Lab Assignment – 02 -Spring2020

Signals and systems

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**Q1) CONTINUOUS SIGNAL GENERATION**

**PROBLEM1**

* Given a signal, we have to plot and display it. Moreover, we have to change the time period of the waveform and define another signal for the same.
* The given signal is,

0 t < 1

t - 1 1 < = t < 2

x(t) = 2 - t/2 2 <= t < 4

-1 4 <= t < 5

0 Otherwise

a) First, we have to plot x(t). By correctly constructing the code for the signal, we can easily develop the sketch of the signal x(t) by creating a function named f1.

b) Then, we have to plot y(t). By correctly constructing the code for the signal, we can easily develop the sketch of the signal y(t) also by creating a function named f2.

Now , A function y(t) is defined as follows :

* The given signal is,

0 t < 1

1 1 <= t < 2

y(t) = - 2 2 <= t < 4

t - 4 4 <= t < 5

1. Otherwise

Here is the code:

A screenshot of a cell phone

Description automatically generated

* Here’s the output :
* This is the output for function 1 named as f1 which is a function of x.

A close up of text on a white background

Description automatically generated

* This is the output for function 2 named as f2 which is a function of y.

A close up of text on a white background

Description automatically generated

* Now , we have plotted only for given functions. But we need to plot the graphs for various increments or decrements of t.
* Here’s the code ..

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Description automatically generated

* Output Plot for :

A close up of text on a white background

Description automatically generated(a) x ( t - 1) y( t +1) (b) x( 2 - t) y ( 1- t)

A screenshot of text

Description automatically generated

(c) x ( 2t - 4) y ( t)

A picture containing text

Description automatically generated

PROBLEM 2

* Now, we need to define two more functions and plot them accordingly.

Now , A function y(t) is defined as follows :

* The given signal is,

0 t < 1

1 - t 1 <= t < 2

x(t) = - 3 + t 2 <= t < 3

1. 3 <= t < 4

0 Otherwise

* Given a signal, we have to plot and display it. Moreover, we have to change the time period of the waveform and define another signal for the same.
* The another given signal is,

0 t < 1

1 1<= t < 2

y(t) = - 2 2 <= t < 3

t - 5 3 <= t < 4

0 Otherwise

a) First, we have to plot x(t). By correctly constructing the code for the signal, we can easily develop the sketch of the signal x(t) and create a function named f3.

b) Then, we have to plot y(t). By correctly constructing the code for the signal, we can easily develop the sketch of the signal y(t) also and create a function named f4.

* Here’s the code :

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* Here’s the output :
* This is the output for function 1 named as f1 which is a function of x.

A screenshot of a computer

Description automatically generated

* This is the output for function 2 named as f2 which is a function of y.

A screenshot of text

Description automatically generated

* Now , we have plotted only for given functions. But we need to plot the graphs for various increments or decrements of t.
* Here’s the code ..

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Description automatically generated

* Output Plot for :

(a) x ( t + 1) y( t - 1) (b) x( 2 + t) y ( - 1- t)

A screenshot of a cell phone

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Description automatically generated

(c) x( -2t - 4) y ( - t)

A close up of a map

Description automatically generated

**Q2) DISCRETE SIGNAL GENERATION**

PROBLEM 1

* Given a signal, we have to plot and display it. Moreover, we have to change the time period of the waveform and define another signal for the same.
* The given signal is,

X[n] = {2, - 2, 3, 4, -4 }

a) First, we have to plot x(n). By correctly constructing the code for the signal, we can easily develop the sketch of the signal x(n) by creating a function named func1.

Now , A function x(n) is defined as follows :

* The given signal is discrete, Here is the code for func1:

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Description automatically generated

* Here’s the output :

This is the output for function 1 named as func1 which is a function of x.

A close up of a map

Description automatically generated

* Now , we have plotted only for given functions. But we need to plot the graphs for various increments or decrements of n.
* Here’s the code ..

A screenshot of a cell phone

Description automatically generated

* Output Plot for :

(a) x ( n – 2 ) (b) x( 3 - n )

A close up of a map

Description automatically generatedA close up of a map

Description automatically generated

(c) x(3 – 2 n ) (d) x( 4n + 5)

A close up of a map

Description automatically generatedA screenshot of a cell phone

Description automatically generatedA close up of a map

Description automatically generated(e) x ( n +1)

PROBLEM 2

* Now, we need to define two more functions and plot them accordingly.

Now , A function x(n) is defined as follows :

* Given a signal, we have to plot and display it. Moreover, we have to change the time period of the waveform and define another signal for the same.
* The given signal is,

X[n] = { -1, 2, - 3, -4 , 5}

a) First, we have to plot x(n). By correctly constructing the code for the signal, we can easily develop the sketch of the signal x(n) by creating a function named func1.

Now , A function x(n) is defined as follows :

* The given signal is discrete, Here is the code for func2:

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Description automatically generated

* Here’s the output :

This is the output for function 2 named as func2 which is a function of x.

A close up of a map

Description automatically generated

* Now , we have plotted only for given functions. But we need to plot the graphs for various increments or decrements of n.
* Here’s the code ..

A screenshot of a cell phone

Description automatically generated

* Output Plot for :

A close up of a map

Description automatically generated(a) x ( n – 1 ) (b) x( n + 2 )

A close up of a map

Description automatically generated

A screenshot of a cell phone

Description automatically generatedA close up of a map

Description automatically generated(c) x( - 3 – n ) (d) x(-3 + 2n )

A screenshot of a cell phone

Description automatically generated(e) x ( n +1)