Tutorial No. – 04

question no. 1:→ Compute the DFT of the four-point sequence $x(n) = [\underset{\uparrow}{0}, 1, 2, 3]$, by using the matrix-based approach.

question no. 2:→ Perform the circular convolution of the following two sequences,

$$x_1(n) = [\underset{\uparrow}{2}, 1, 2, 1]$$

$$x_2(n) = [\underset{\uparrow}{1}, 2, 3, 4]$$

by using the graphical approach.

question no. 3:→ By means of the DFT and IDFT, determine the sequence $x_3(n)$ corresponding to the circular convolution of the sequences $x_1(n)$ and $x_2(n)$.

$$x_1(n) = [\underset{\uparrow}{2}, 1, 2, 1]$$

$$x_2(n) = [\underset{\uparrow}{1}, 2, 3, 4]$$

question no. 4:→ For complex valued sequences $x(n)$ and $y(n)$, in general, if

$$x(n) \overset{\text{DFT}}{\underset{N}{\longleftrightarrow}} X[k]$$

$$y(n) \overset{\text{DFT}}{\underset{N}{\longleftrightarrow}} Y[k]$$

then prove that

$$\sum_{n=0}^{N-1} x(n)\, y^*(n) = \frac{1}{N} \sum_{k=0}^{N-1} X[k]\, Y^*[k]$$

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