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part1

```
n = -10:10;
```

```
figure(1)
```

```
f = (3.*(n==-2))-(1.*(n==1))+(2.*(n==3));
```

```
subplot(1,3,1)
```

```
stem(n,f)
```

```
title('stem(n,f)')
```

```
ylabel('f(n)')
```

```
xlabel('n')
```

```
g = (n>=-4)-(n>=3);
```

```
subplot (1,3,2)
```

```
stem(n,g)
```

```
title('stem(n,g)')
```

```
ylabel('g(n)')
```

```
xlabel('n')
```

```

x = conv(f,g);

subplot (1,3,3)

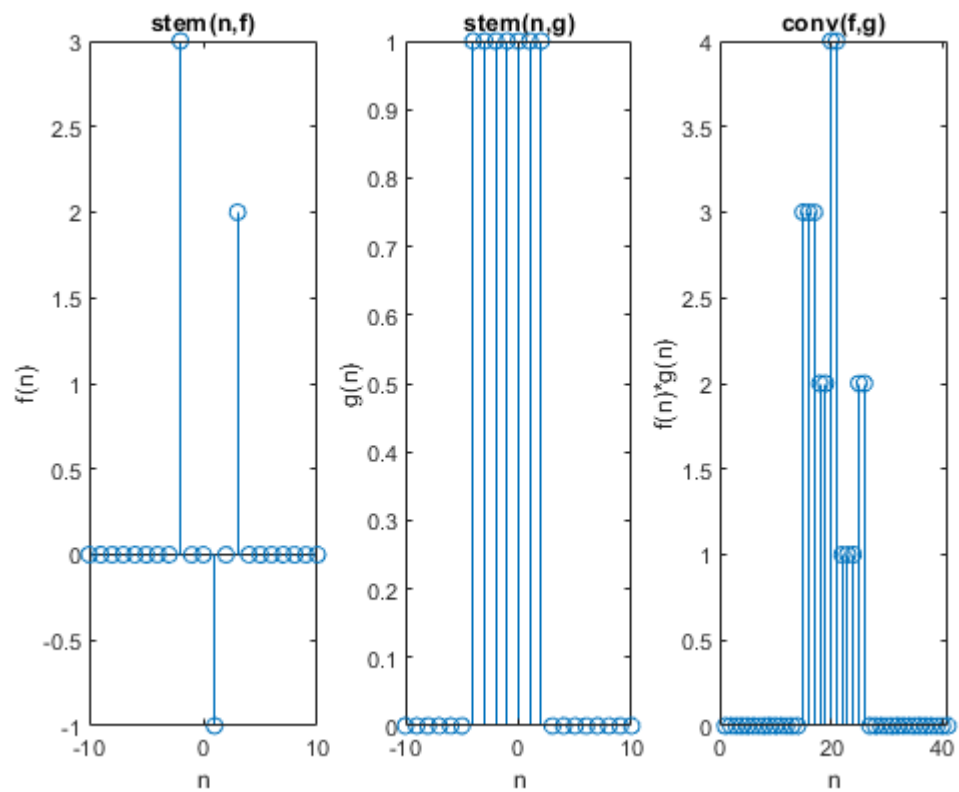
stem(x)

title('conv(f,g)')

ylabel('f(n)*g(n)')

xlabel('n')

```



part2

```
load DataEOG.txt
```

```
x1 = DataEOG;
```

```
figure(2)

subplot (2,2,1)

plot(x1)

h = ones(1,11)/11;

y = conv(x1,h);


subplot (2,2,2)

plot(y)


subplot (2,2,3)

hold on

plot(x1)

plot(y)

hold off


y2 = y;

y2(1:5)=[];

y2(end-4:end)=[];


subplot (2,2,4)

hold on
```

```
plot(x1)
```

```
plot(y2)
```

```
hold off
```

```
%(a)The noise on the graph has decreased.
```

```
%(b)length of h is add to length of x1
```

```
%(c)y and x1 have different length of n.
```

```
%(d)It makes same y2 and x1 have same length of n which is 600.
```

```
figure(4)
```

```
subplot (2,2,1)
```

```
plot(x1)
```

```
h = ones(1,31)/31;
```

```
y = conv(x1,h);
```

```
subplot (2,2,2)
```

```
plot(y)
```

```
subplot (2,2,3)
```

```
hold on
```

```
plot(x1)
```

```
plot(y)
```

```
hold off
```

```
y2 = y;
```

```
y2(1:31)=[];
```

```
subplot (2,2,4)
```

```
hold on
```

```
plot(x1)
```

```
plot(y2)
```

```
hold off
```

```
figure(5)
```

```
subplot (2,2,1)
```

```
plot(x1)
```

```
h = ones(1,67)/67;
```

```
y = conv(x1,h);
```

```
subplot (2,2,2)
```

```
plot(y)
```

```
subplot (2,2,3)
```

```
hold on
```

```
plot(x1)
```

```
plot(y)
```

```
hold off
```

```
y2 = y;
```

```
y2(1:67)=[];
```

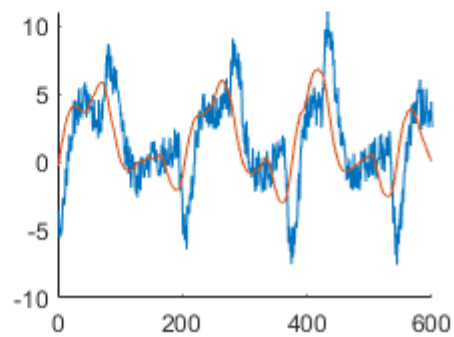
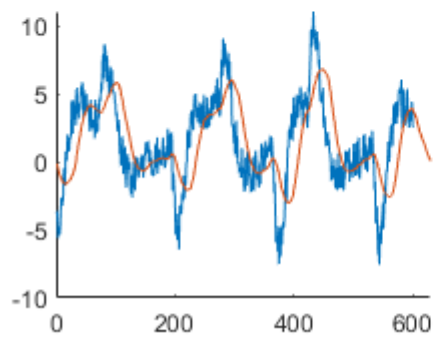
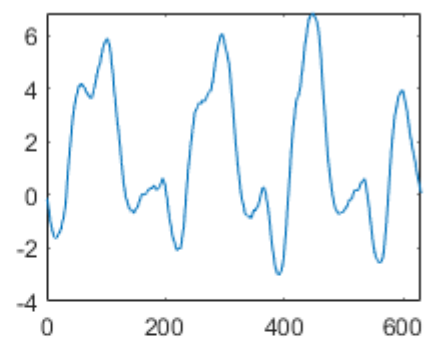
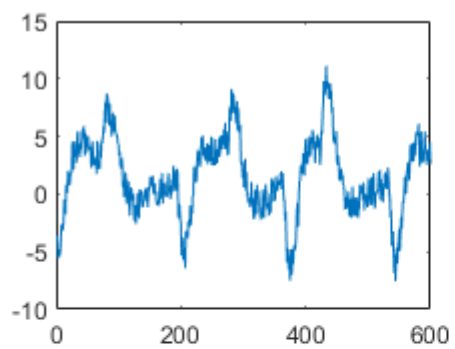
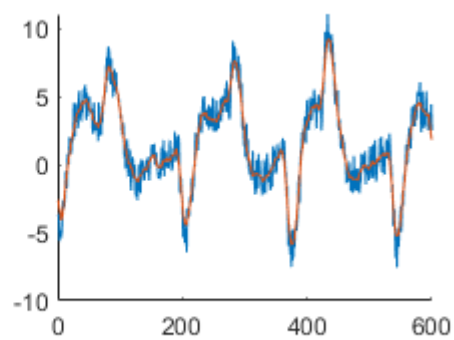
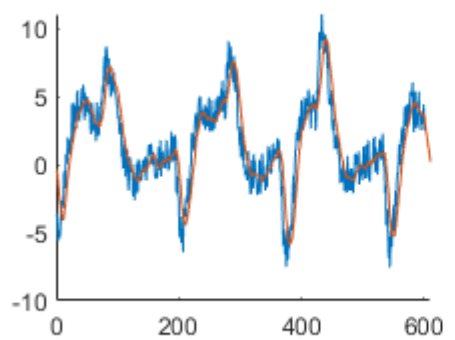
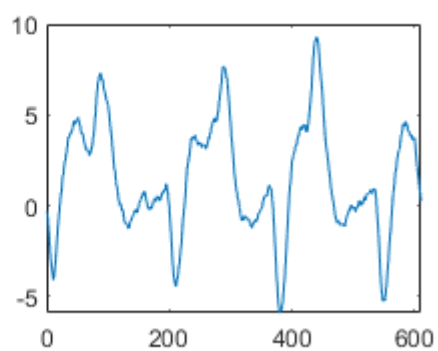
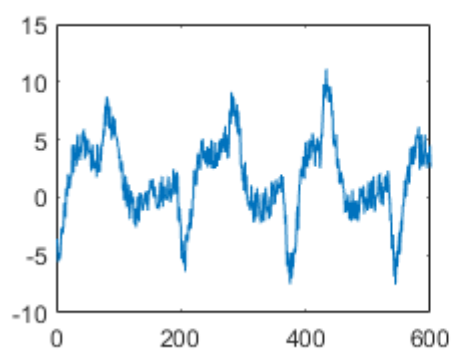
```
subplot (2,2,4)
```

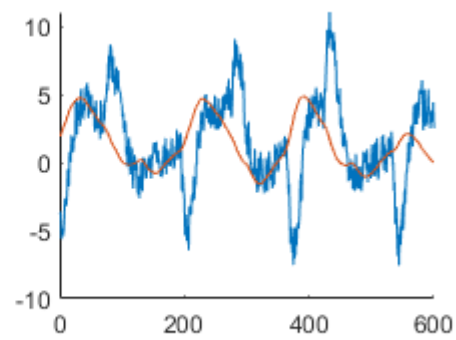
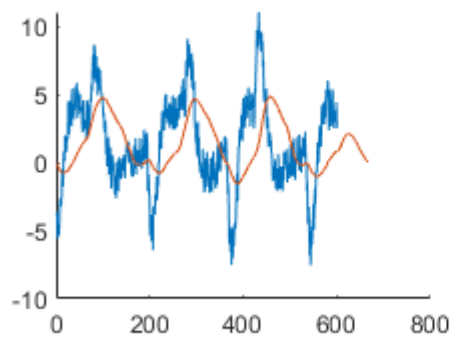
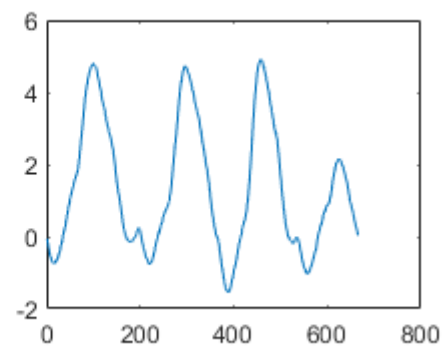
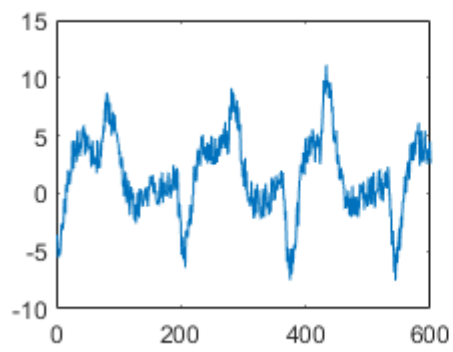
```
hold on
```

```
plot(x1)
```

```
plot(y2)
```

```
hold off
```





part3

```
figure(6)

n=0:9;

x1=1:10;

x2=[zeros(1,4) 1:6];

y1=mydiff(x1);

y2=mydiff(x2);

subplot(2,1,1)

stem(n,x1)

hold on

stem(n,x2);

hold off
```



```

xlabel('n');

legend('x1','x2');

subplot(2,1,2)

stem(n,y1)

hold on

stem(n,y2)

hold off

xlabel('n');

legend('y1','y2');

%the system is linear

figure(7)

n=0:100;

x=[1 zeros(1,100)];

h=mydiffeq(x);

subplot(2,1,1)

stem(n,x);

xlabel('n');

ylabel('Wdelta[n]');

subplot(2,1,2)

stem(n,h)

```

```
xlabel('n');

ylabel('h[n]');


figure(8)

n1=0:50;

n=0:100;

x=[cos(0.125.*pi.*n1) zeros(1,length(n)-length(n1))];%defining x,

h=[1 1.05];

y1=conv(x,h);%y[n] using conv

y1=y1(1:length(n));

y2=mydiffeq(x);%y[n] using mydiffeq function

diff=y1-y2;%difference between both outputs

stem(n,y1);

hold on

stem(n,y2)

xlabel('n');

legend('y[n] using "conv" function','y[n] using "mydiffeq" function');
```

function mydiffeq(x)

```
function y=mydiffeq(x)

x=[0 x];

y=zeros(size(x));

for k=2:length(x)

y(k)=-0.95.*x(k-1)+2.*x(k-1)+x(k);

end

y=y(2:end);

end
```

