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ECE 3770 - Lab 1

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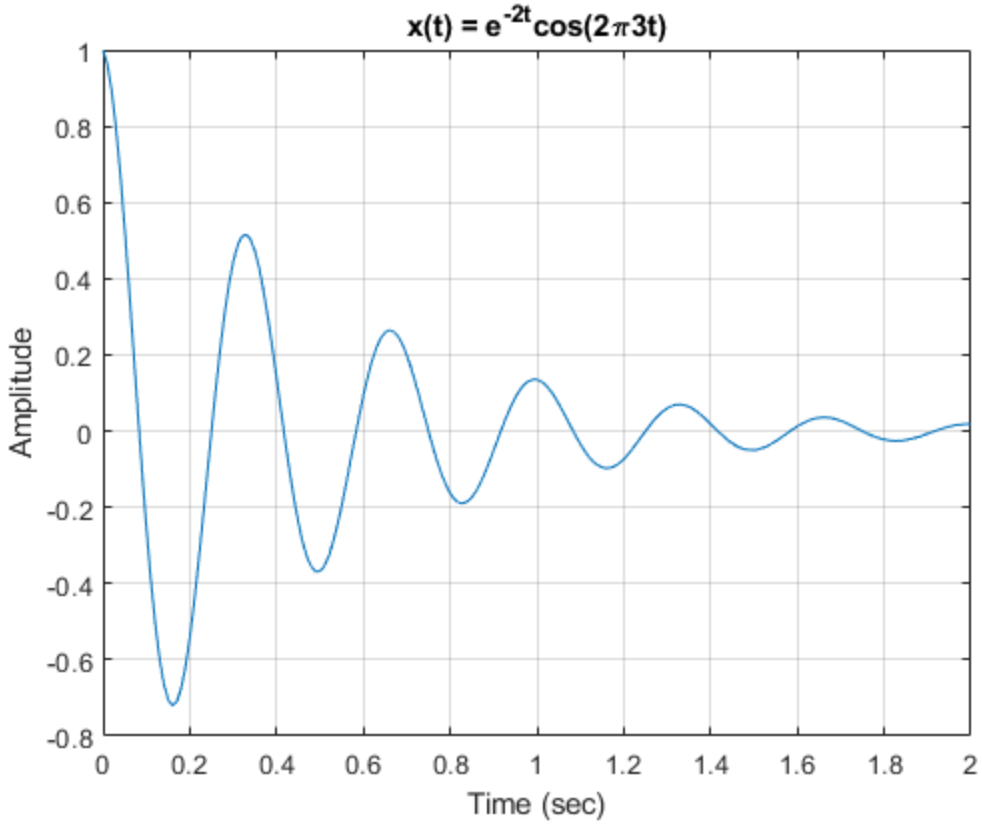
```
clc; clear; close all;
```

Part 1

Generating and plotting x(t)

```
t = 0:0.01:2;
fun = @(x) exp(-2*x).*cos(2*pi*3*x);
x = fun(t);

figure(1)
plot(t,x); grid
xlabel('Time (sec)')
ylabel('Amplitude')
title(['x(t) = e^{-2t}cos(2\pi3t)'])
```



Part 2

Finding the power of x(t)

```
N = length(x);
Ts = 2/N;
P = 0;

for n = 1:N
    P = P + x(n)^2 * Ts;
end

fprintf("Power of Signal x(t): %4.3f W\n\n",P/2);
```

```
Power of Signal x(t): 0.065 W
```

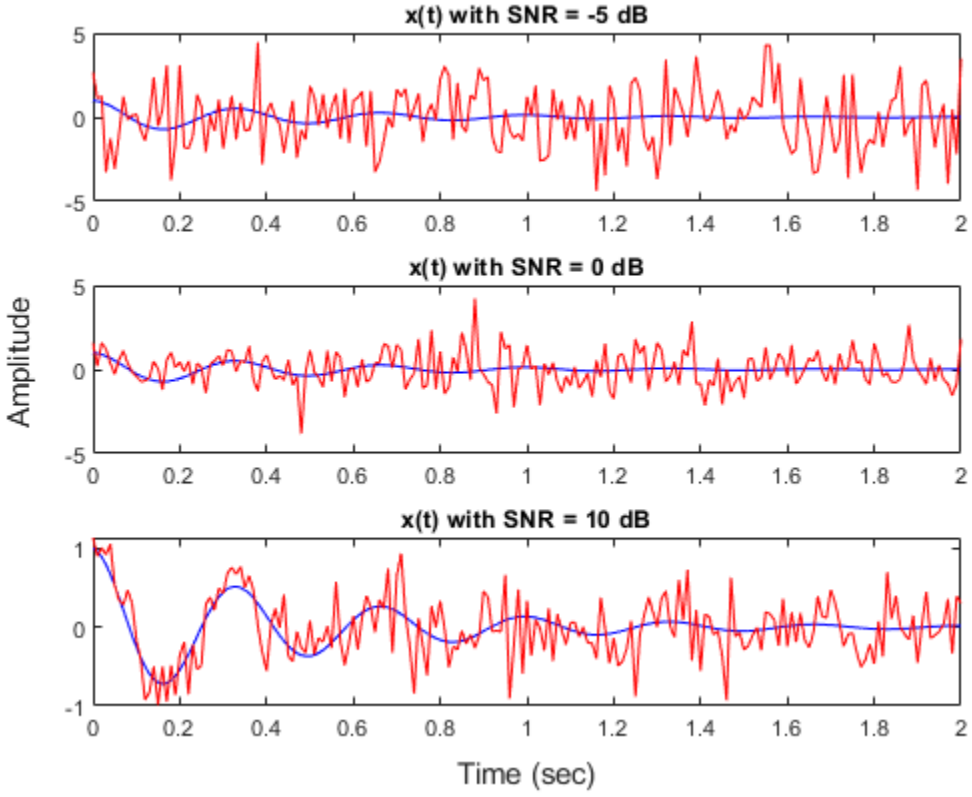
Part 3

Adding noise to x(t) and plotting varying results

```
xm5 = awgn(x,-5);
x0 = awgn(x,0);
x10 = awgn(x,10);
```

```
% Generating subplots and superimposing noisy signals over base signal
figure(9)
subplot(3,1,1), plot(t, x, 'Color', 'blue'); title('x(t) with SNR = -5
 dB'); hold on
plot(t, xm5,  'Color', 'red'); hold off
subplot(3,1,2), plot(t, x, 'Color', 'blue'); title('x(t) with SNR = 0
 dB'); hold on
plot(t, x0,  'Color', 'red'); hold off
subplot(3,1,3), plot(t, x, 'Color', 'blue'); title('x(t) with SNR = 10
 dB'); hold on
plot(t, x10,  'Color', 'red'); hold off

% Adding common axis labels for the subplots
ax = axes('Parent',figure(9),'visible','off');
ax.XLabel.Visible='on';
ax.YLabel.Visible='on';
xlabel(ax,'Time (sec)')
ylabel(ax,'Amplitude');
```



Part 4

Making the ABC News audio clip inaudible

```
load abcnews;
snr = -10;
fs = 22000;
```

```
m2 = awgn(m,snr);
sound(m2,fs);

fprintf("The following SNR renders the ABC News audio inaudible: %d
 dB",snr);
```

```
The following SNR renders the ABC News audio inaudible: -10 dB
```

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