

Lab Worksheet (Week-5)

Plotting and Visualization

1. Plot a function $x^5 + 4x^3 + 3x^2 + x + 1$, together with its first, second, third, and fourth derivatives. Give the title *Plotting of 5-degree polynomial and its derivatives*, with the following properties:
 - (i) Use the 100 points over a range -5 to 2 .
 - (ii) Use different colors for each function.
 - (iii) Label the axes and use a legend in the lower right corner.
 - (iv) Use different line styles.
2. Write a Python program to draw a scatter plot for comparing Mathematics and Science subject marks. Use marks of 10 students.
Sample data:
Test Data:
math marks = [88, 92, 80, 89, 100, 80, 60, 100, 80, 34]
science marks = [35, 79, 79, 48, 100, 88, 32, 45, 20, 30]
marks range = [10, 20, 30, 40, 50, 60, 70, 80, 90, 100]
3. Write a Python program to draw a graph of $e^{-x^2} \cos(40x)$ bounded by $-e^{-x^2}$ and e^{-x^2} . Use 1000 points over a range -2 to 2 and the same color for both the bounds. Save it by the name *Graph*.
4. Write a Python program to plot the vectors $[1, 1, 1]$, $[2, -1, 5]$, and $[4, 1, -2]$ in $3D$.