411 - Assignment #3

November 19, 2020

For this assignment:

(1) You should select a technique from the following areas of optimization.

(2) Study the selected technique by reviewing related reference materials and understand its theory, working principles, and advantages/disadvantages.

(3) Create **your own computer program** to implement the selected technique.

(4) Solve few examples by your choice using the devised code.

(5) Compare the numerical results for your examples with another (rival) technique by your choice implemented in a computer program or software package.

(6) Finally, a report along with the devised code should be submitted.

Areas of Optimization:

- Numerical Methods for Constrained Optimization (including but not limited to Sequential Quadratic Programming, Interior-point Method, Generalized Reduced Gradient Method, Gradient Projection Method, Active Set Methods)

- Multi-Objective Optimization (including but not limited to Weighted Sum Approach, Lexicographic Method)

- Modern Optimization Methods (including but not limited to Genetic Algorithm, Simulated Annealing)

- Dynamic Programming

- Integer Programming (including but not limited to Branch-and-Bound Method)

- Stochastic Programming (including but not limited to Chance-Constrained Programming)

- Linear Programing (Interior-point Methods)

Important Notes:

(i) The selected technique should be different from those optimization methods used in your group project.

(ii) It is essential that all of the sections of the submitted report and code are your own individual and original work. You should also cite any reference materials that you have used.

Deliverables:

A report (no more than 5 pages in 2-column format) in the form of paper is required. The report should include an abstract, background/literature survey, theory and other explanations, numerical results for examples and comparisons, discussions, and conclusions. This report and the devised computer program should be submitted by **Friday, Dec. 18, 2020.**

Please note that the degree of complexity of the selected technique along with the presented level of knowledge for it will be taken into account for marking this assignment. To demonstrate a good understanding of the selected technique, the following pieces are needed:

- A proper survey of existing reference materials

- Validity and clarity for working principles of the selected technique, its theory, numerical results, and other explanations

- Solving suitable examples and using rational metrics for comparison with rival method

- Mindful discussions of your results

If you need further information, please contact the course instructors.