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K036

SNS LAB2

Sem 3

B.Tech Cybersecurity

AIM: To perform time and amplitude operations on the signal.

a. Adding two signals

b. Multiplying two signals

c. Time shifting

d. Time scaling

e. Time folding.

MATLAB CODE:

```
clc
clear all;
close all;

A=5; f1=3;
t=[0:0.001:2];
x1=A*sin(2*pi*f1*t);
subplot(3,3,1); plot(t,x1)
xlabel('time')
ylabel('Amplitude')
title('sinusoidal signal of freq -3')
```

```
A=5; f2=6;
t=[0:0.001:2];
x2=A*sin(2*pi*f2*t);
subplot(3,3,2); plot(t,x2)
xlabel('time')
ylabel('Amplitude')
title('sinusoidal signal of freq-6')

x3=x1+x2;
subplot(3,3,3); plot(t,x3)
xlabel('time')
ylabel('Amplitude')
title('sinusoidal signal of addition')

x4=x1 .* x2;
subplot(3,3,4); plot(t,x4)
xlabel('time')
ylabel('Amplitude')
title('sinusoidal signal of multiplication')
```

```
x5=A*sin(2*pi*f1*(t-2))
subplot(3,3,5);
plot(t-2,x5) xlabel('time')
ylabel('Amplitude')
title('Time shifted sinusoidal signal')

x6=A*sin(2*pi*f1*(t+6))
subplot(3,3,6); plot(t+6,x6)
xlabel('time')
ylabel('Amplitude')
title('Time shifted sinusoidal signal')

x7=A*sin(2*pi*f1*(t*4))
subplot(3,3,7); plot(t/4,x7)
xlabel('time')
ylabel('Amplitude')
title('Time scaled sinusoidal signal')

x8=A*sin(2*pi*f1*(t/8))
subplot(3,3,8);
```

plot(t*8,x8) xlabel('time')

ylabel('Amplitude')

title('Time scaled sinusoidal signal')

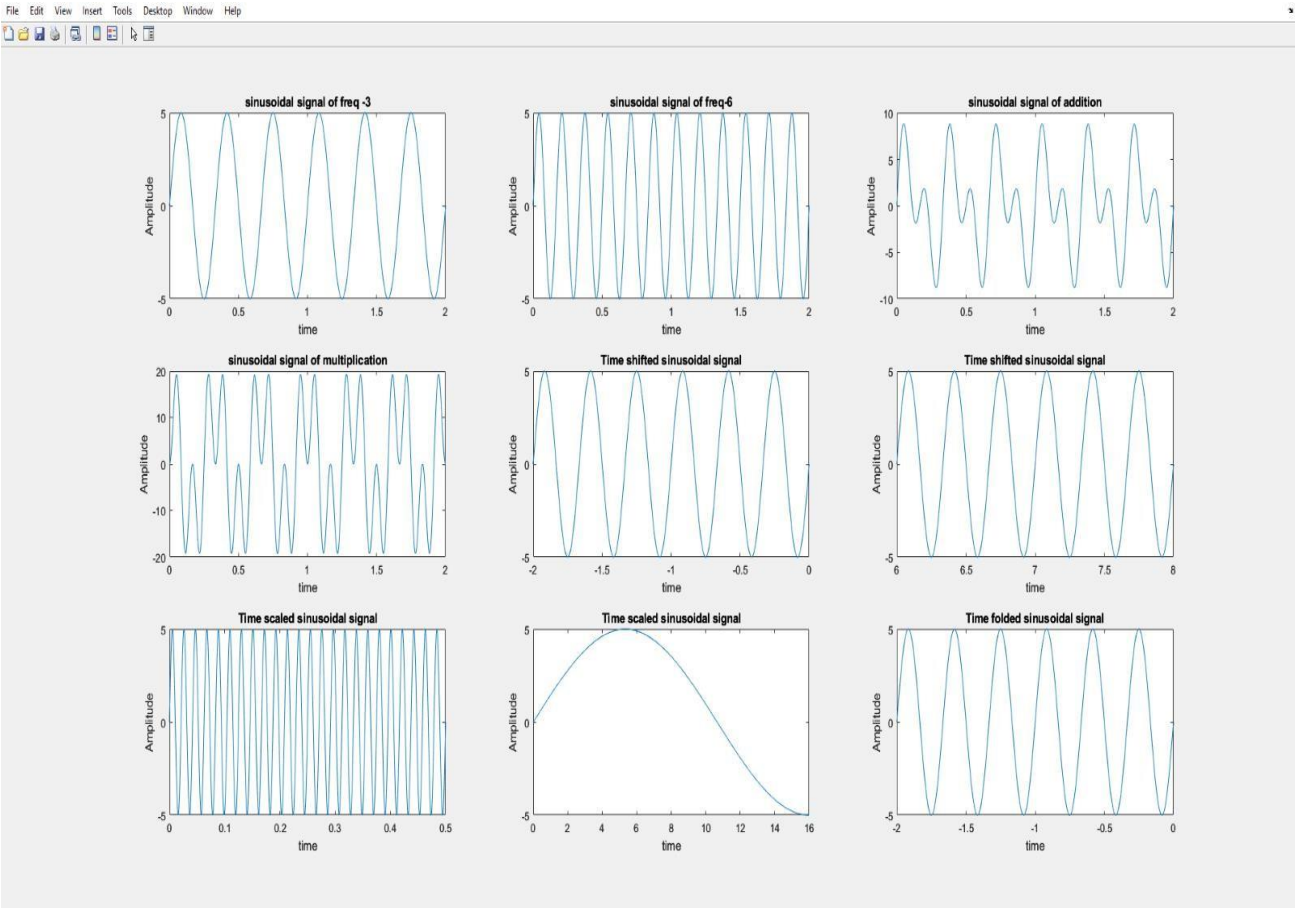
x9=A*sin(2*pi*f1*(-t)) subplot(3,3,9);

plot(-t,x9) xlabel('time')

ylabel('Amplitude')

title('Time folded sinusoidal signal')

Results:



CONCLUSION:

In this experiment, we performed key signal operations to understand their effects. Adding two signals resulted in a combined signal that represents their superposition. Multiplying signals demonstrated how interaction affects amplitude, relevant for modulation. Time shifting showed how delaying or advancing a signal alters its timing. Time scaling illustrated changes in signal duration and frequency by compressing or stretching it. Time folding revealed the effect of mirroring a signal, highlighting its symmetrical properties. These operations are essential for effective signal processing in various applications.