Plot in python:

1. Create a line plot of the function y = sin(x) with a solid blue line and circle markers.

2. Plot y = cos(x) with a dashed green line and square markers.

3. Create a line plot of y = e^x with a dotted red line and triangle markers.

4. Plot y = log(x) with a dash-dot black line and star markers.

5. Create a subplot with two line plots: one for y = sin(x) and one for y = cos(x).

6. Plot y = x^2 with a thick purple line and plus markers.

7. Create a line plot with a figure size of 10x5 inches, plotting y = $\sqrt{x}$ with a solid orange line and diamond markers.

8. Plot y = tan(x) with a thin gray line and 'x' markers.

9. Create a line plot of y = sin(x) + cos(x) with a dash-dot blue line and cross markers.

10. Plot y = $\frac{1}{x}$ with a solid green line and hexagon markers.

11. Create a subplot with two rows and one column. In the first subplot, plot y = x^3 with a solid red line. In the second subplot, plot y = x^4 with a dashed blue line.

12. Create a line plot of y = sin(x) with a figure size of 12x6 inches, using a dotted black line and 'o' markers.

13. Plot y = e^{-x} with a thick orange line and 'D' markers.

14. Create a subplot with two line plots: one for y = sin(x) with a dashed green line and one for y = cos(x)with a solid blue line.

15. Plot y = sin(2x) with a dash-dot purple line and 's' markers.

16. Create a line plot of y = cos(2x) with a thick black line and 'o' markers.

17. Create a subplot with three rows and one column. In the first subplot, plot y = sin(x)with a solid red line. In the second subplot, plot y = cos(x) with a dashed green line. In the third subplot, plot y = sin(x)+ cos(x) with a dash-dot blue line.

18. Plot y = x^2 - 2x + 1 with a solid blue line and 'x' markers.

19. Create a line plot of y = $\sqrt{x}$ with a figure size of 8x4 inches, using a dotted green line and '+' markers.

20. Plot y = sin(x) cos(x) with a thick red line and diamond markers.

21. Create a subplot with the function y = sin(x), its first derivative y' = cos(x), and its second derivative y'' = -sin(x). Use a solid line for the function and dashed lines for the derivatives.

22. Create a subplot with the function y = x^2, its first derivative y' = 2x, and its second derivative y'' = 2. Use different line styles and markers for each plot.

23. Plot y = e^x with subplots showing its first derivative y' = e^x and second derivative y'' = e^x. Use solid lines for the function and dashed lines for the derivatives.

24. Create a subplot with y = log(x), its first derivative y' = $\frac{1}{x}$ and its second derivative y'' = $\frac{1}{x^2}$. Use different colors and line styles for each.

25. Plot y = tan(x) with subplots showing its first derivative y' = sec^2(x)and its second derivative y'' = 2sec^2(x) tan(x).

Steepest Descent Method

1. Implement the Steepest Descent Method to minimize the function f(x, y) = x^2 + y^2.

Initialize the starting point at (1, 1), set the step size α = 0.1, and use a convergence tolerance of 1e-6.

2. Apply the Steepest Descent Method to minimize the following functions:

- f(x, y) = x^2 + 2xy + y^2
- f(x, y) = sin(x) + cos(y)

Initialize at (0, 0) and use a step size α = 0.01 and a convergence tolerance of 1e-6.

3. Convergence Analysis

Implement the Steepest Descent Method for the function f(x, y) = (x - 1)^2 + (y - 2)^2 with different step sizes (α = 0.1, α = 0.01, α = 0.001).

4. Implement the Steepest Descent Method to minimize the function f(x, y) = x^2 + 2xy + y^2.

5. Apply the Steepest Descent Method to minimize the non-quadratic function f(x, y) = e^(-(x^2 + y^2)).

Use a starting point (1, 1), a step size α = 0.1, and a convergence tolerance of 1e-6.