Independent University Bangladesh

Department of Electrical and Electronics Engineering

Lab Report 02

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Course code: EEE 321L

Couse name: Digital Signal Processing Lab

Lab no: 01

Lab title: Study of discrete signals and systems

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a) Function definitions

i. Unit Impulse Sequence (impseq.m)

```
% function to generate unit impulse sequence(delay n0, range n1, n2)
function [x, n] = impseq(n0, n1, n2)
n = n1:n2;           % define range
x = (n-n0) == 0;     % array with 1 when n-n0 = 0 otherwise 0
end
```

ii. Unit Step Sequence (stepseq.m)

```
% function to generate unit step sequence (delay n0, range n1, n2)
function [x, n] = stepseq(n0, n1, n2)
n = n1:n2;
x = (n - n0) >= 0;       % 1 when n-n0 >= 0, 0 otherwise
end
```

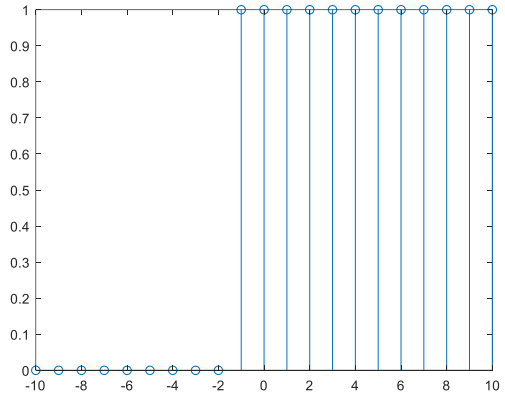
b) Signal generations

i. x(n) = u(n+1) where -10 ≤ n ≤ 10

Call:

```
% x(n) = u(n+1) for -10:10
[x, n] = stepseq(-1, -10, 10);
      % delay = -1
stem(n, x)
```

Output:

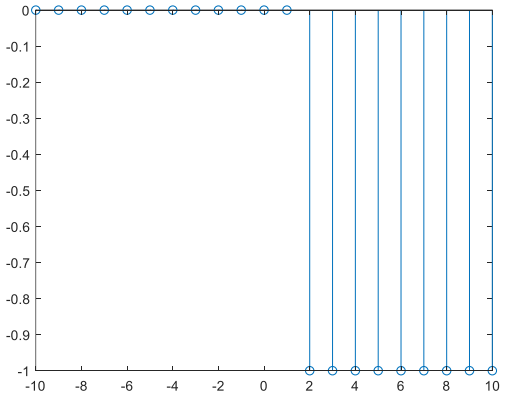


ii. x(n) = - u(n-2) where -10 ≤ n ≤ 10

Call:

```
% x(n) = -u(n-2) for -10:10
n = -10:10;
y = -stepseq(2,-10,10);
stem(n,y)
```

Output:

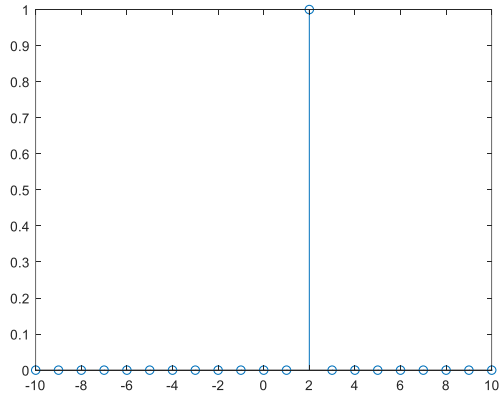


iii. x(n) = δ(n-2) where -10 ≤ n ≤ 10

Call:

```
% x(n) = d(n-2) for -10:10
[x, n] = impseq(2, -10, 10);
stem(n, x)
```

Output:

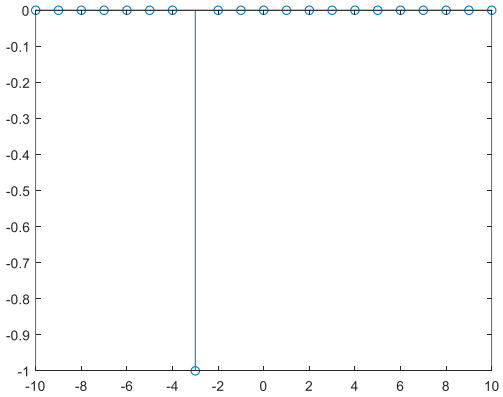


iv. x(n) = -δ(n+2) where -10 ≤ n ≤ 10

Call:

```
% x(n) = -d(n+3) for -10:10
n = -10:10;
y = -impseq(-3,-10,10);
stem(n,y)
```

Output:

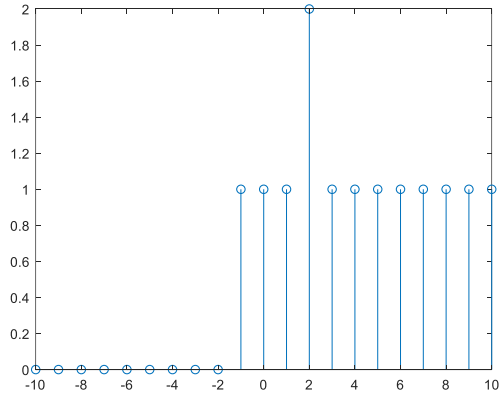


v. x(n) = u(n+1) + δ(n-2) where -10 ≤ n ≤ 10

Call:

```
% x(n) = u(n+1) + d(n-2) for -10:10
n = -10:10;
y = stepseq(-1, -10, 10) +
impseq(2,-10,10);
stem(n,y)
```

Output:



c) Function to generate a ramp signal

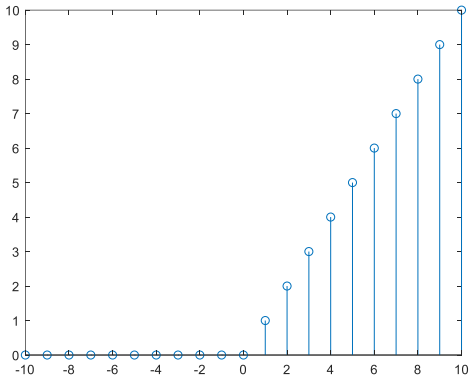
Definition (rampseq.m)

```
% function to generate unit step sequence (delay n0, range n1,n2)
function [x, n] = rampseq(n0, n1, n2)
n = n1:n2;
x = (n-n0).*[(n-n0) >= 0];      % 1*(n-n0) when n-n0 >= 0, 0 otherwise
end
```

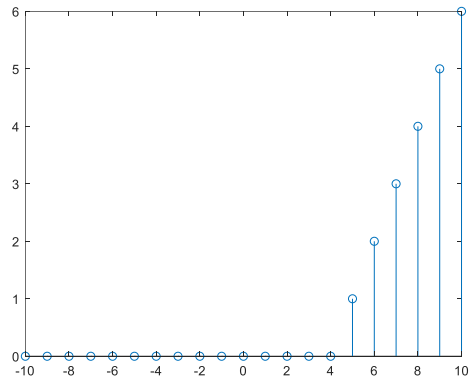
Calls:

```
% x(n) = ramp(n) for -10:10
[x, n] = rampseq(0, -10, 10);
stem(n, x)
```

Outputs:



```
% x(n) = ramp(n-4) for -10:10
[x, n] = rampseq(4, -10, 10);
stem(n, x)
```



```
% x(n) = ramp(n-4) for -10:10
n = -10:10;
y = -rampseq(4,-10,10);
stem(n,y)
```