Assignment 7

The due date for submitting the assignment is October 22, 2022. You are expected to complete the assignment using MATLAB or Octave.

1. Let $\text{minimize} f(x) = x_1 + x_2^2 - 3x_1^2 - x_2$ over the domain $\mathbb{R}^2$. Use the conjugate gradient method to find the minimum of the function.

2. Consider the optimization problem $\text{minimize} f(x) = x_1^2 + x_2^2$ over $\mathbb{R}^2$. Use the Newton’s method to find the minimum.

3. Consider the optimization problem $\text{minimize} f(x) = x_1^4 + x_2^4$ over $\mathbb{R}^2$. Use the gradient descent method to find the minimum.

4. Consider the optimization problem $\text{minimize} f(x) = x_1^2 + x_2^2$ over $\mathbb{R}^2$. Use the trust-region method to find the minimum.

5. Consider the optimization problem $\text{minimize} f(x) = x_1^2 + x_2^2$ over $\mathbb{R}^2$. Use the simulated annealing method to find the minimum.

6. Consider the optimization problem $\text{minimize} f(x) = x_1^2 + x_2^2$ over $\mathbb{R}^2$. Use the genetic algorithm to find the minimum.

7. Consider the optimization problem $\text{minimize} f(x) = x_1^2 + x_2^2$ over $\mathbb{R}^2$. Use the particle swarm optimization method to find the minimum.

8. Consider the optimization problem $\text{minimize} f(x) = x_1^2 + x_2^2$ over $\mathbb{R}^2$. Use the differential evolution method to find the minimum.

9. Consider the optimization problem $\text{minimize} f(x) = x_1^2 + x_2^2$ over $\mathbb{R}^2$. Use the multi-start method to find the minimum.

10. Consider the optimization problem $\text{minimize} f(x) = x_1^2 + x_2^2$ over $\mathbb{R}^2$. Use the quasi-Newton method to find the minimum.

11. Consider the optimization problem $\text{minimize} f(x) = x_1^2 + x_2^2$ over $\mathbb{R}^2$. Use the nonlinear conjugate gradient method to find the minimum.

12. Consider the optimization problem $\text{minimize} f(x) = x_1^2 + x_2^2$ over $\mathbb{R}^2$. Use the Broyden’s method to find the minimum.

13. Consider the optimization problem $\text{minimize} f(x) = x_1^2 + x_2^2$ over $\mathbb{R}^2$. Use the Polak–Ribière’s method to find the minimum.

14. Consider the optimization problem $\text{minimize} f(x) = x_1^2 + x_2^2$ over $\mathbb{R}^2$. Use the Fletcher-Reeves method to find the minimum.

15. Consider the optimization problem $\text{minimize} f(x) = x_1^2 + x_2^2$ over $\mathbb{R}^2$. Use the Powell’s method to find the minimum.

16. Consider the optimization problem $\text{minimize} f(x) = x_1^2 + x_2^2$ over $\mathbb{R}^2$. Use the Andrei’s method to find the minimum.

17. Consider the optimization problem $\text{minimize} f(x) = x_1^2 + x_2^2$ over $\mathbb{R}^2$. Use the Wang’s method to find the minimum.

18. Consider the optimization problem $\text{minimize} f(x) = x_1^2 + x_2^2$ over $\mathbb{R}^2$. Use the Raydan’s method to find the minimum.

19. Consider the optimization problem $\text{minimize} f(x) = x_1^2 + x_2^2$ over $\mathbb{R}^2$. Use the Tillman’s method to find the minimum.

20. Consider the optimization problem $\text{minimize} f(x) = x_1^2 + x_2^2$ over $\mathbb{R}^2$. Use the Lin–Liu’s method to find the minimum.

21. Consider the optimization problem $\text{minimize} f(x) = x_1^2 + x_2^2$ over $\mathbb{R}^2$. Use the Liu’s method to find the minimum.