

Lab Assignment-1

Experiment 1: Introduction to Signal Types

Objective: Understand different types of signals.

Generate and plot the following signals using MATLAB or any signal processing software:

- a. Continuous-time sinusoidal signal
- b. Discrete-time unit step signal
- c. Continuous-time impulse signal
- d. Discrete-time exponential signal

Experiment 2: Signal Transformation

Objective: Explore signal transformation techniques.

Use continuous-time sinusoidal or unit step signal generated in the above experiment (Exp-1).

Apply the following transformations to the signal:

- a. Time scaling
- b. Time shifting
- c. Amplitude scaling
- d. Time reversal

Plot the original and transformed signals to observe the effects of each transformation.

Experiment 3: Classification of Signals

Objective: To analyze the properties of signals of different classes.

- A. Periodic and Aperiodic Signals:** Create a discrete-time signal using a random number generator. Analyze the signal to determine if it is periodic or aperiodic. Explain your process and findings.
- B. Even and Odd Signals:** Design a discrete-time signal using a combination of even and odd components. Provide a mathematical expression for the signal and plot it. Explain how you constructed the signal to ensure it possesses both even and odd properties.
- C. Causal and Non-causal Signals:** Create a continuous-time signal using a piecewise function that includes both causal and non-causal components. Plot the signal and clearly indicate the causal and non-causal regions.