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

setup

```
size = 20 ;  
x = randi(10,size,1) ;  
start = randi(length(x)-3,1,1) ;  
  
len_y = randi(size-start,1,1) ;  
y = x(start:(start+len_y),1) ;  
  
corrLength = length(x)-length(y)+1 ;  
lenCon = 2^ceil(log2(length(x)+length(y)-1)) ;
```

calculate rxx0 values

```
rxx = zeros(lenCon,1) ;  
rxx0 = zeros(corrLength,1) ;  
  
for i = 1:corrLength  
    rxx = ifft(fft(x(i:(i+length(y)-1)),2*length(x)-1).* ...  
        conj(fft(x(i:(i+length(y)-1)),2*length(x)-1))) ;  
    rxx0(i,1) = round(rxx(1,1)) ;  
end
```

calculate ryy0

```
ryy = ifft(fft(y,2*length(y)-1).*conj(fft(y,2*length(y)-1))) ;  
ryy0 = round(ryy(1,1)) ;
```

calculate normalized cross correlation

```
x_pad = zeros(lenCon,1) ;  
y_pad = zeros(lenCon,1) ;  
  
for i = 1:length(x)  
    x_pad(i,1) = x(i,1) ;  
end
```

```

for i = 1:length(y)
    y_pad(i,1) = y(i,1) ;
end

X = fft(x_pad) ;
Y = fft(y_pad) ;

corr = ifft(X.*conj(Y)) ;
corr = round(corr(1:corrLength)) ;

autocorr = zeros(corrLength,1) ;

for i = 1:corrLength
    autocorr(i,1) = corr(i,1) / sqrt(rxx0(i,1)*ryy0) ;
end

for i = 1:length(autocorr)
    if autocorr(i,1) == 1
        match = i ;
        break ;
    end
end
end

```

removed matched signal

```

sub_sig = zeros(length(x),1) ;

j = 1 ;
for i = match:(match+length(y)-1)
    sub_sig(i,1) = y(j,1) ;
    j = j+1 ;
end

new_sig = x - sub_sig ;

sig_beg = x(1:(match-1)) ;
sig_end = x((match+length(y)):end) ;

sig_final = [sig_beg; sig_end] ;

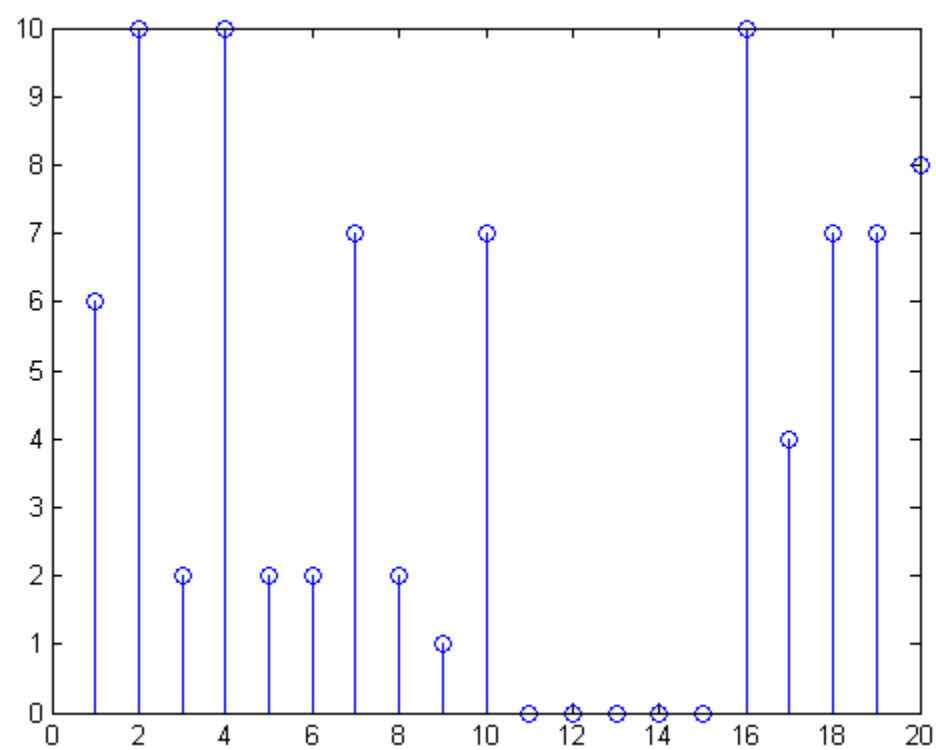
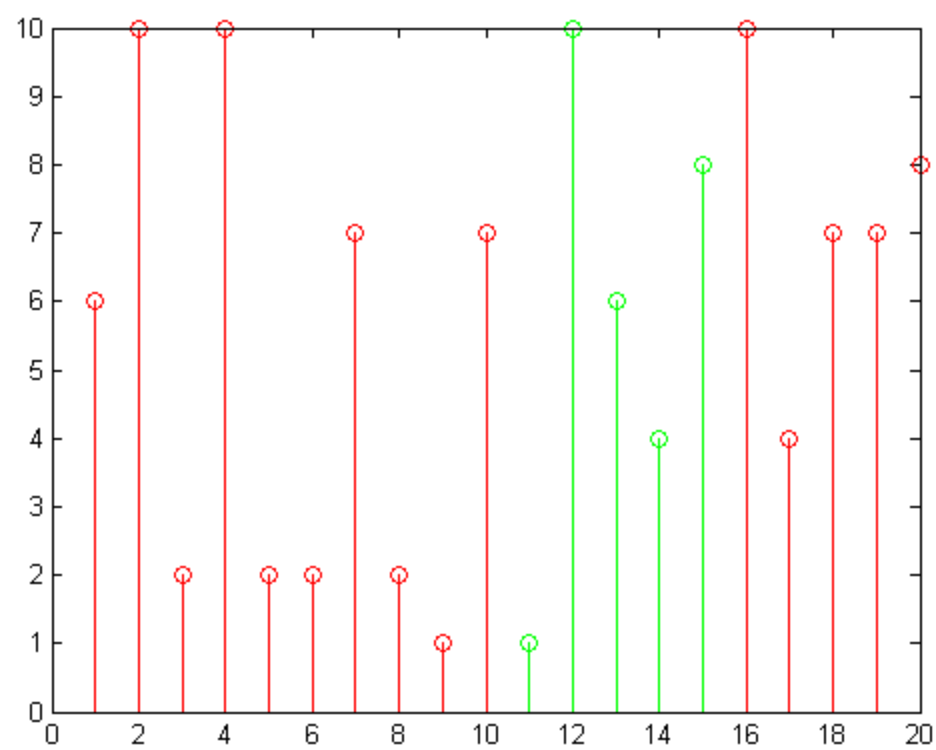
```

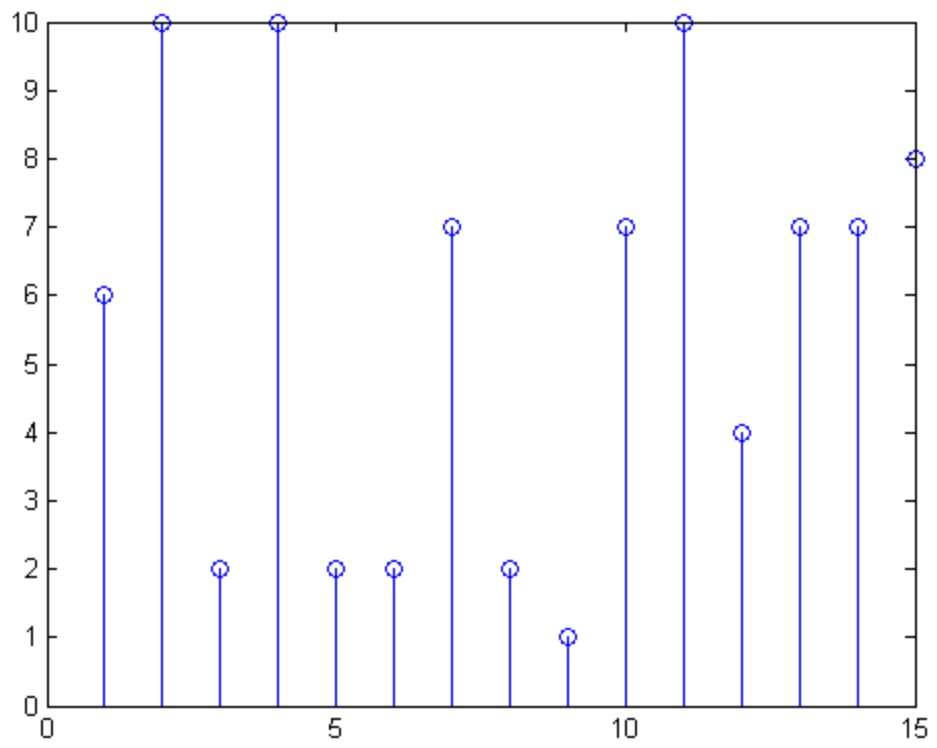
plot

```

figure ;
stem(x, 'r') ;
hold on ;
stem(start:(start+len_y), y, 'g') ;
figure ;
stem(new_sig, 'b') ;
figure ;
stem(sig_final, 'b') ;

```





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