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

setup

```
x = randi(10,100,1) ;
start = randi(length(x)-3,1,1) ;

len_y = randi(100-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)-
    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
```

removed matched signal

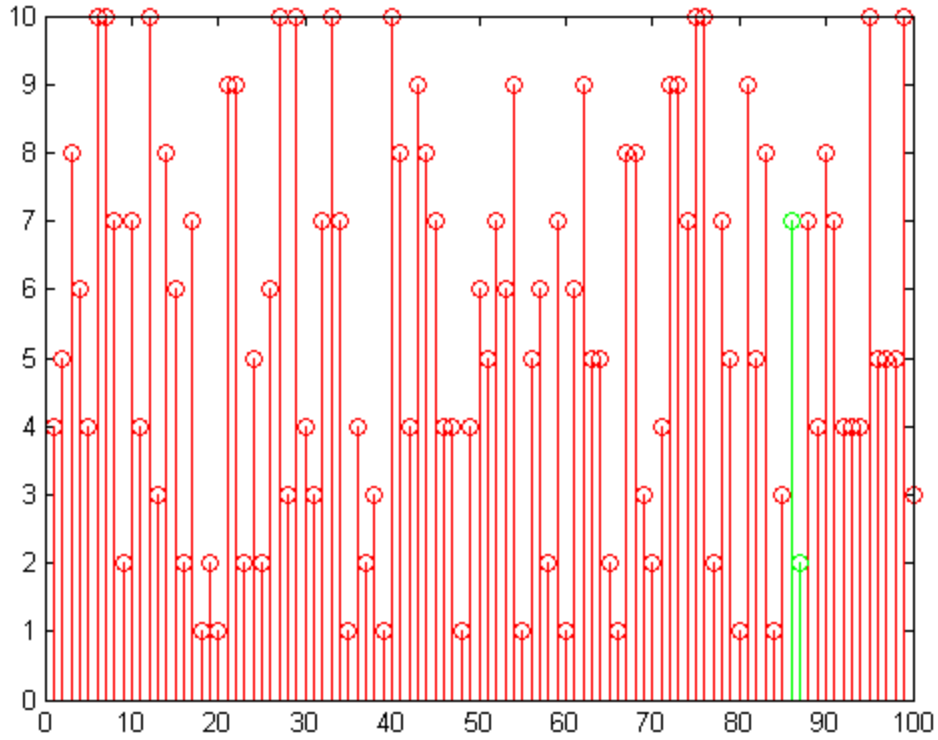
```
sub_sig = zeros(length(x),1) ;

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 ;
```

plot

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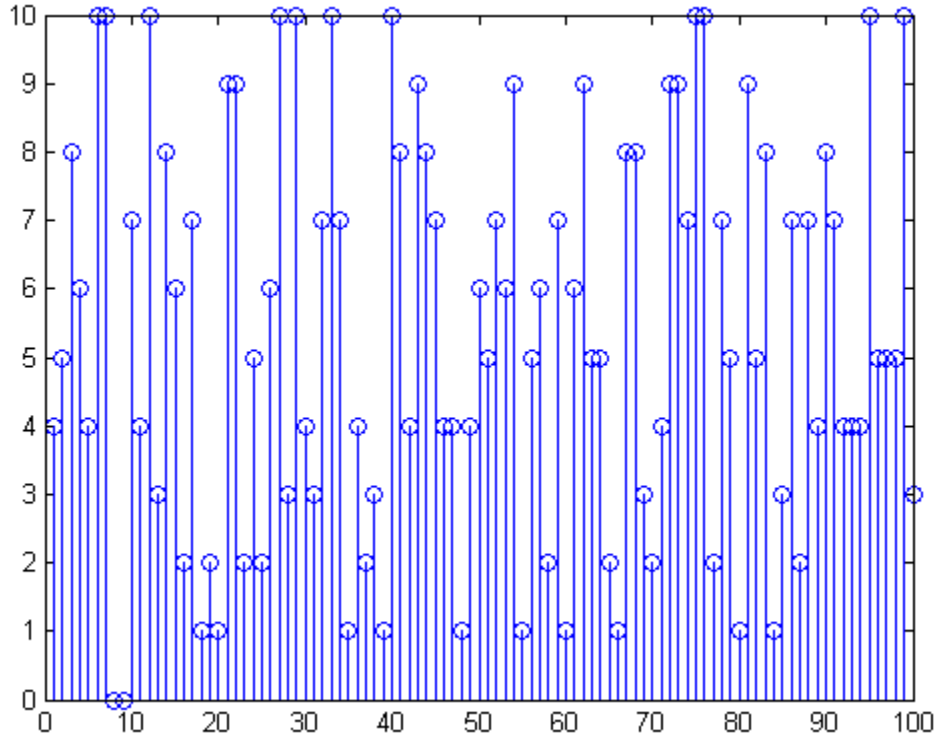
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