Recitation # 4

Exercise #1:

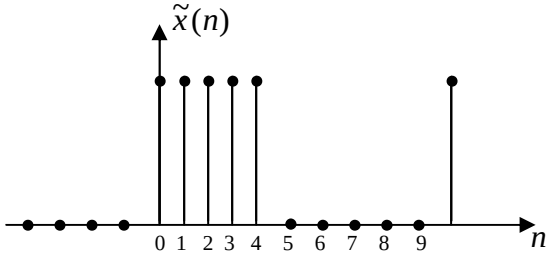
Given a periodic sequence $\tilde{x}(n)$ with a period *N*.

a- Show that the DFT of this delayed signal of *m* is given by $W_N^{-nm}\tilde{X}(k)$

b- Is there an ambiguity based on *m* values?

Exercise #2:

The periodic sequence $\tilde{x}(n)$ is represented by the following figure:



a- Determine the ZT of $\tilde{x}(n)$.

b- Calculate $\tilde{X}(k)$ using the ZT and the definition of the DFT.

Exercise #3:

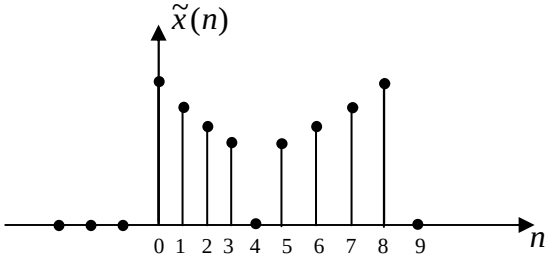
If $\tilde{x}(n) = a^n rect_N(n)$ is real signal with finite duration where $a<1$ is real.

a- Determine its DFT and discrete amplitude and phase spectrum,

where $a = 0.75$ and $N = 8$

Exercise #4:

If $\tilde{x}(n)$ is signal with finite duration $N = 8$ where its DFT is given by the following figure



We form a new signal $\tilde{y}(n)$ with period $N = 16$.

$$\tilde{y}(n) = \begin{cases} x(n/2) & \text{for } n \text{ even} \\ 0 & \text{for } n \text{ odd} \end{cases}$$

a- Sketch the form of $\tilde{Y}(k)$ and justify your response.