**DCCL LAB1**

**matlab**

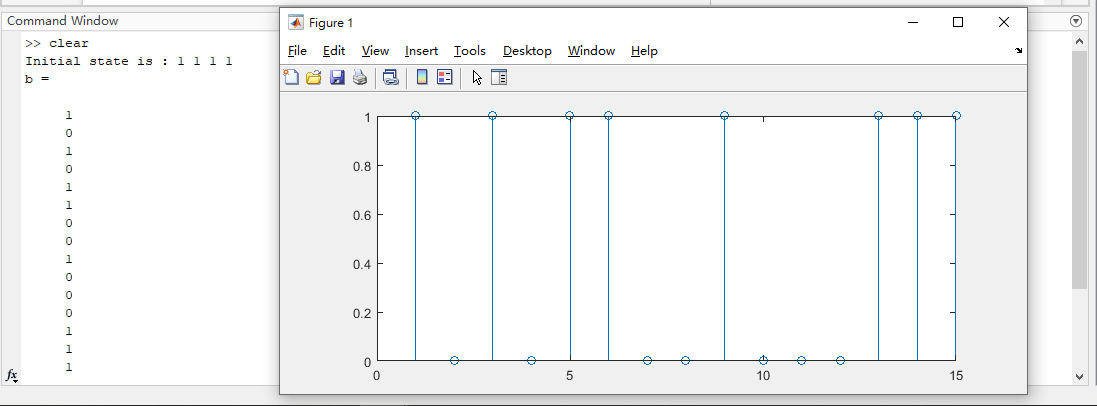
電機碩一 111521035 林豪澤

1. Write down the initial state. Print out the m-sequence.(Use command “stem”)

The initial state is: [ 1 1 1 1 ]

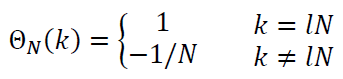
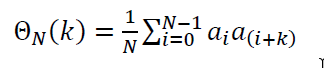
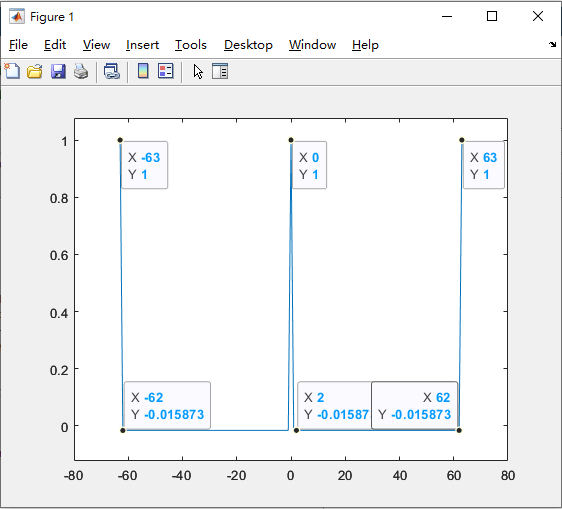
The PN sequence is:

b = [1 0 1 0 1 1 0 0 1 0 0 0 1 1 1];



1. Draw the autocorrelation result.

Use 103oct and initial state [ 1 1 0 0 1 1 ] to generate sequence b.

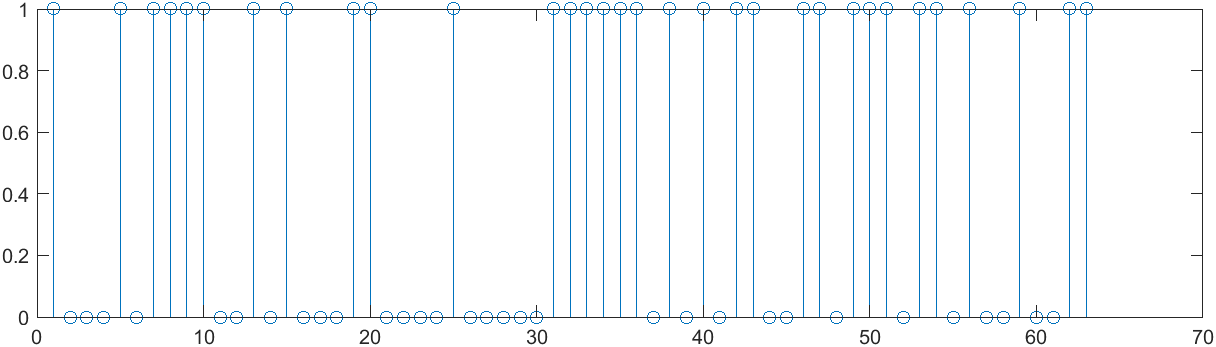
The autocorrelation result is:

1. Write down the initial state that you use to generate sequence

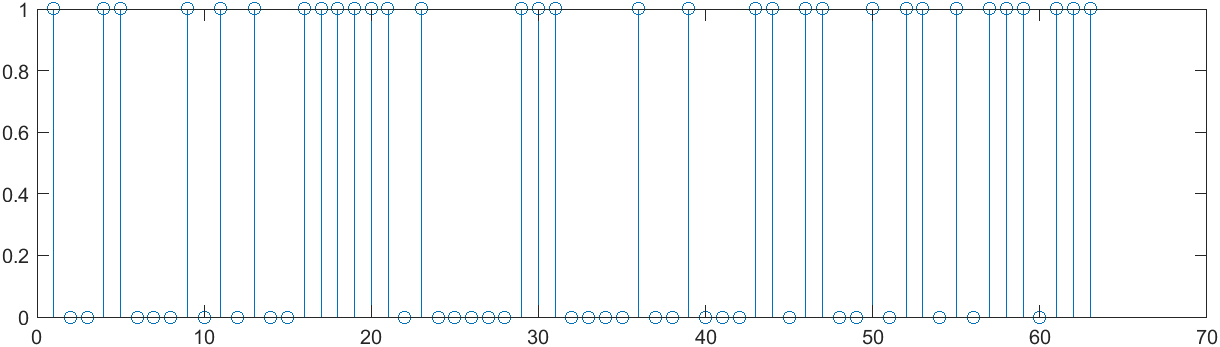
Use 103oct and initial state [ 1 1 0 0 1 1 ] to generate sequence b.

Use q=13 to generate sequence b’.

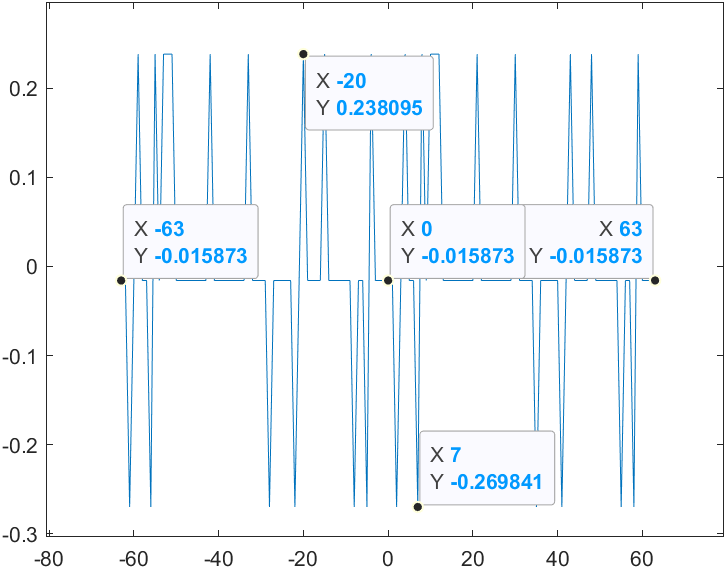
b = [1 0 0 0 1 0 1 1 1 1 0 0 1 0 1 0 0 0 1 1 0 0 0 0 1 0 0 0 0 0 1 1 1 ...

1 1 1 0 1 0 1 0 1 1 0 0 1 1 0 1 1 1 0 1 1 0 1 0 0 1 0 0 1 1]; 

b\_prime = [1 0 0 1 1 0 0 0 1 0 1 0 1 0 0 1 1 1 1 1 1 0 1 0 0 0 0 0 1 1 ...

0 0 0 0 1 0 0 1 0 0 0 1 1 0 1 1 0 0 1 0 1 1 0 1 0 1 1 1 0 1 1 1]; 

b and b\_prime’s full-period cross-correlation:



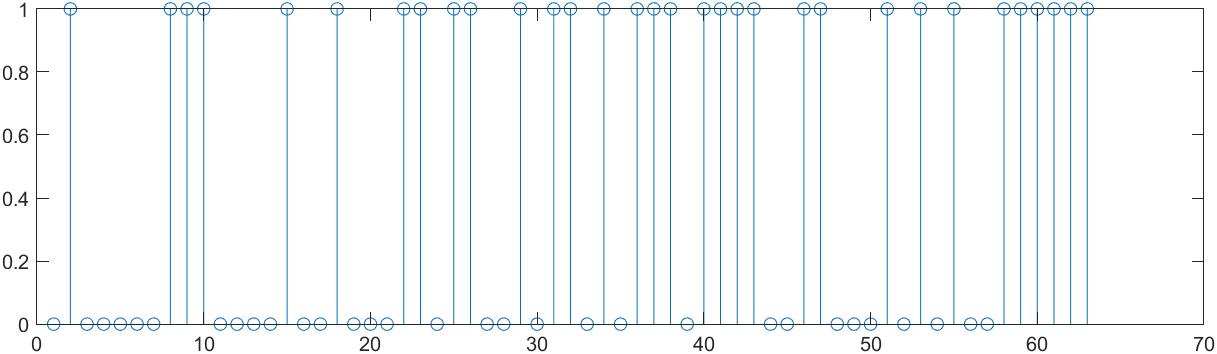
,three possible values:

1. Write down the initial state that use to generate sequence b’’.

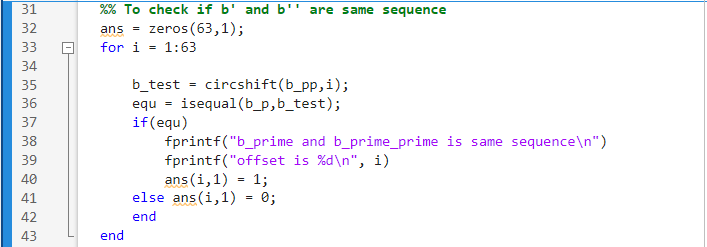
Use 133oct and initial state [ 1 1 0 1 1 0 ] to generate sequence b’’.

b’’ = [0 1 0 0 0 0 0 1 1 1 0 0 0 0 1 0 0 1 0 0 0 1 1 0 1 1 0 0 1 0 1 1 ...

0 1 0 1 1 1 0 1 1 1 1 0 0 1 1 0 0 0 1 0 1 0 1 0 0 1 1 1 1 1 1];



The way to check if b’ and b’’ are the same sequence:



1. 假設b’與b’’為同一sequence，但是具有不同的offset。
2. 使用circshift函式移動(右移)其中一個陣列，一共移動N=63次。
3. 使用isequal函式逐一比對移動過的陣列是否相等，一共比對63次。

如果相等則在ans陣列中標註為1並輸出其offset位置

結果:

b’ 與 b’’ 為相同的sequence，其offset 為右移 21 個位元。

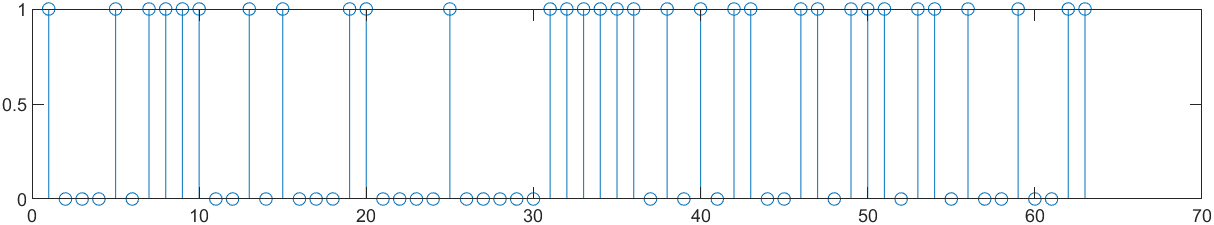
b\_prime and b\_prime\_prime is same sequence

offset is 21

1. Print out 5 sequence among 65 Gold code sequences according to procedure 5.

First sequence in Gold code(i.e. b):

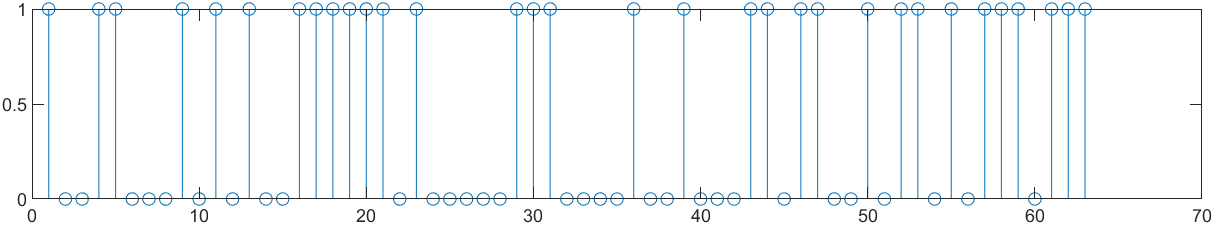
[1 0 0 0 1 0 1 1 1 1 0 0 1 0 1 0 0 0 1 1 0 0 0 0 1 0 0 0 0 0 1 1 1 1 ...

1 1 0 1 0 1 0 1 1 0 0 1 1 0 1 1 1 0 1 1 0 1 0 0 1 0 0 1 1]; 

Second sequence in Gold code(i.e. b’):

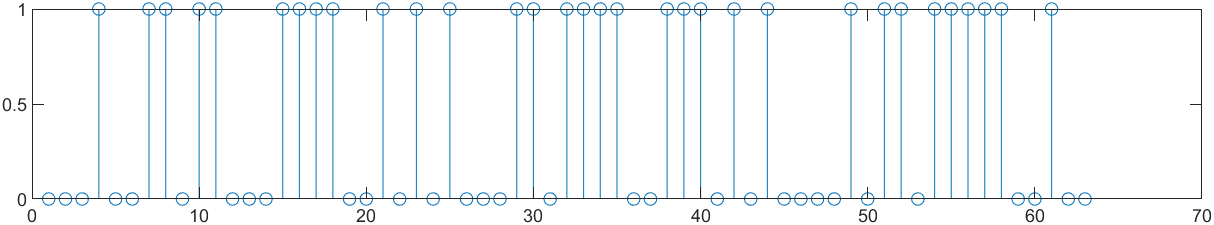
[ 1 0 0 1 1 0 0 0 1 0 1 0 1 0 0 1 1 1 1 1 1 0 1 0 0 0 0 0 1 1 1 0 0 0 ...

0 1 0 0 1 0 0 0 1 1 0 1 1 0 0 1 0 1 1 0 1 0 1 1 1 0 1 1 1];



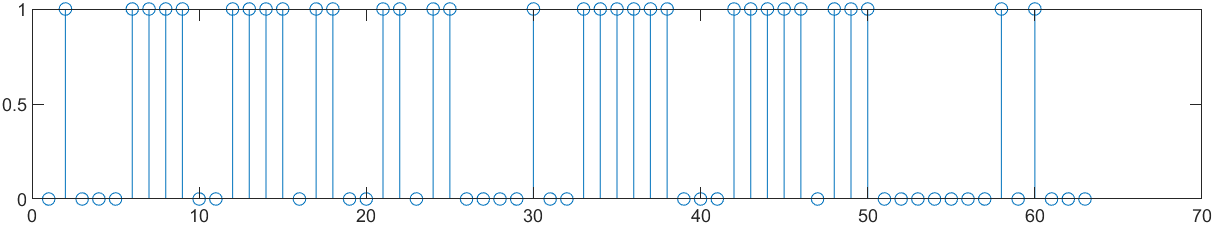
Third sequence in Gold code(i.e. b+b’):

[0 0 0 1 0 0 1 1 0 1 1 0 0 0 1 1 1 1 0 0 1 0 1 0 1 0 0 0 1 1 0 1 1 1 ...

1 0 0 1 1 1 0 1 0 1 0 0 0 0 1 0 1 1 0 1 1 1 1 1 0 0 1 0 0]; 

Fourth sequence in Gold code(i.e. b+Db’):

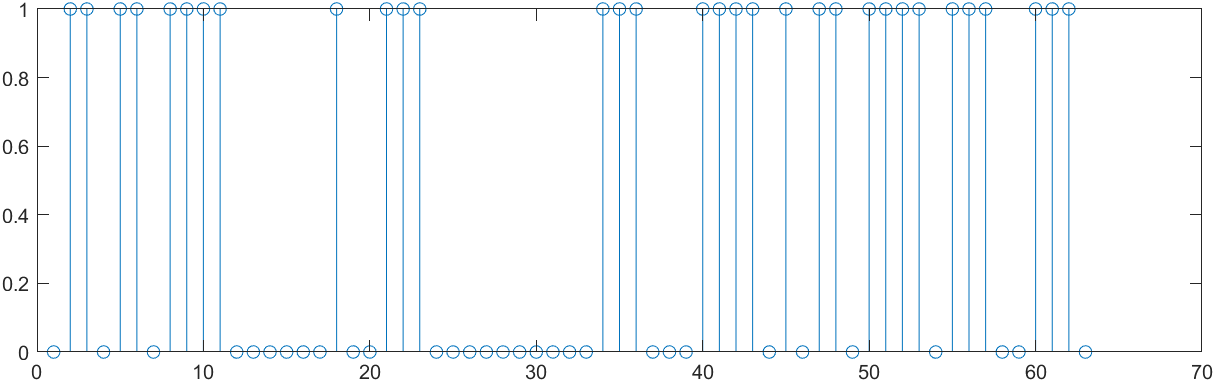
[0 1 0 0 0 1 1 1 1 0 0 1 1 1 1 0 1 1 0 0 1 1 0 1 1 0 0 0 0 1 0 0 1 1 ...

1 1 1 1 0 0 0 1 1 1 1 1 0 1 1 1 0 0 0 0 0 0 0 1 0 1 0 0 0]; 

(Fifth sequence in Gold code is print on next page)

Fifth sequence in Gold code(i.e. b+D2b’):

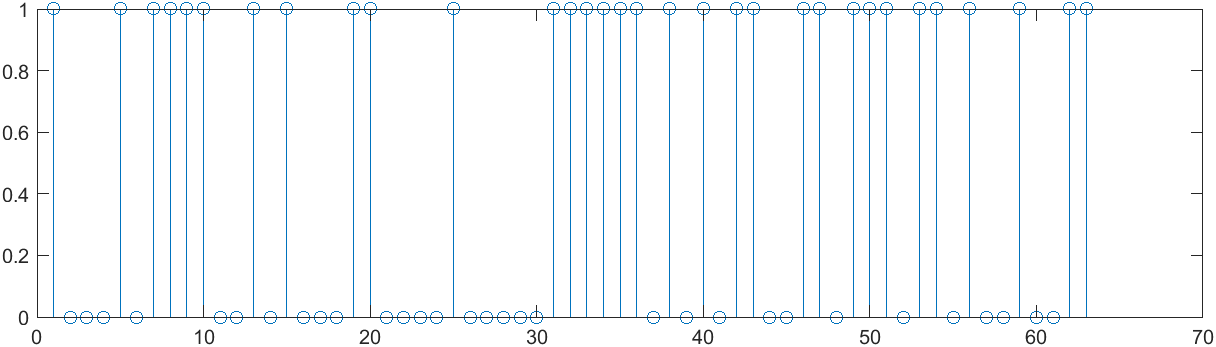
[0 1 1 0 1 1 0 1 1 1 1 0 0 0 0 0 0 1 0 0 1 1 1 0 0 0 0 0 0 0 0 0 0 1 ...

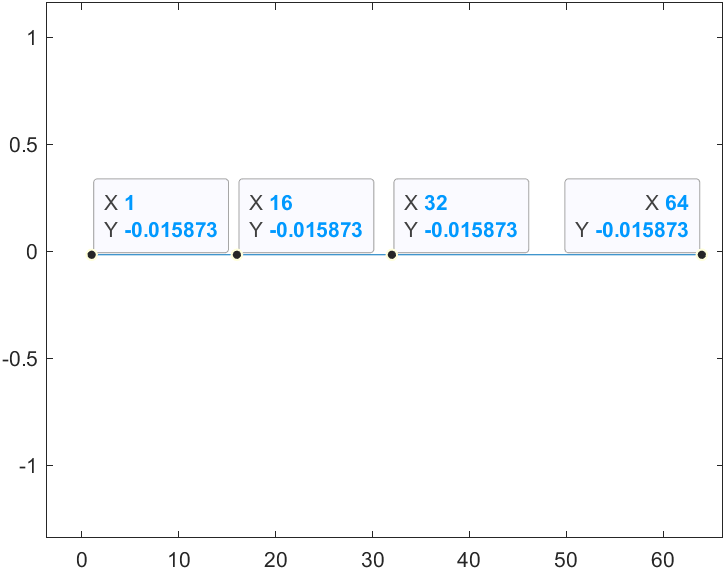
1 1 0 0 0 1 1 1 1 0 1 0 1 1 0 1 1 1 1 0 1 1 1 0 0 1 1 1 0]; 

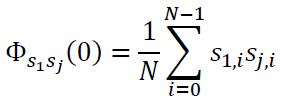
1. Write down the base sequence.

The base sequence is same as result 3.

b = [1 0 0 0 1 0 1 1 1 1 0 0 1 0 1 0 0 0 1 1 0 0 0 0 1 0 0 0 0 0 1 1 1 ...

1 1 1 0 1 0 1 0 1 1 0 0 1 1 0 1 1 1 0 1 1 0 1 0 0 1 0 0 1 1]; 

Draw the result of full-period cross-correlation in a figure.

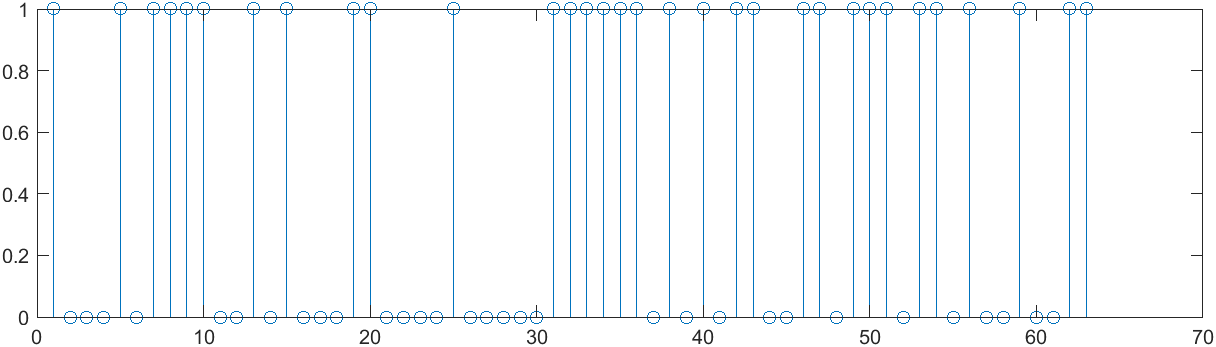


All the result in full-period cross-correlation is -0.0159. i.e. (-1/N),N= 63

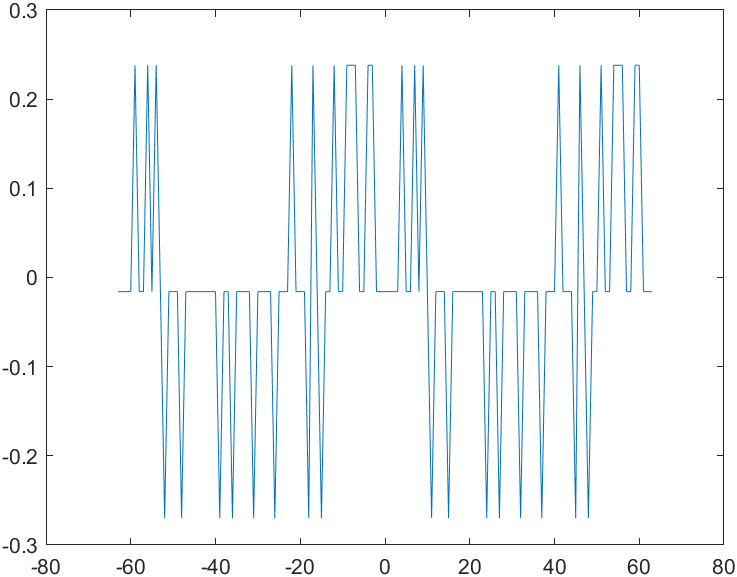
1. Write down the base sequence.

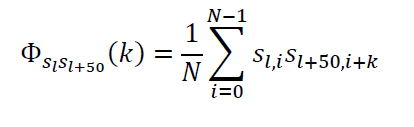
The base sequence is same as result 6.

b = [1 0 0 0 1 0 1 1 1 1 0 0 1 0 1 0 0 0 1 1 0 0 0 0 1 0 0 0 0 0 1 1 1 ...

1 1 1 0 1 0 1 0 1 1 0 0 1 1 0 1 1 1 0 1 1 0 1 0 0 1 0 0 1 1]; 

Draw the result of full-period cross-correlation in a figure.





, three possible values: