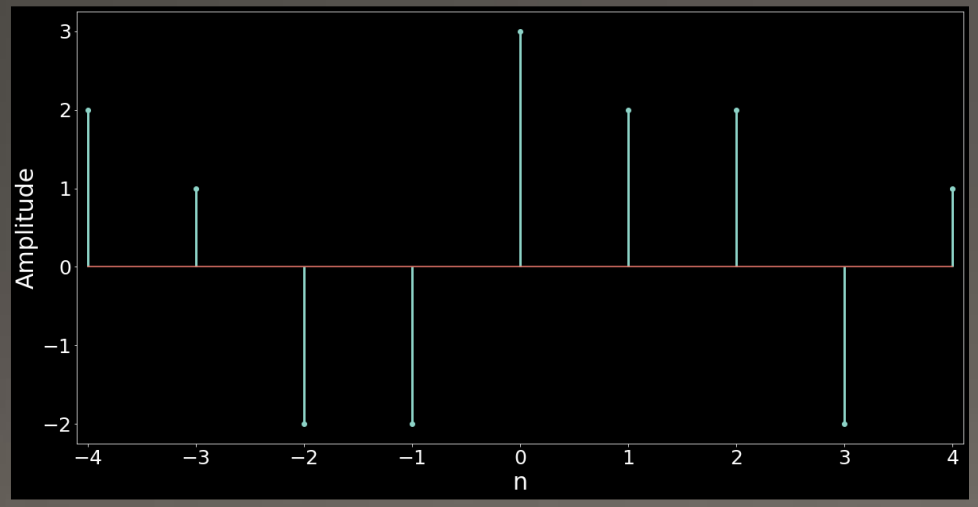
Iqraq's Note

Convolution

Discrete time signal representation

- Sequential method
- X(n) = [2,1,-2,-3,2,2,-2,1]

- Graphical method



The Convolution Sum

- Used to get the sum (y(n)) of two input signas x1(n) and x2(n)

- $y(n) = x1(n) * x2(n)$ or $y(n) = \sum_{k=0}^{N-1} x1(k) * x2(n-k)$

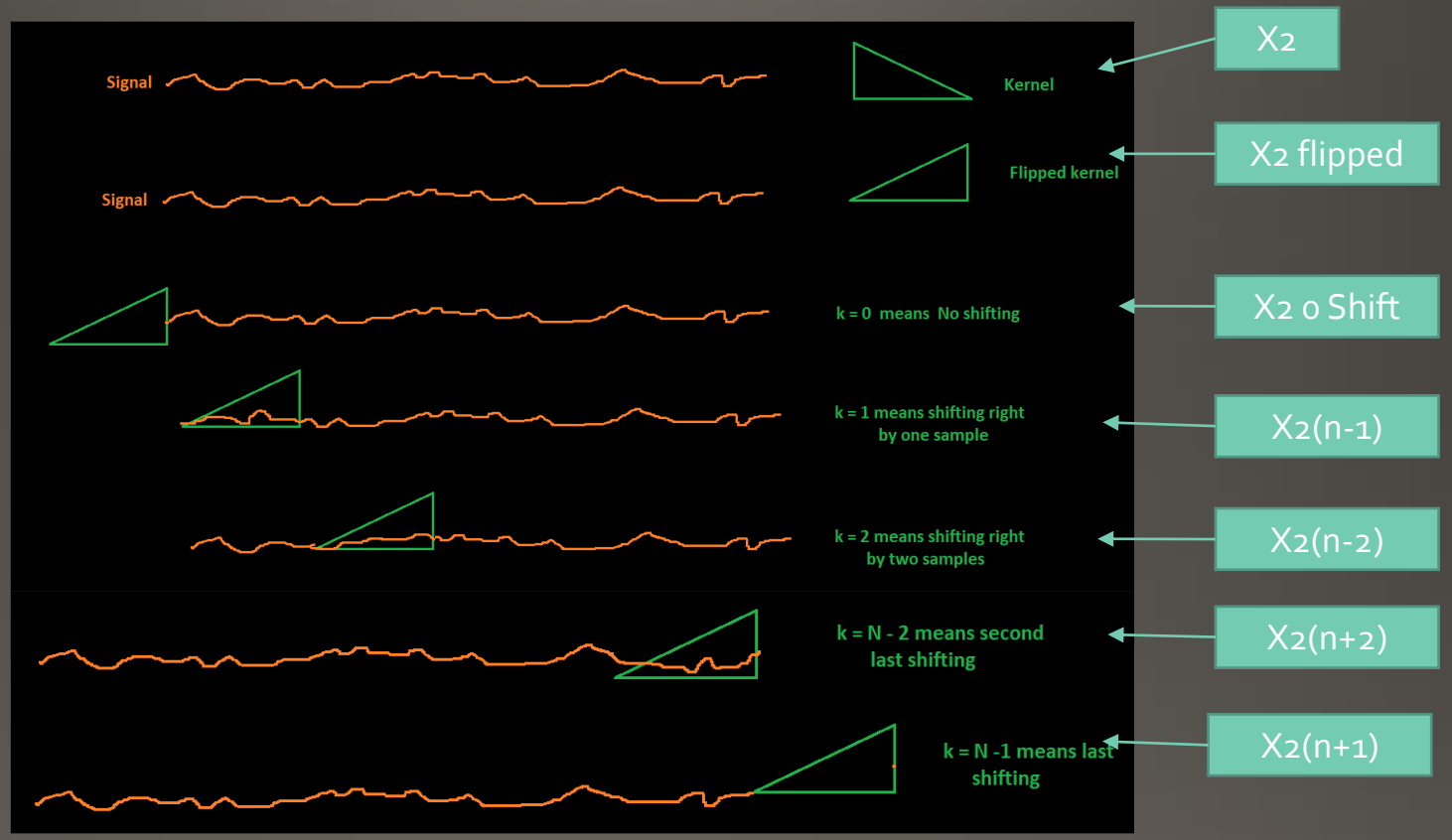
Where x2(n) is called kernel/filter

Steps to perform Conv sum

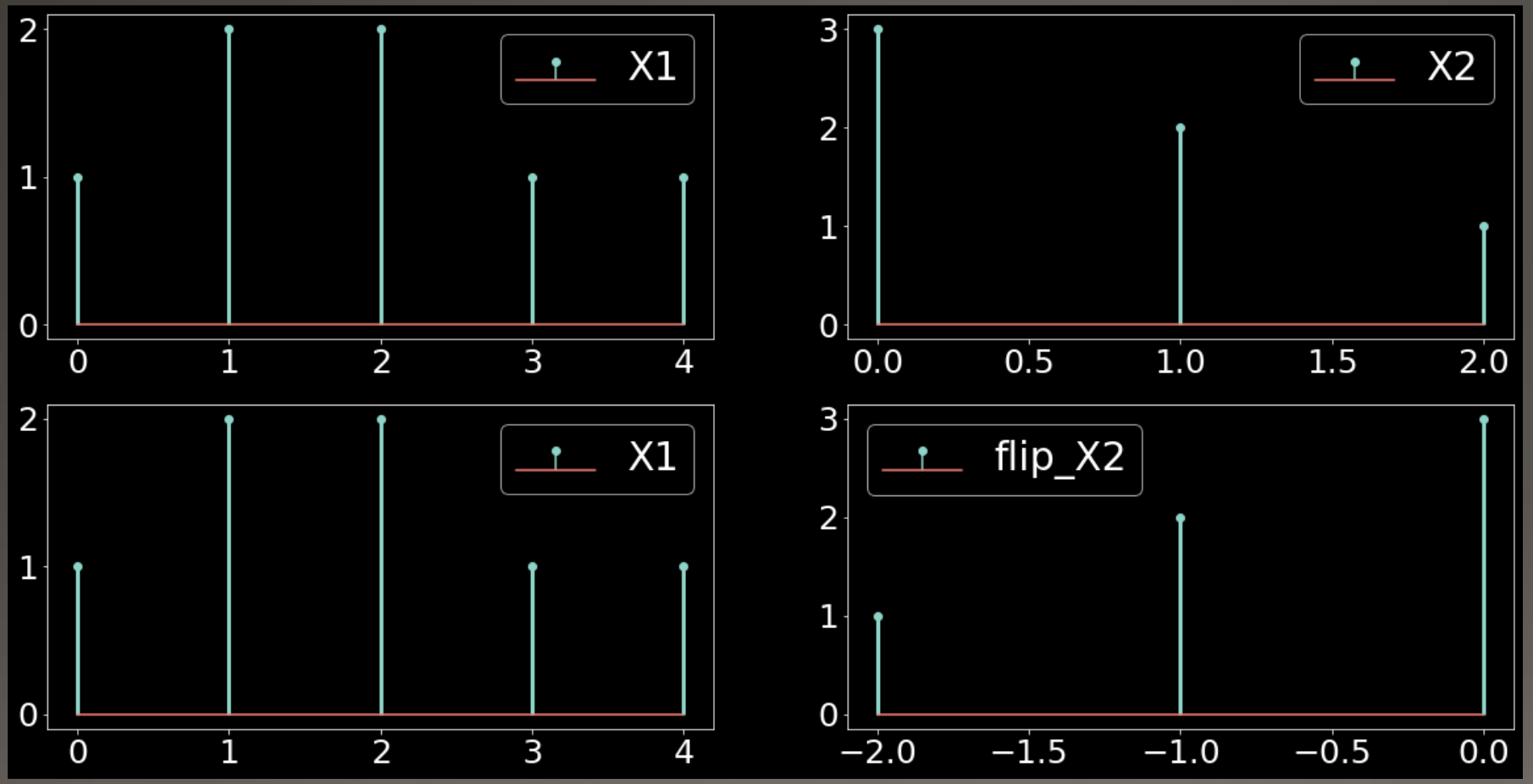
1.Flipping
2.Shifting
3.Multiplication
4.Addtion

Example

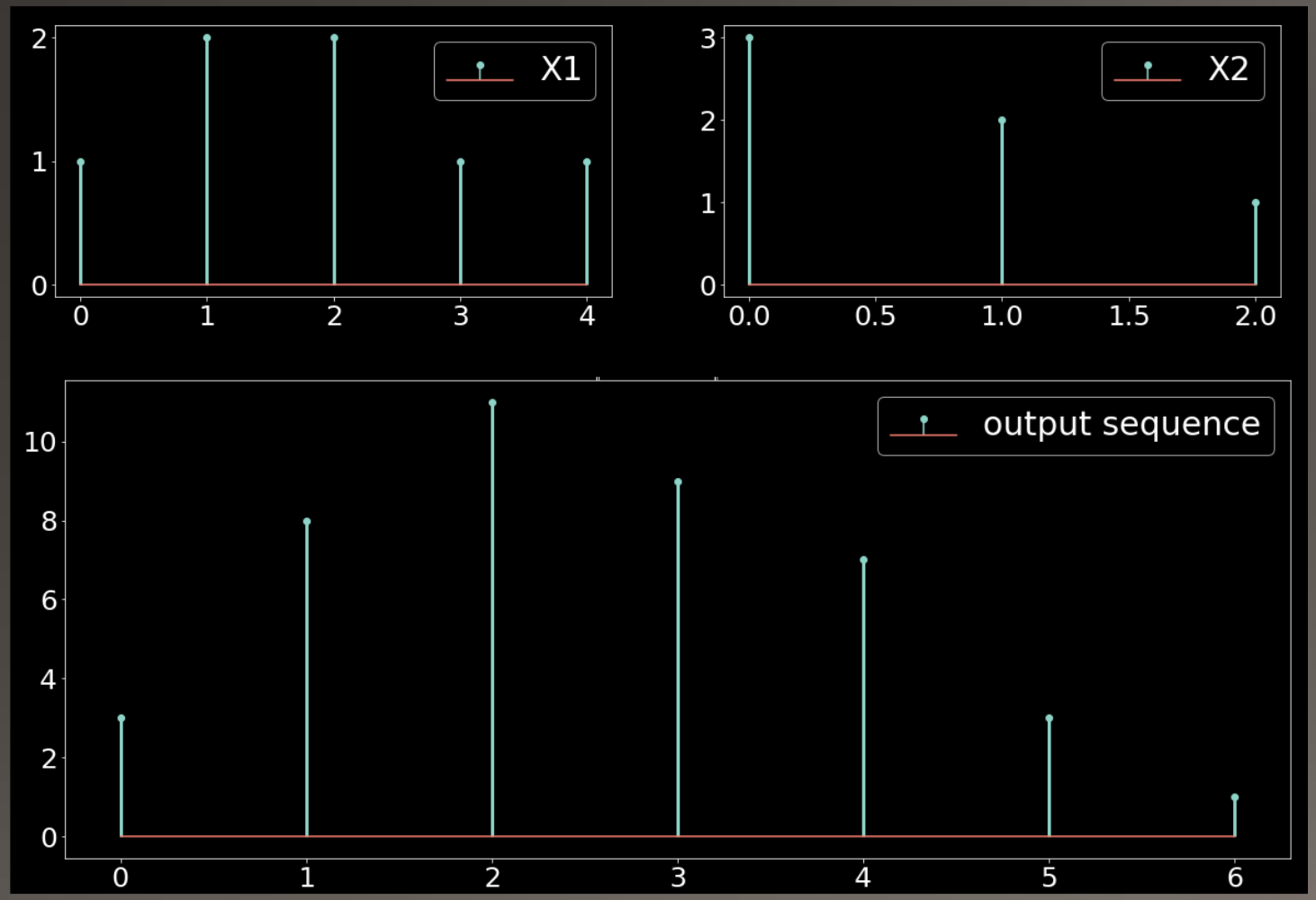
$$y(n) = \sum_{k=0}^{N-1} x1(k) * x2(n-k)$$



Flipping before multiplication



Full Mode Convolution



Number of samples of first signal

Number of samples of second signal

Number of samples of output sequence =nconv =nx1 +nx2 -1

=5+3-1 (rule of thumb)

=7

#in coding – introduce zero padding to make sure the output number is correct (prevent shrinkage)