Lab 3: Study of Signal characteristics using MATLAB

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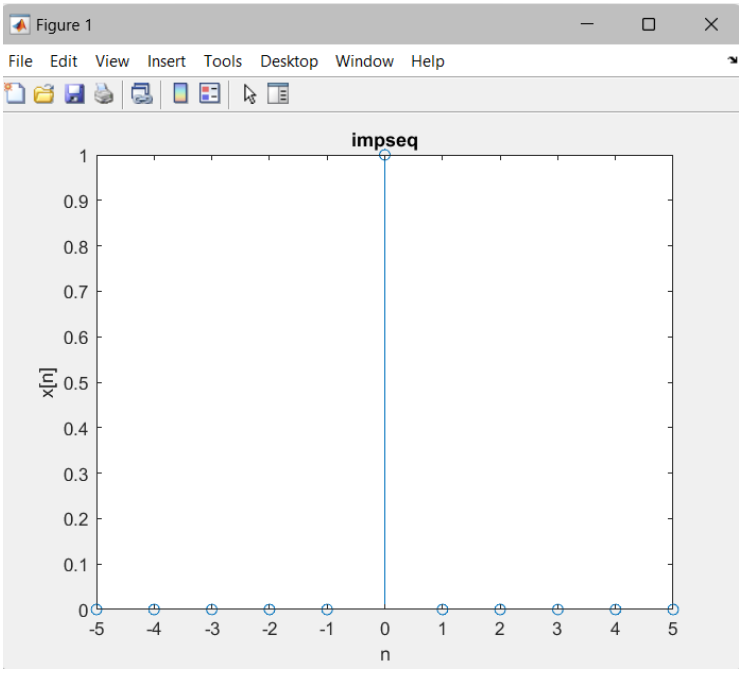
Task 1:

```
function [x,n]=impseq(n0,n1,n2)
n=n1:n2;
n0=0;
x(n==n0)=1;
x(n~=n0)=0;
stem(n,x)
title('impseq')
xlabel('n')
ylabel('x[n]')
```

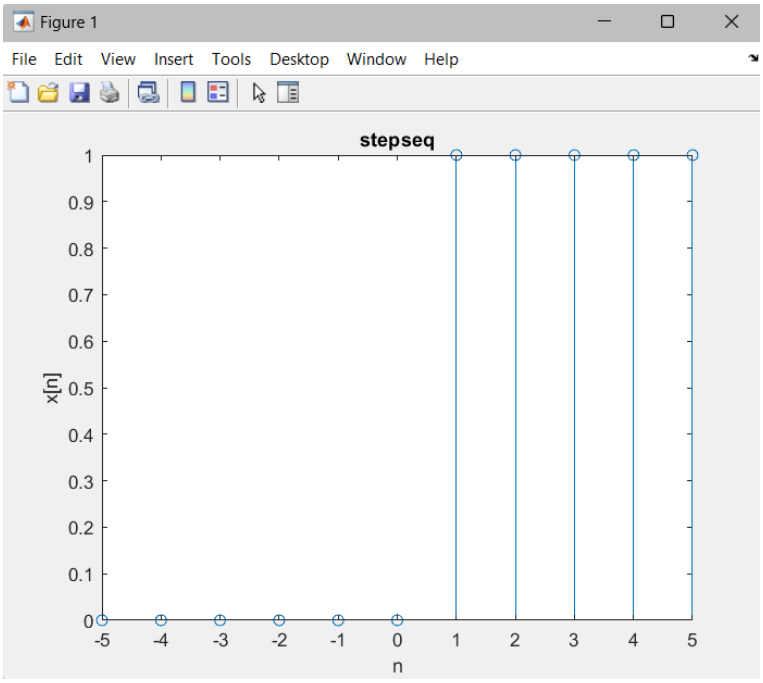
```
>> impseq(0,-5,5)

ans =

     0     0     0     0     0     1     0     0     0     0     0

>> [x,n]=impseq(0,-5,5)

x =

     0     0     0     0     0     1     0     0     0     0     0


n =

    -5    -4    -3    -2    -1     0     1     2     3     4     5
```



Task 2:

```
function [x,n]=stepseq(n0,n1,n2)
n=n1:n2;
n0=0;
x(n>=n0)=1;
x(n<=n0)=0;
stem(n,x)
title('stepseq')
xlabel('n')
ylabel('x[n]')
end
```

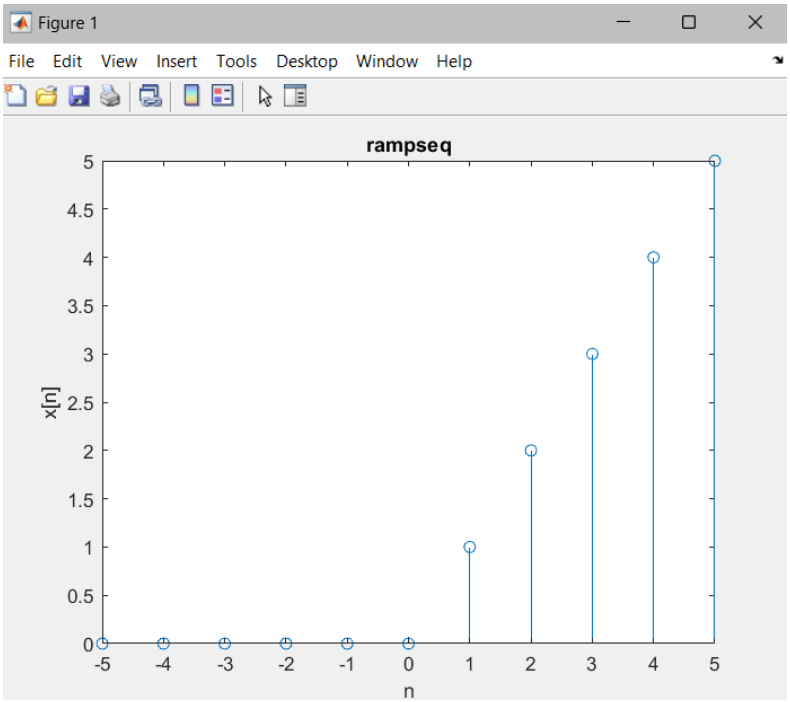
```
>> [x,n]=stepseq(0,-5,5)

x =

     0     0     0     0     0     0     1     1     1     1     1


n =

    -5    -4    -3    -2    -1     0     1     2     3     4     5
```



Task 3:

```
function [x,n]=rampseq(n0,n1,n2)
n=n1:n2;
n0=0;
x=n.*(n>=n0);
x(n<=n0)=0;
stem(n,x)
title('rampseq')
xlabel('n')
ylabel('x[n]')
end
```

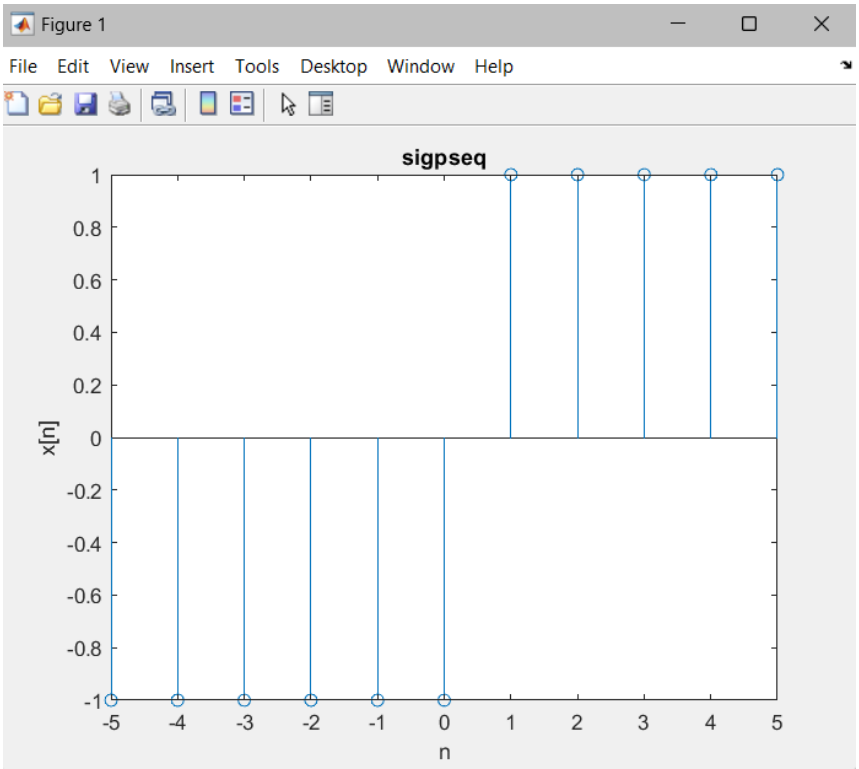
```
>> [x,n]=rampseq(0,-5,5)

x =

     0     0     0     0     0     0     1     2     3     4     5


n =

    -5    -4    -3    -2    -1     0     1     2     3     4     5

>>
```



Task 4:

```
function [x,n]=sigpseq(n0,n1,n2)
n=n1:n2
n0=0;
x(n>=n0)=1;
x(n<=n0)=-1;
stem(n,x)
title('sigpseq')
xlabel('n')
ylabel('x[n]')
end
```

```
>> [x,n]=sigpseq(0,-5,5)

x =

    -1    -1    -1    -1    -1    -1     1     1     1     1     1


n =

    -5    -4    -3    -2    -1     0     1     2     3     4     5
```



Task 5:

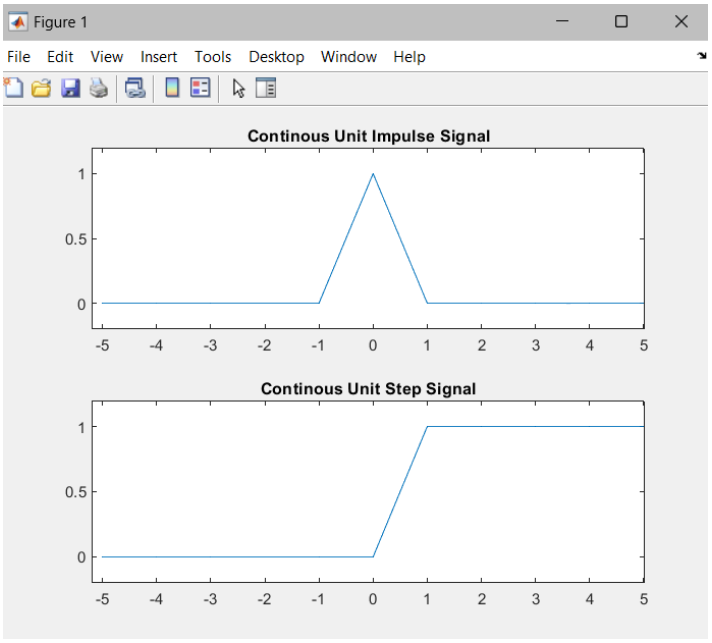
```
>> t=0:0.0001:1;
>> tri=1-abs(t);
>> trapz(t,tri.^2)

ans =

    0.3333
```

Task 6:

```
>> n=-100:1:100;
>> x=cos(pi/4.*n);
>> xsq=x.^2;
>> value=sum(xsq)/200;
>> value

value =

    0.5050
```

Task 7:

```
>> f_name(-5,5,'C')

y =

  1×11 logical array

   0   0   0   0   0   0   1   1   1   1   1


ans =

  1×11 logical array

   0   0   0   0   0   0   1   1   1   1   1
```



Critical Analysis/Conclusion:

In this Lab I learnt how to plot the graphs for the unit sample series, step sequence, ramp sequence, and signum sequence. Then, I calculated the energy and power using MATLAB. I came to the conclusion that the graphs could be plotted simply by entering the correct sequence. In this I used stem to plot the graph because we want Discrete Time Graphs and it's an easier way to plot any graph whether it is Continuous time or its discrete time graph.