

Department: Electronics and Communication Engineering

## **SIGNAL AND SYSTEM LAB**

**(KEC-453)**

### **LIST OF EXPERIMENTS**

**(As per AKTU Syllabus)**

#### 1. Introduction to MATLAB

- a. To define and use variables and functions in MATLAB.
- b. To define and use Vectors and Matrices in MATLAB.
- c. To study various MATLAB arithmetic operators and mathematical functions.
- d. To create and use m-files.

#### 2. Basic plotting of signals

- a. To study various MATLAB commands for creating two and three-dimensional plots.
- b. Write a MATLAB program to plot the following continuous time and discrete time signals.
  - i. Step Function
  - ii. Impulse Function
  - iii. Exponential Function
  - iv. Ramp Function
  - v. Sine Function

#### 3. Time and Amplitude transformations

Write a MATLAB program to perform amplitude-scaling, time-scaling, and time-shifting on a given signal.

#### 4. Convolution of given signals

Write a MATLAB program to obtain linear convolution of the given sequences.

#### 5. Autocorrelation and Cross-correlation

a. Write a MATLAB program to compute the autocorrelation of a sequence  $x(n)$  and verify the property.

b. Write a MATLAB program to compute the cross-correlation of sequences  $x(n)$  and  $y(n)$  and verify the property.

#### 6. Fourier Series and Gibbs Phenomenon

a. To calculate Fourier series coefficients associated with Square Wave.

b. To Sum the first 10 terms and plot the Fourier series as a function of time.

c. To Sum the first 50 terms and plot the Fourier series as a function of time.

#### 7. Calculating transforms using MATLAB

a. Calculate and plot the Fourier transform of a given signal.

b. Calculate and plot the Z-transform of a given signal.

#### 8. Impulse response and Step response of a given system

a. Write a MATLAB program to find the impulse response and step response of a system from its difference equation.

b. Compute and plot the response of a given system to a given input.

#### 9. Pole-zero diagram and bode diagram

a. Write a MATLAB program to find the pole-zero diagram, and bode diagram of a given system from the given system function.

b. Write a MATLAB program to find, a bode diagram of a given system from the given system function.

#### 10. Frequency response of a system

Write a MATLAB program to plot the magnitude and phase response of a given system.

#### 11. Checking linearity/non-linearity of a system using SIMULINK

a. Build a system that amplifies a sine wave by a factor of two.

b. Test the linearity of this system using SIMULINK

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**Software Required: MATLAB**

For smooth conduction of the same lab, we have the following Equipment:

1. Computer System: - We have 30 latest computer systems with high configuration in the laboratory for conducting the lab. All the computer system is installed with the latest version of MATLAB software. We provide one computer system to one student to complete his/her experiment.
2. Software: - We have the latest version of MATLAB software installed in all the systems and updating from time to time as per requirement.