**FFT\_Term\_Project**

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一、code與說明

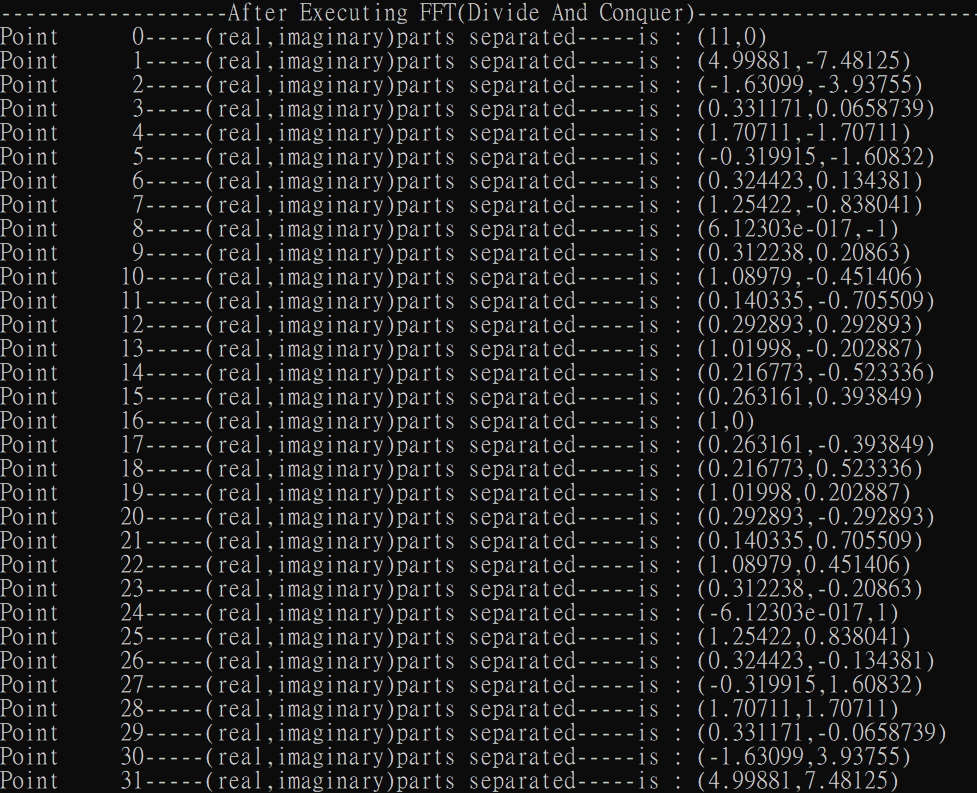
二、執行測試

(1) N = 32, M = 5

x[n] = 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

Ans：

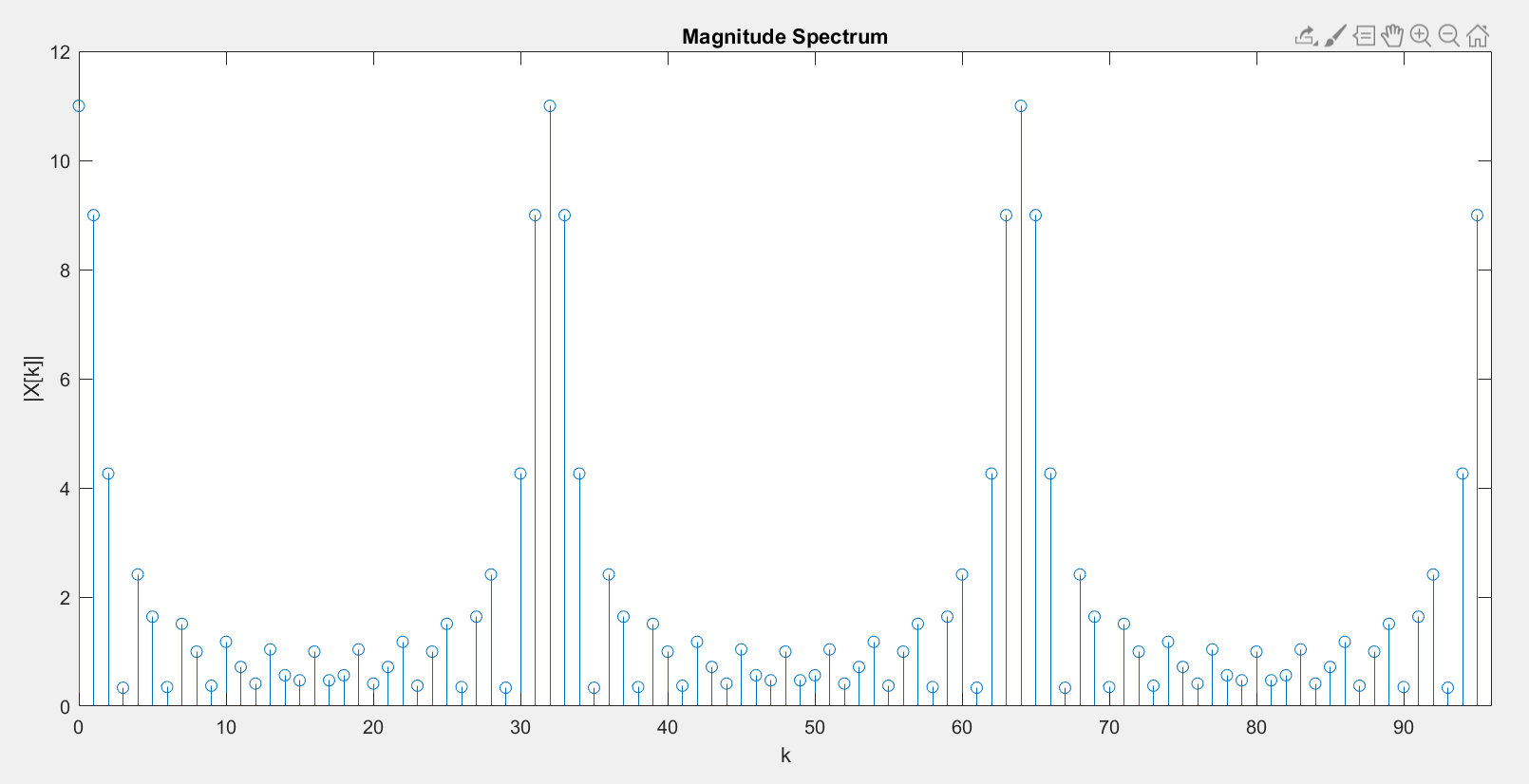
X[k] =

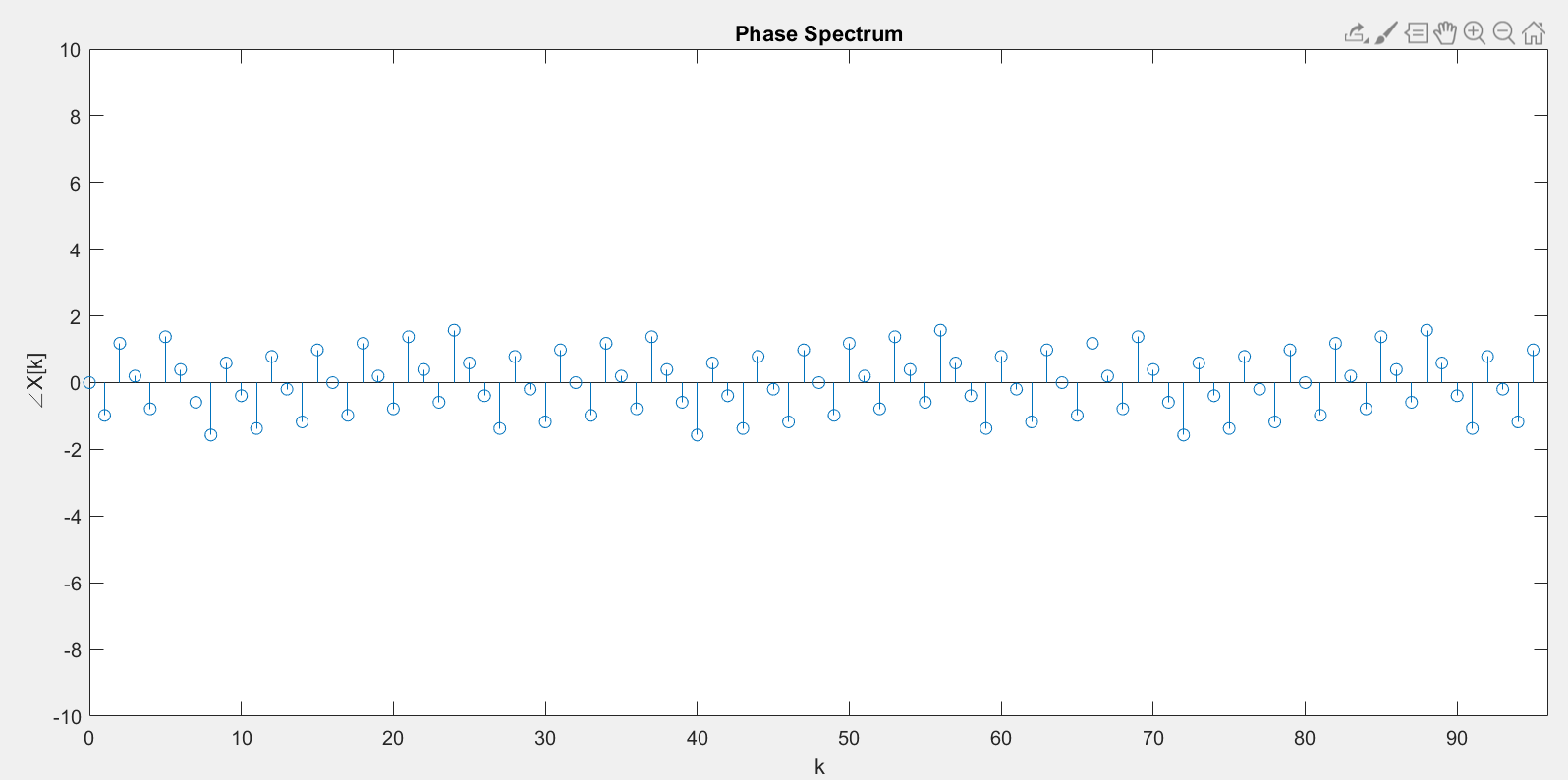


\*Matlab驗證\*



\*Plot\*



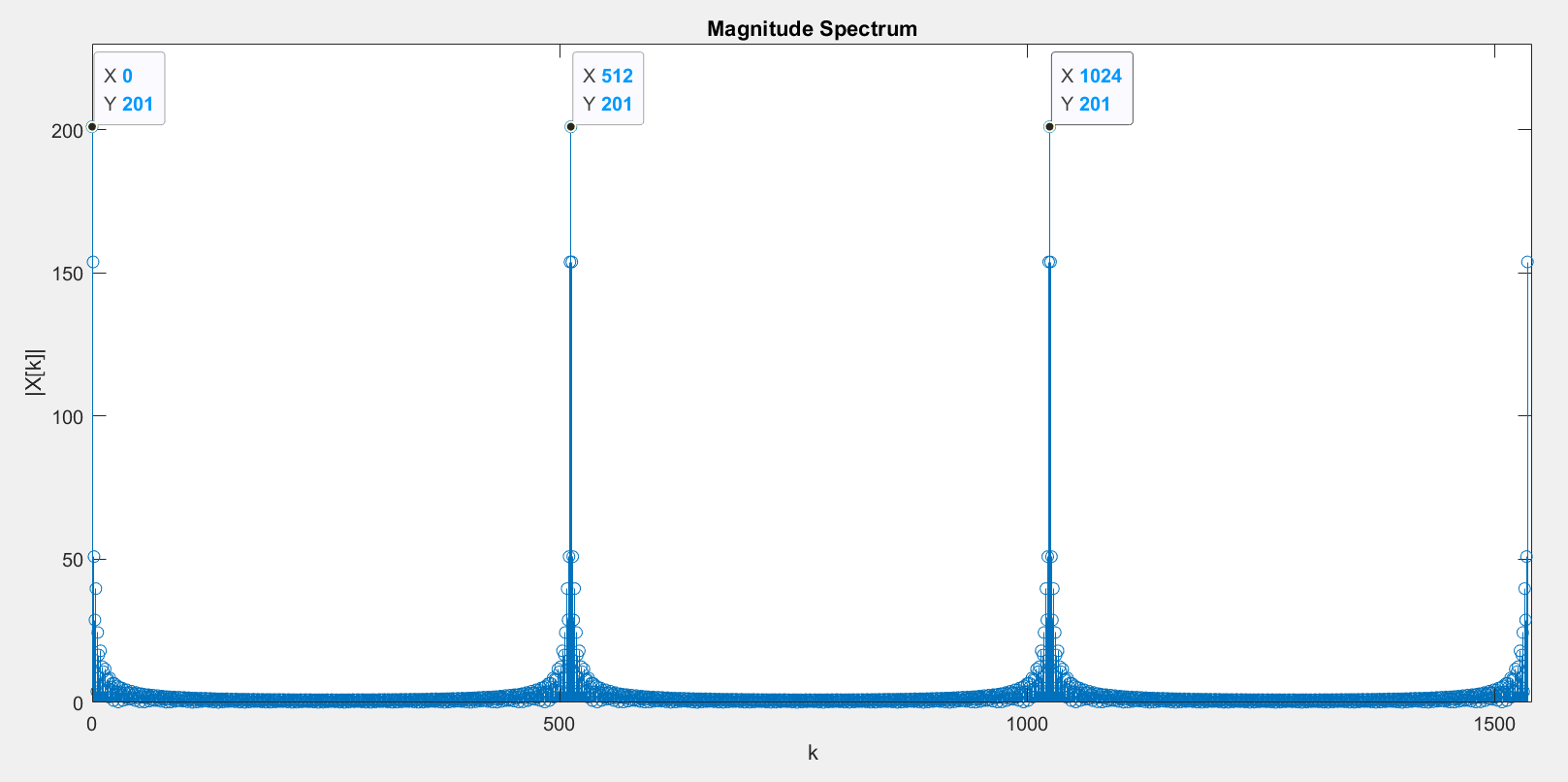


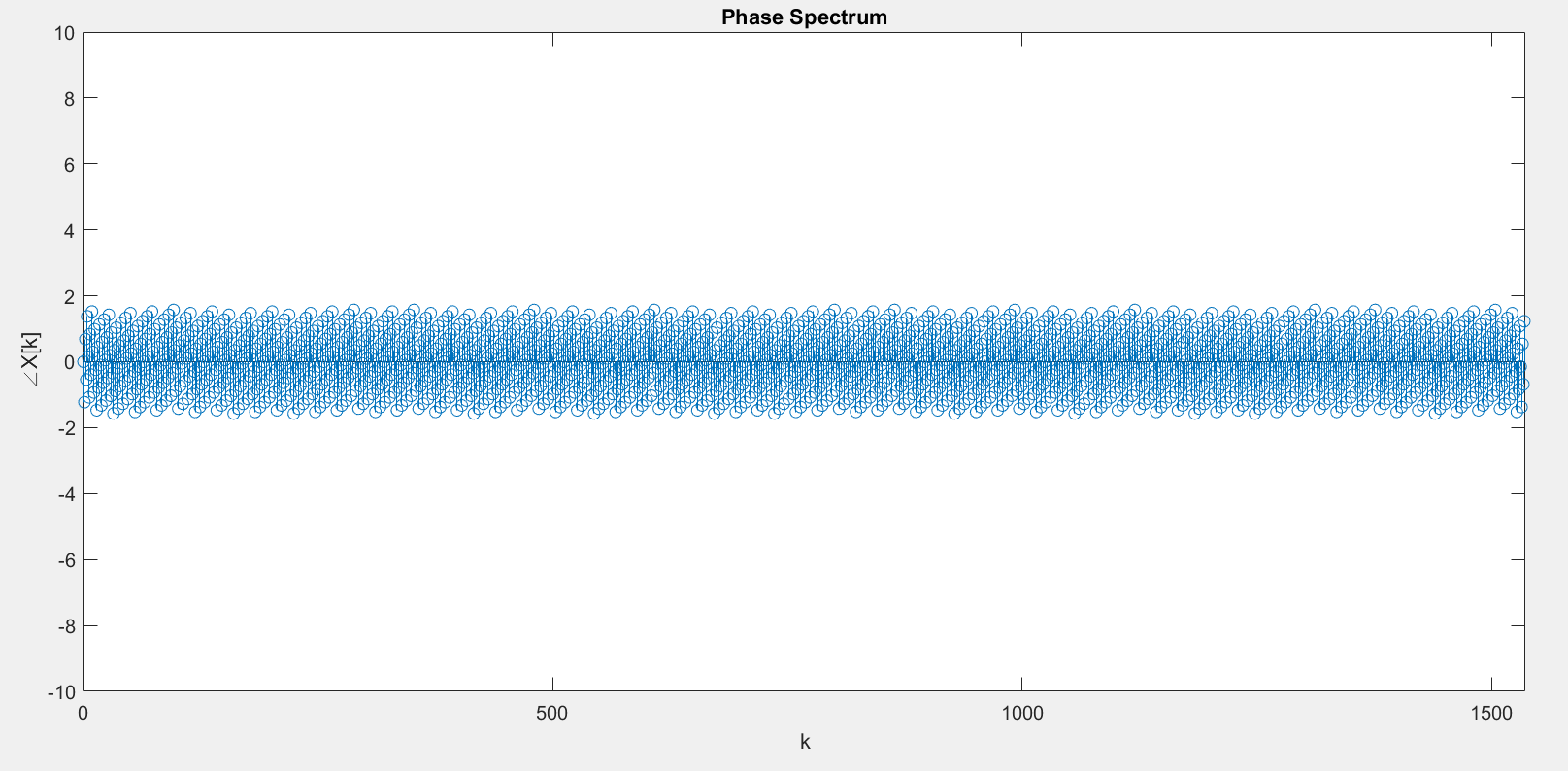
(2) N = 512, M = 100

x[0] ~ x[200] = 1, x[201] ~ x[511] = 0

Ans：

\*Plot\*



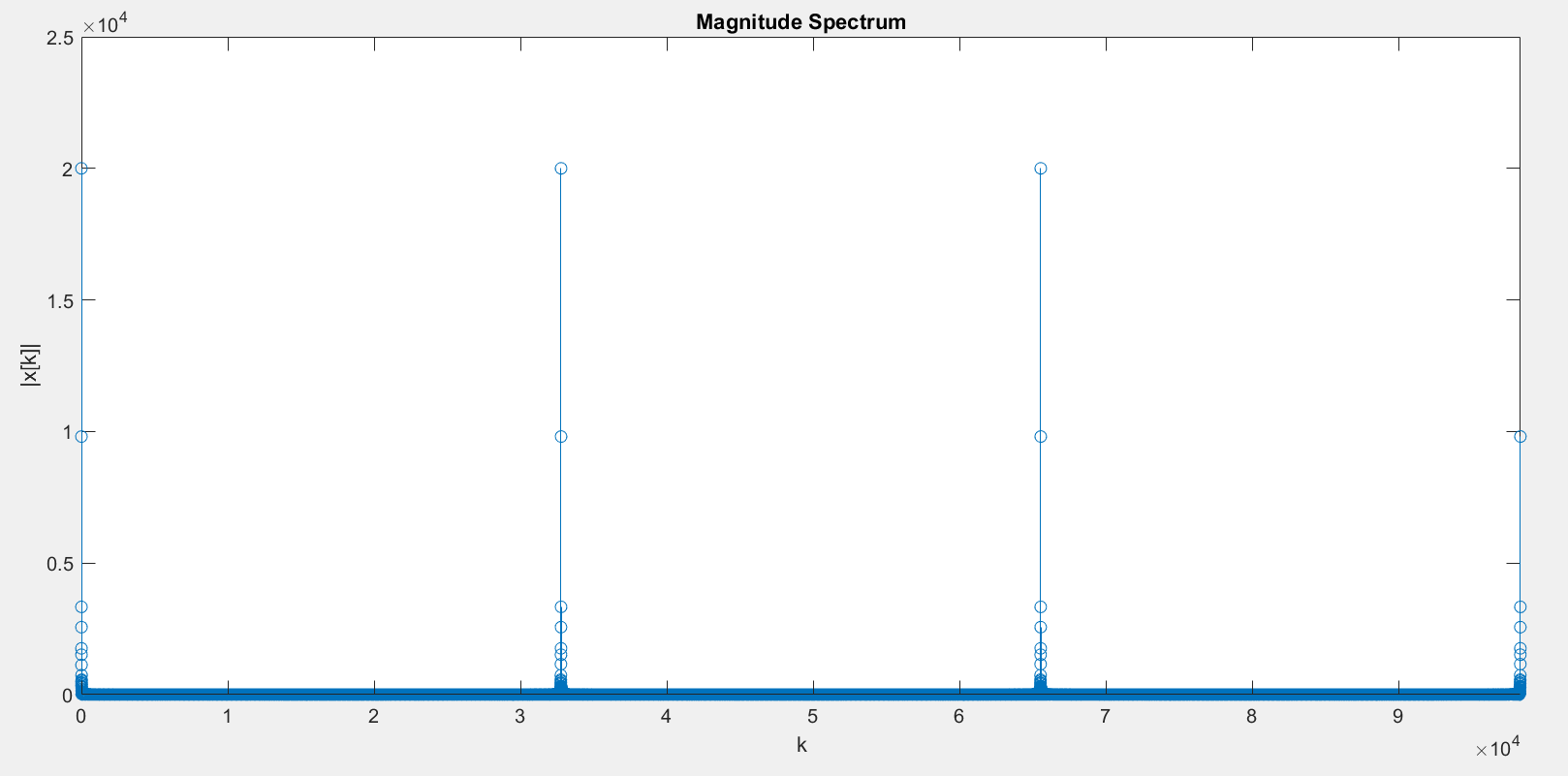


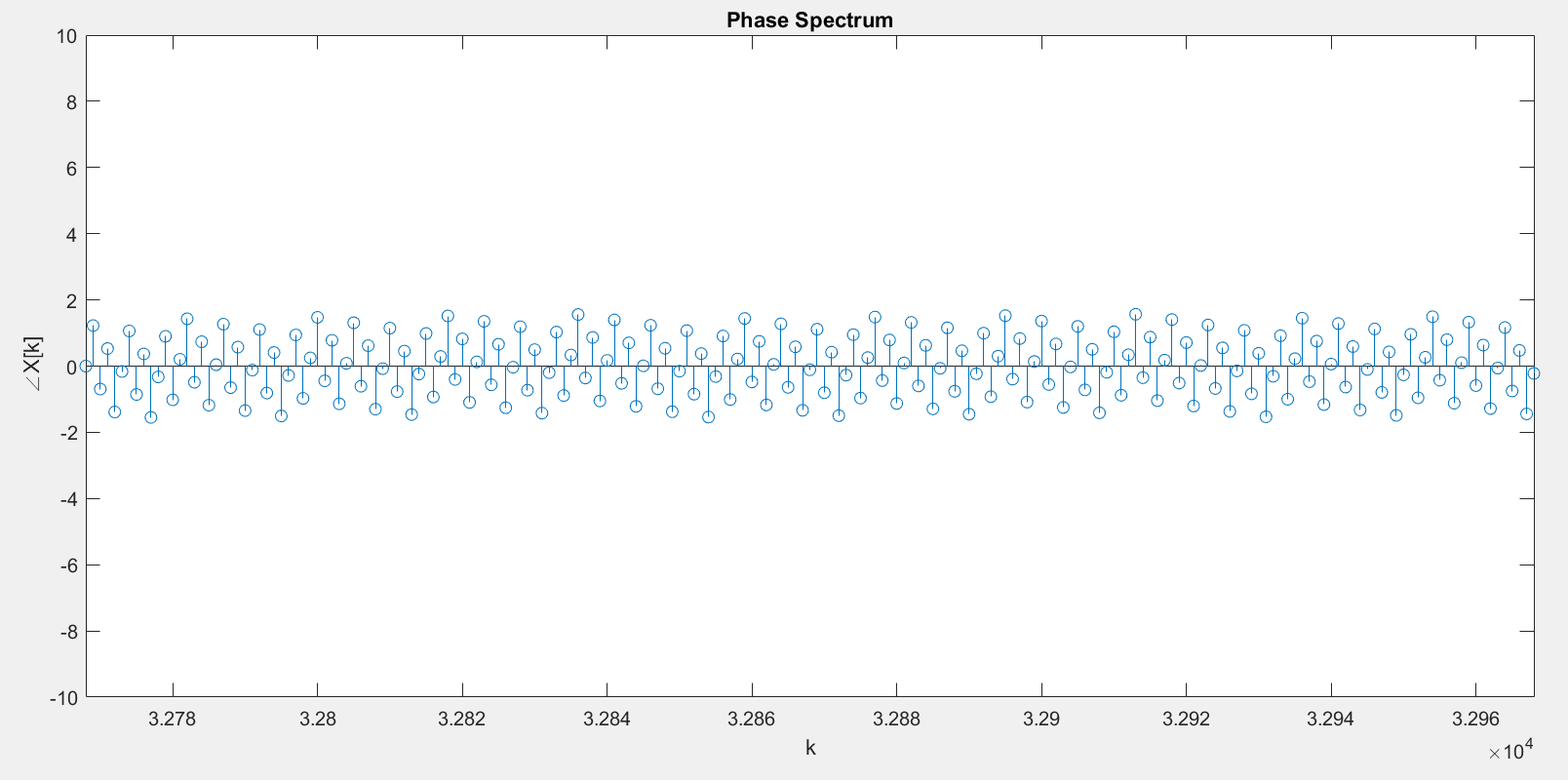
(3) N = 32768, M = 10000

x[0] ~ x[20000] = 1, x[20001] ~ x[32767] = 0

Ans：

\*Plot\*





三、比較，「Direct computation」&「Divide-and-Conquer」

(一) Complexity

(1) Direct computation

multiplication：N^2

addition：N(N-1)

(2) Divide-and-Conquer

multiplication：N(lgN-1)

addition：NlgN

(二) Computation time (以32768點為例)