

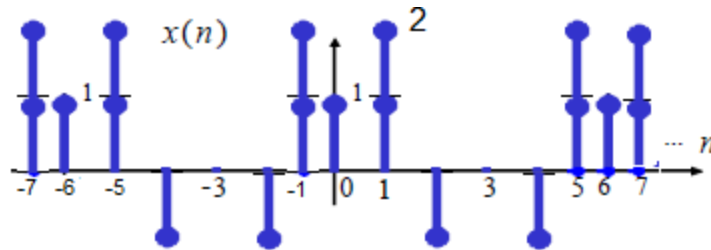
- **Fourier Series Representation (in DT):-**

The main difference between DTFS & CTFS is that in DT the FS coefficients are periodic ($a_k = a_{k+N}$)
 (Note that if $\Phi_k[n] = e^{jk\omega_0 n}$, then $\Phi_{k+N}[n] = e^{j(k+N)\omega_0 n} = e^{j(k+N)(2\pi/N)n} = e^{j(k)(2\pi/N)n} = \Phi_k[n]$)

$$\rightarrow \boxed{x[n] = \sum_{k=-\infty}^{\infty} a_k e^{jk(2\pi/N)n}}; \text{ FS coefficients } \boxed{a_k = \frac{1}{N} \sum_{n=-\infty}^{\infty} x[n] e^{-jk(2\pi/N)n}}$$

The DTFS properties are shown in Table 3.2 in attached Fourier tables pdf file.

Q1) Find the FS representation of the following signal



Q2) Determine the FS coefficient of the signal $x(n) = \sin(\pi n)$. Sketch a_k from $[-3, 3]$