Scilab Manual for
Signals and Systems
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Experiment: 1

To express sum of two complex exponentials as a single sinusoid

Scilab code Solution 1.1 To express sum of two complex exponentials as a single sinusoid

```
//To express sum of two complex exponentials as a single sinusoid
//scilab 5.4.1 ;64 bit(windows 8)
clear;
clc;
close;
t =0:1/100:2*%pi;
x1 = exp(sqrt(-1)*2*t);
x2 = exp(sqrt(-1)*3*t);
x = x1+x2;
for i = 1:length(x)
  X(i) = sqrt((real(x(i)).^2)+(imag(x(i)).^2));
end
plot(t,X);
```

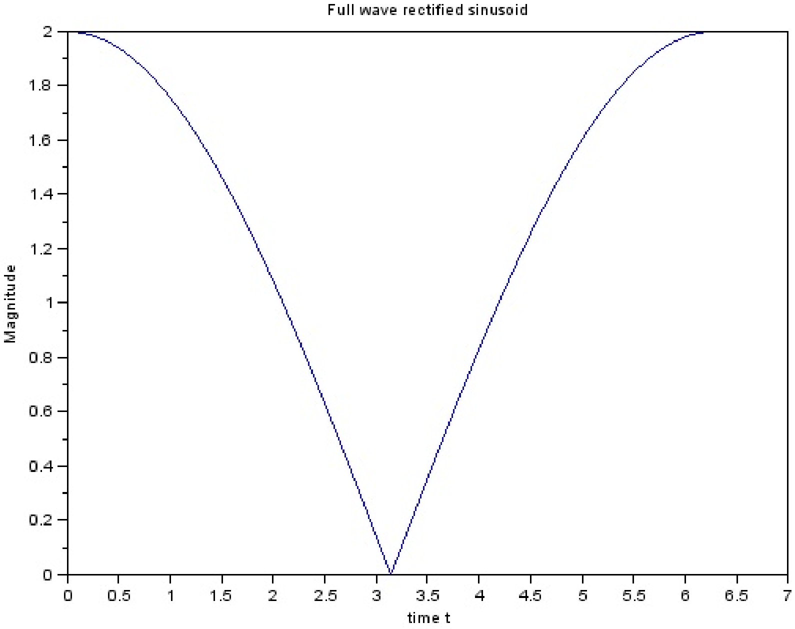

Figure 1.1: To express sum of two complex exponentials as a single sinusoid

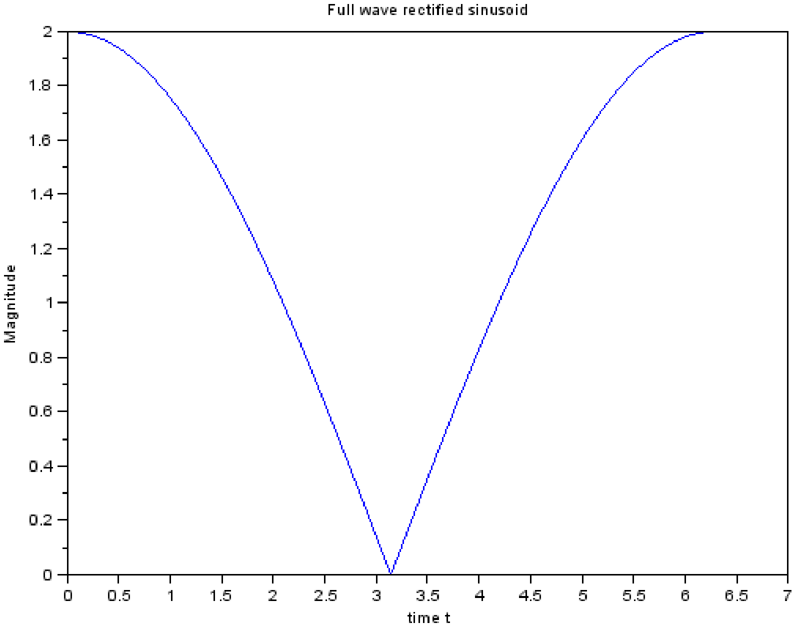

Figure 1.2: To express sum of two complex exponentials as a single sinusoid

```
xtitle('Full wave rectified sinusoid','time t','
    Magnitude');
```

Experiment: 2

Perform linear convolution sum

Scilab code Solution 2.1 Perform linear convolution sum

```
// To Perform linear convolution sum
//scilab 5.4.1 ;64 bit(windows 8)
clear;
close;
clc;
h = [0,0,1,1,1,0,0];
N1 = -2:4;
x = [0,0,0.5,2,0,0,0];
N2 = -2:4;
y = convol(x,h);
for i = 1:length(y)
  if (y(i)<=0.0001)
    y(i)=0;
  end
end
N = -4:8;
subplot(3,1,1)
a=gca();
plot2d3('gnn',N1,h)
xtitle('Impulse Response','n','h[n]');
a.thickness = 2;
```

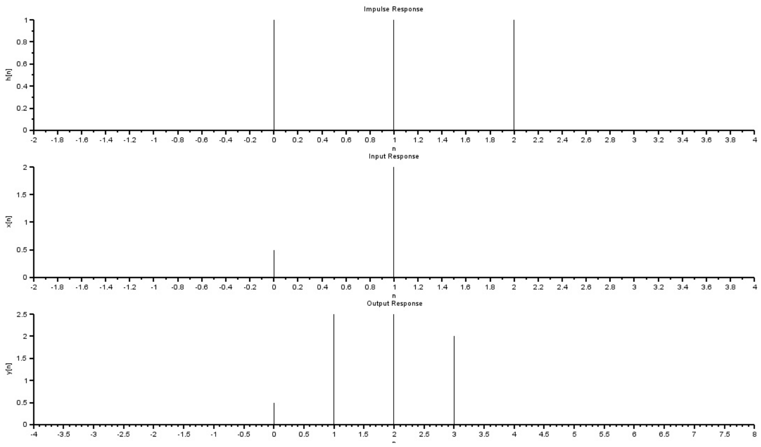

Figure 2.1: Perform linear convolution sum

```
subplot(3,1,2)
a=gca();
plot2d3('gnn',N2,x)
xtitle('Input Response','n','x[n]');
a.thickness = 2;
subplot(3,1,3)
a=gca();
plot2d3('gnn',N,y)
xtitle('Output Response','n','y[n]');
a.thickness = 2;
```

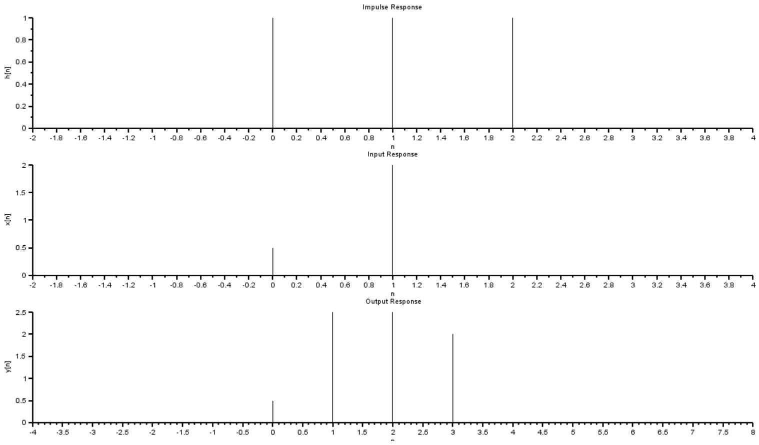

Figure 2.2: Perform linear convolution sum

Experiment: 3

Convolution integral of finite duration signals

Scilab code Solution 3.1 convolution integral of finite duration signals

```
//Convolution Integral of fintie duration signals
//scilab 5.4.1 ;64 bit(windows 8)
clear;
close;
clc;
T = 10;
x = ones(1,T);   //Input Response
for t = 1:2*T
  h(t) = t-1;     //Impulse Response
end
N1 = 0:length(x)-1;
N2 = 0:length(h)-1;
y = convol(x,h);
N = 0:length(x)+length(h)-2;
subplot(3,1,1)
a=gca();
a.x_location=”origin”;
plot2d(N2,h)
xtitle('Impulse Response','t','h(t)');
```

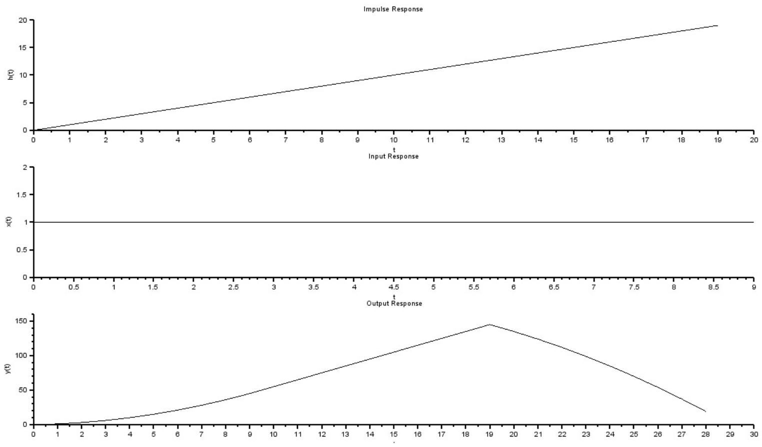

Figure 3.1: convolution integral of finite duration signals

```
a.thickness = 2;
subplot(3,1,2)
a=gca();
plot2d(N1,x)
xtitle('Input Response','t','x(t)');
a.thickness = 2;
subplot(3,1,3)
a=gca();
plot2d(N,y)
xtitle('Output Response','t','y(t)');
a.thickness = 2;
```

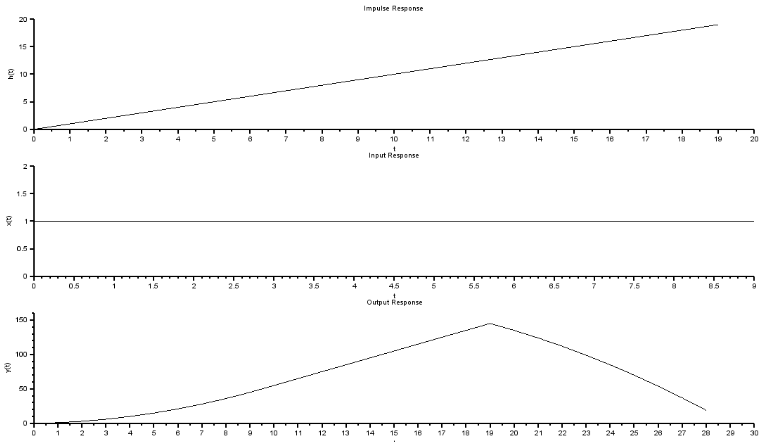

Figure 3.2: convolution integral of finite duration signals

Experiment: 4

Convolution sum of finite duration sequences

Scilab code Solution 4.1 convolution sum of finite duration sequences

```
//Convolution Sum of finite duration sequences
//scilab 5.4.1 ;64 bit(windows 8)
clear;
close;
clc;
x = ones(1,5);
N1 =0:length(x)-1;
Alpha = 1.4;     //alpha > 1
for n = 1:7
  h(n)= (Alpha^(n-1))*1;
end
N2 =0:length(h)-1;
y = convol(x,h);
N = 0:length(x)+length(h)-2;
subplot(3,1,1)
a=gca();
plot2d3('gnn',N2,h)
xtitle('Impulse Response','n','h[n]');
a.thickness = 2;
```

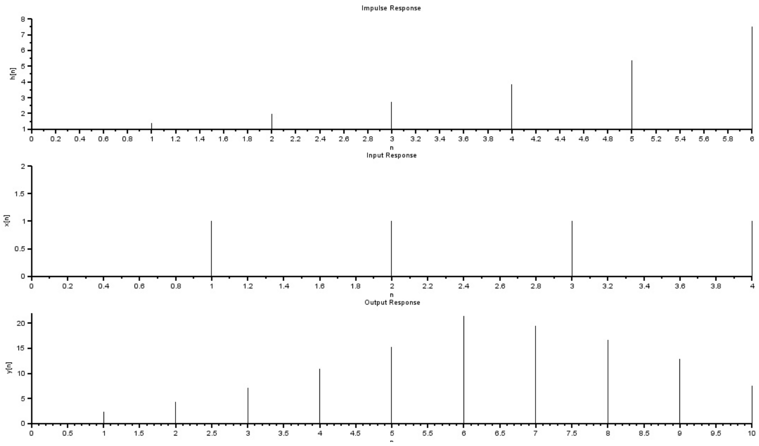

Figure 4.1: convolution sum of finite duration sequences

```
subplot(3,1,2)
a=gca();
plot2d3('gnn',N1,x)
xtitle('Input Response','n','x[n]');
a.thickness = 2;
subplot(3,1,3)
a=gca();
plot2d3('gnn',N,y)
xtitle('Output Response','n','y[n]');
a.thickness = 2;
```

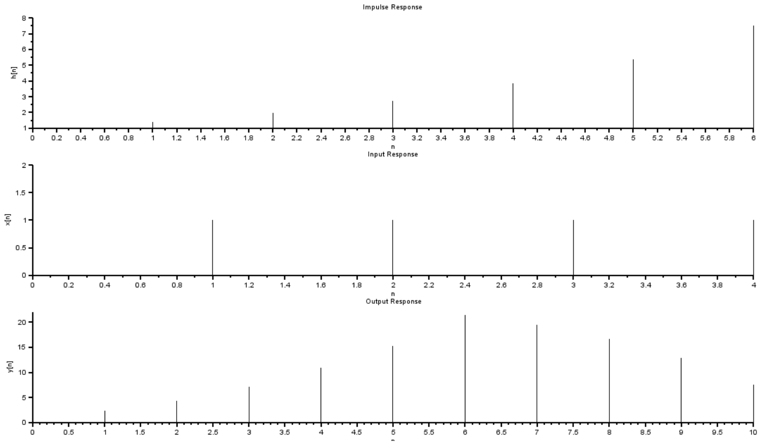

Figure 4.2: convolution sum of finite duration sequences

Experiment: 5

Frequency Response of Ideal Low pass Filter X (jW) = 1

Scilab code Solution 5.1 Frequency Response of Ideal Low pass Filter

```
//Frequency Response of Ideal Low pass Filter ,X(jW)=1
//scilab 5.4.1 ;64 bit(windows 8)
clear;
clc;
close;
Wc = 10;      //1 rad/sec
W  = -Wc:0.1:Wc; //Passband of filter
HW0 = 1; //Magnitude of Filter
HW = HW0*ones(1,length(W));
//Inverse Continuous-time Fourier Transform
t = -%pi:%pi/length(W):%pi;
Dw = 0.1;
ht =(1/(2*%pi))*HW *exp(sqrt(-1)*W'*t)*Dw;
ht = real(ht);
```

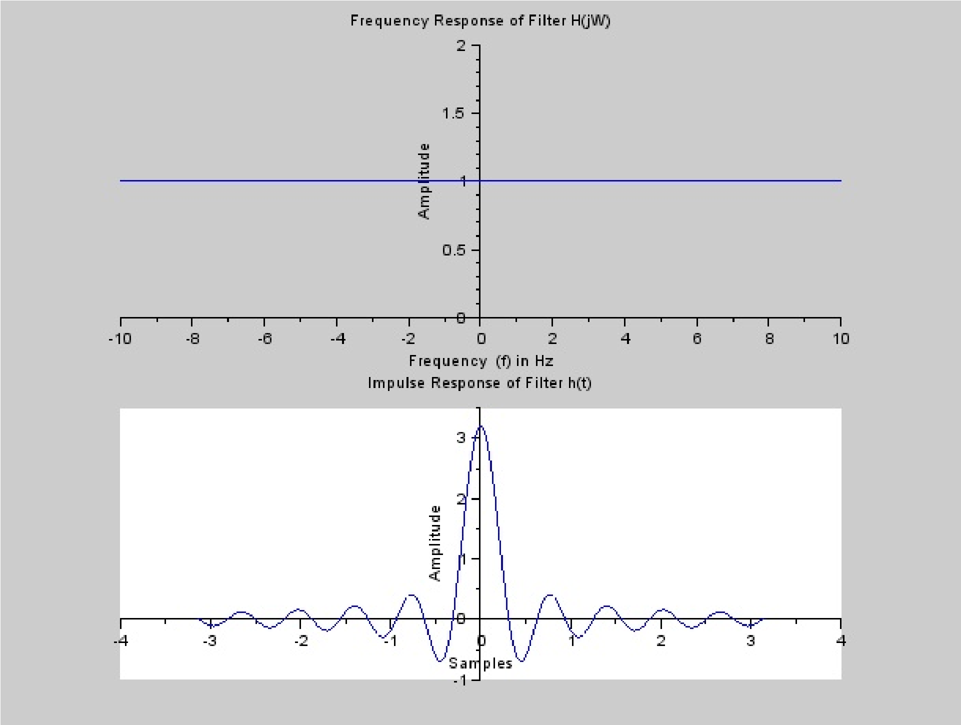

Figure 5.1: Frequency Response of Ideal Low pass Filter

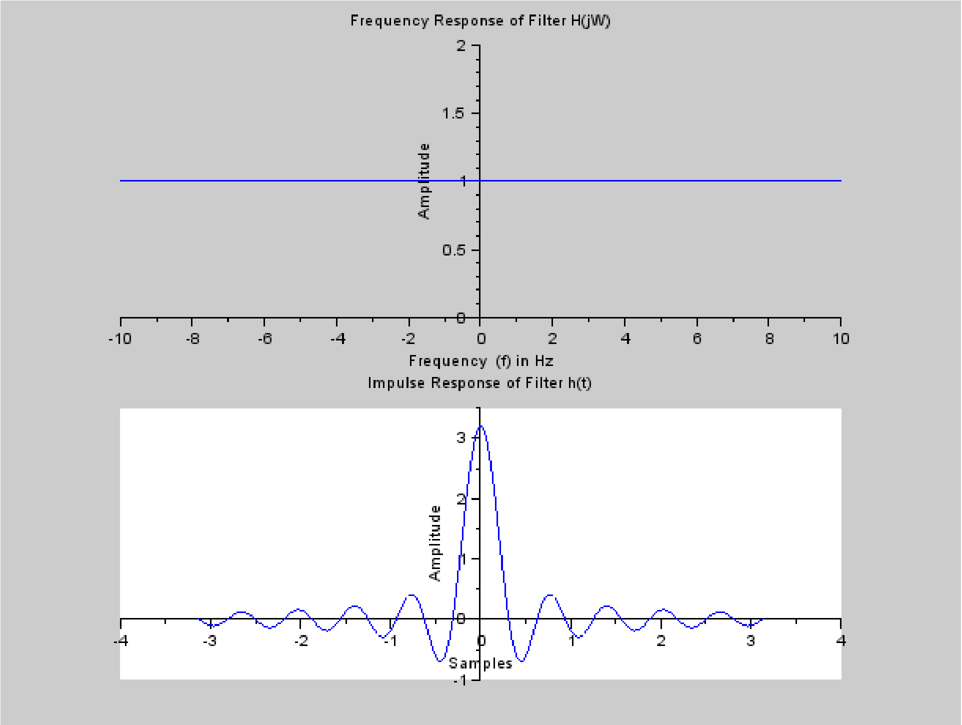

Figure 5.2: Frequency Response of Ideal Low pass Filter

```
subplot(2,1,1)
a = gca();
a.y_location =”origin”;
a.x_location =”origin”;
plot(W,HW);
xtitle('Frequency Response of Filter H(jW)')
xlabel('Frequency  (f) in Hz');
ylabel('Amplitude');
subplot(2,1,2)
a = gca();
a.y_location =”origin”;
a.x_location =”origin”;
plot(t,ht);
xtitle('Impulse Response of Filter h(t)')
xlabel('Samples');
ylabel('Amplitude');
```