Chittagong University of Engineering & Technology

EEE-496

Digital Signal Processing Sessional

Class Performance of lab-02.

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Contents

1 User defined function

1.1 Impulse function which take only one input

```
function out=DeltaFunction(n)
if n==0
    out=1;
else
    out=0;
end
end
```

1.2 Step function which take only one input

```
function out=StepFunction(n)
if n≥0
    out=1;
else
    out=0;
end
end
```

1.3 Ramp function which take only one input

```
function out=RampFunction(n)
out=n*StepFunction(n);
end
```

1.4 Parabolic function

```
function out=parabolic(n)
out=n^2*StepFunction(n);
end
```

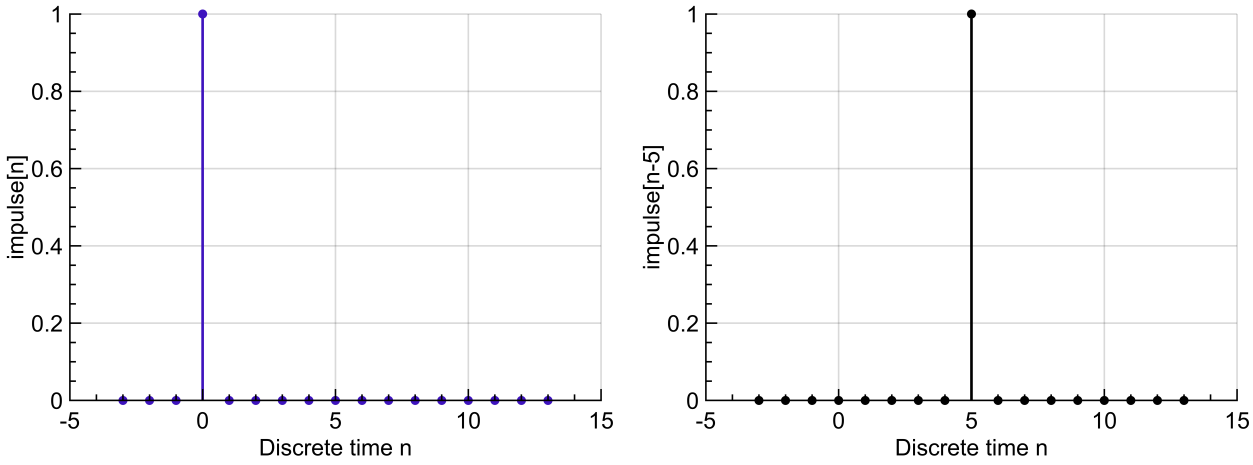
2 Implulse function with delay

2.1 Code

```
clc;
clear;
close all;
n=-3:13;
delt=zeros(size(n));
delt_5=zeros(size(n));
for i=1:length(n)
```

```
    delt(i)=DeltaFunction(n(i));
    delt_5(i)=DeltaFunction(n(i)-5);
end
figure
stem(n, delt,"filled", "linewidth", 1.5, "color", [62/256
   19/256 191/256])
plt=[];
plt.XLabel='Discrete time n'
plt.YLabel="impulse[n]";
plt.XGrid="on";
plt.YGrid="on";
plt.ShowBox="off";
setPlotProp(plt)

figure
stem(n, delt_5,"filled", "linewidth", 1.5, "color", "k")
plt=[];
plt.XLabel='Discrete time n'
plt.YLabel="impulse[n-5]";
plt.XGrid="on";
plt.YGrid="on";
plt.ShowBox="off";
setPlotProp(plt)
```

2.2 Figure



(a) (b)

Figure 1: (a) Unit impulse signal $\delta[n]$ (b) Unit impulse signal with delay; $\delta[n-5]$

3 Step function with delay

3.1 Code

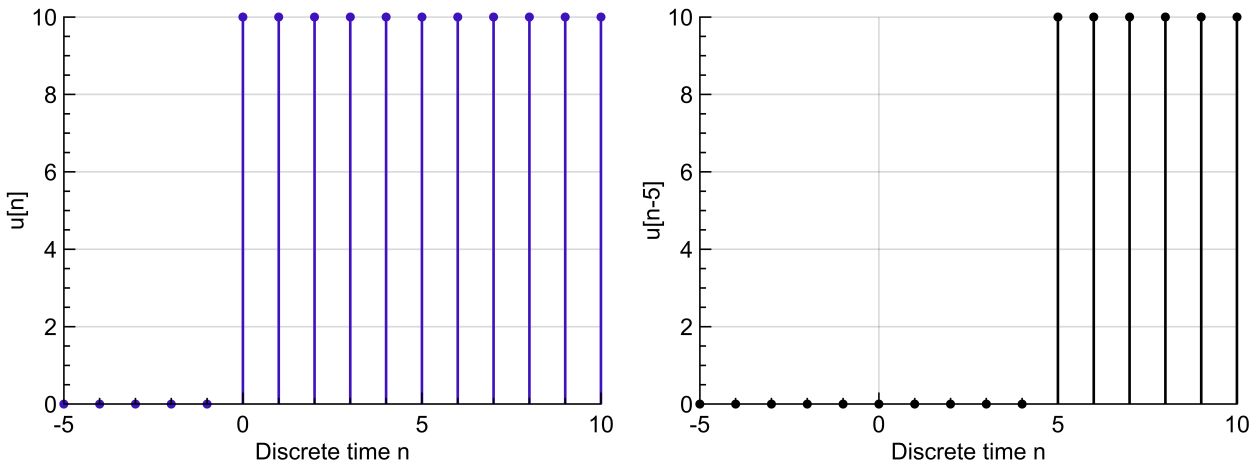
```
clc;
clear;
close all;
n=-5:10;
step=zeros(size(n));
step_5=zeros(size(n));
for i=1:length(n)
    step(i)=10*StepFunction(n(i));
    step_5(i)=10*StepFunction(n(i)-5);
end
figure
stem(n, step,"filled", "linewidth", 1.5, "color", [62/256
   19/256 191/256])
plt=[];
plt.XLabel='Discrete time n'
plt.YLabel="u[n]";
plt.XGrid="on";
plt.YGrid="on";
plt.ShowBox="off";
setPlotProp(plt)

figure
stem(n, step_5,"filled", "linewidth", 1.5, "color", "k")
plt=[];
plt.XLabel='Discrete time n'
plt.YLabel="u[n-5]";
plt.XGrid="on";
plt.YGrid="on";
plt.ShowBox="off";
setPlotProp(plt)
```

3.2 Figure

4 Ramp function with delay

4.1 Code

```
clc;
clear;
close all;
n=-3:13;
ramp=zeros(size(n));
ramp_5=zeros(size(n));
for i=1:length(n)
    ramp(i)=RampFunction(n(i));
    ramp_5(i)=RampFunction(n(i)-5);
end
```



(a) (b)

Figure 2: (a) Unit step signal $u[n]$ (b) Unit step signal with delay; $u[n-5]$

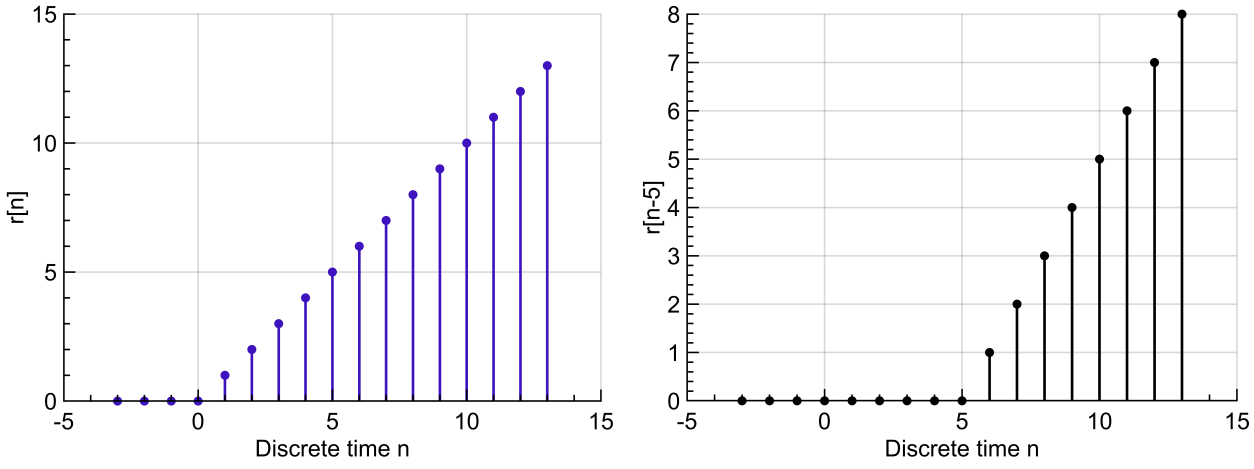
```
figure
stem(n, ramp,"filled", "linewidth", 1.5, "color", [62/256
   19/256 191/256])
plt=[];
plt.XLabel='Discrete time n'
plt.YLabel="r[n]";
plt.XGrid="on";
plt.YGrid="on";
plt.ShowBox="off";
setPlotProp(plt)

figure
stem(n, ramp_5,"filled", "linewidth", 1.5, "color", "k")
plt=[];
plt.XLabel='Discrete time n'
plt.YLabel="r[n-5]";
plt.XGrid="on";
plt.YGrid="on";
plt.ShowBox="off";
setPlotProp(plt)
```

4.2 Figure

5 Parabolic function with delay

5.1 Code

```
clc;
clear;
close all;
```

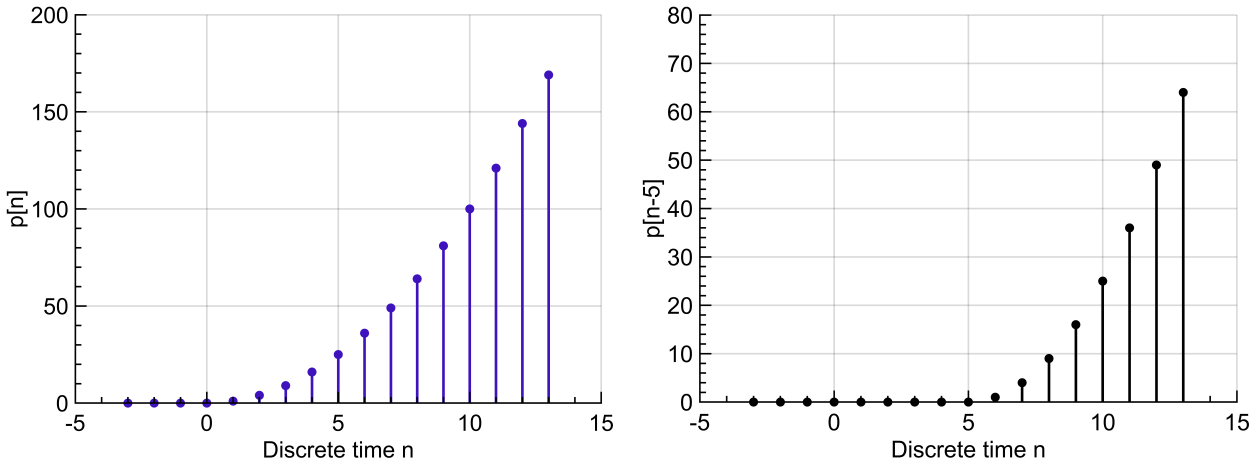


(a) (b)

Figure 3: (a) Ramp signal $r[n]$ (b) Ramp signal with delay; $r[n-5]$

```
n=-3:13;
parab=zeros(size(n));
parab_5=zeros(size(n));
for i=1:length(n)
    parab(i)=parabolic(n(i));
    parab_5(i)=parabolic(n(i)-5);
end
figure
stem(n, parab,"filled", "linewidth", 1.5, "color", [62/256
   19/256 191/256])
plt=[];
plt.XLabel='Discrete time n'
plt.YLabel="p[n]";
plt.XGrid="on";
plt.YGrid="on";
plt.ShowBox="off";
setPlotProp(plt)

figure
stem(n, parab_5,"filled", "linewidth", 1.5, "color", "k")
plt=[];
plt.XLabel='Discrete time n'
plt.YLabel="p[n-5]";
plt.XGrid="on";
plt.YGrid="on";
plt.ShowBox="off";
setPlotProp(plt)
```

5.2 Figure



(a) (b)

Figure 4: (a) Parabolic signal $r[n]$ (b) Parabolic signal with delay; $r[n-5]$