Work Report

This report presents the tasks and results obtained from the Jupyter Notebook provided.

1. Data Visualization

The notebook begins by generating two sets of data:

- A sine wave function created using numpy and math libraries.

- A noisy dataset consisting of manually defined values.

The sine wave is plotted against the noisy data points. The visualization highlights the comparison between the true underlying function (sine wave) and the observed noisy data. This demonstrates the concept of noise corruption in data.

2. Function for Monotonicity Check

A function named `is_monotonic` is implemented to determine whether a sequence is monotonic (increasing or decreasing). The function checks pairwise comparisons within the array.

- If the sequence is consistently increasing or decreasing, it is classified as monotonic.

- Otherwise, it is classified as not monotonic.

The function is tested with three different lists:

- A strictly increasing list, identified as monotonic.

- A strictly decreasing list, identified as monotonic.

- A mixed list, identified as not monotonic.

3. Results

The outputs show the correctness of the function implementation. The notebook successfully distinguishes between monotonic and non-monotonic sequences. Furthermore, the visualization step effectively demonstrates the impact of noise on data compared to an ideal mathematical function.

Conclusion

The tasks performed in the notebook include data visualization, noise analysis, and implementation of an algorithm to check monotonicity in datasets. These exercises contribute to understanding data behavior and developing simple yet effective analytical tools.