MAWLANA BHASHANI SCIENCE AND TECHNOLOGY UNIVERSITY

DEPARTMENT OF ICT

Lab Report No : 03

Course Code : ICT-4206

Course Title : Digital Signal Processing Lab

Lab Report name : perform amplitude-scaling, time-scaling and time shifting on a given signal

Submitted by

Md. Faruk Hosen

ID : IT-17035

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Submitted to

Dr. Monir Morshed

Professor,

Department of ICT,MBSTU

Santosh,Tangail-1902

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Experiment No: 3

Experiment name: Perform amplitude-scaling, time-scaling and time shifting on a given signal.

Objectives: Through this experiment we will learn how to perform amplitude-scaling, time-scaling and time shifting on a given signal.

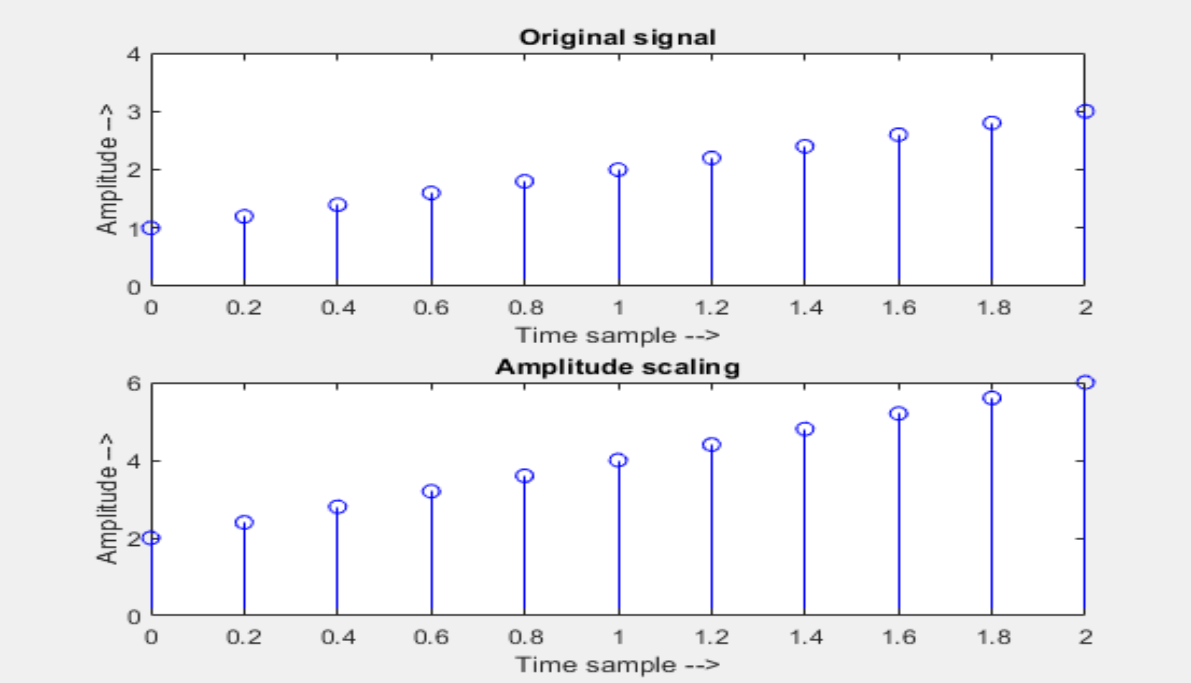
i. Amplitude scaling:

Corresponding code:

```
clc; close all; clear all;
function x = y(t)
x = (1.0+t).*(t>=0 & t<=2);
end
%amplitude scaling
tmin=-3;
tmax=5;
dt=0.2;
t = tmin:dt:tmax;
y0 = y(t);
y1 = 2*y(t);
subplot(2,1,1); stem(t,y0,'b');
xlabel('Time sample -->'); ylabel('Amplitude -->');
title('Original signal');
axis([0 2 0 4]);

subplot(2,1,2); stem(t,y1,'b');
xlabel('Time sample -->'); ylabel('Amplitude -->');
title('Amplitude scaling');
axis([0 2 0 6]);
```

Output:



ii. Time scaling:

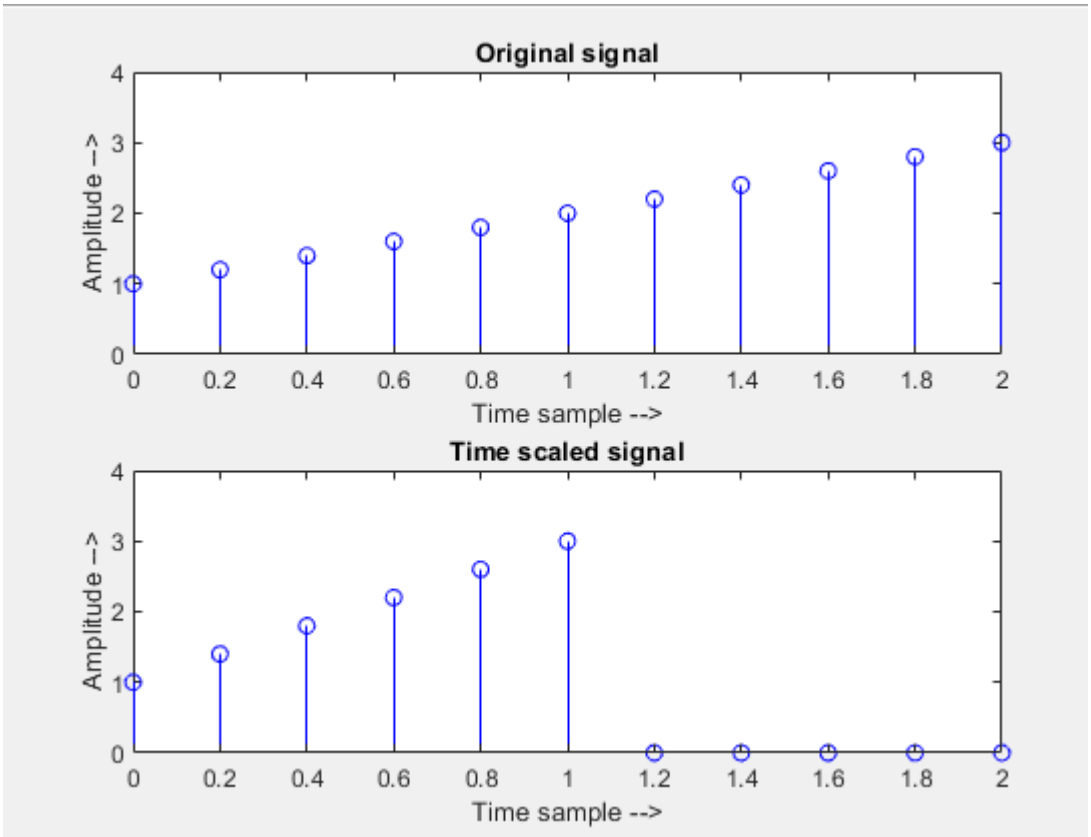
Corresponding code:

```
clc; close all; clear all;
%time scaling
function x = y(t)
x = (1.0+t).*(t>=0 & t<=2);
end

tmin=-3;
tmax=5;
dt=0.2;
t = tmin:dt:tmax;
y0 = y(t);
y1 = y(2*t);
subplot(2,1,1); stem(t,y0,'b');
xlabel('Time sample -->'); ylabel('Amplitude -->');
title('Original signal');
axis([0 2 0 4]);

subplot(2,1,2); stem(t,y1,'b');
xlabel('Time sample -->'); ylabel('Amplitude -->');
title('Time scaled signal');
axis([0 2 0 4]);
```

Output:



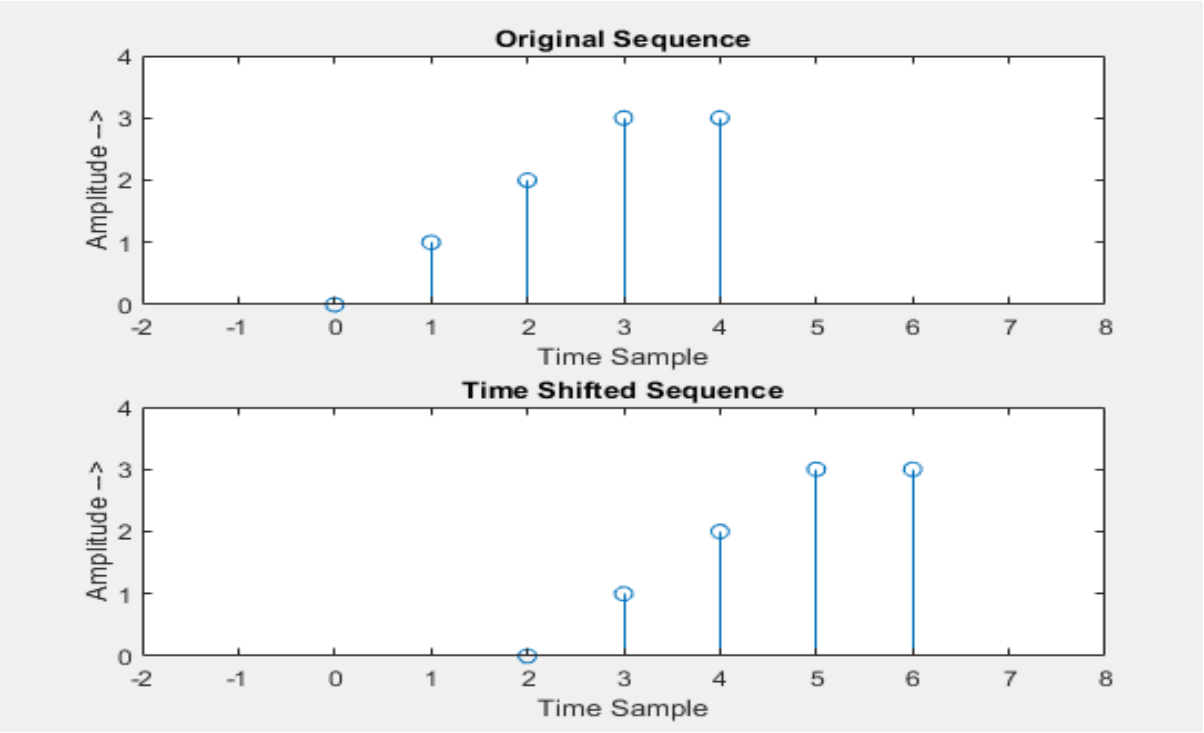
iii. Time shifting:
Corresponding code:

```
clc; close all; clear all;
%time shifting

n = 0:4;
x =[0 1 2 3 3];
subplot(2,1,1);
stem(n,x);
xlabel('Time Sample'); ylabel('Amplitude -->');
title('Original Sequence');
axis([-2 8 0 4]);

m = n+2;
subplot(2,1,2);
stem(m,x);
xlabel('Time Sample'); ylabel('Amplitude -->');
title('Time Shifted Sequence');
axis([-2 8 0 4]);
```

Output:



Discussion: After completing this experiment, we have learnt, about how to perform amplitude-scaling, time-scaling and time shifting on a given signal.