Assignment

11.9.1 - 9

EE23BTECH11220 - R.V.S.S Varun

Question

Find a_9 in the sequence $a_n = (-1)^{n-1}\, n^3$

Solution

Given,

Symbol	Description
x(0)	first term of the sequence
x(n)	(n + 1)th term of the sequence
X(z)	z- transform of x(n)
u(n)	unit step function

TABLE 0
Table of parameters

$$x(n) = (-1)^n \cdot (n+1)^3 \cdot u(n) \tag{1}$$

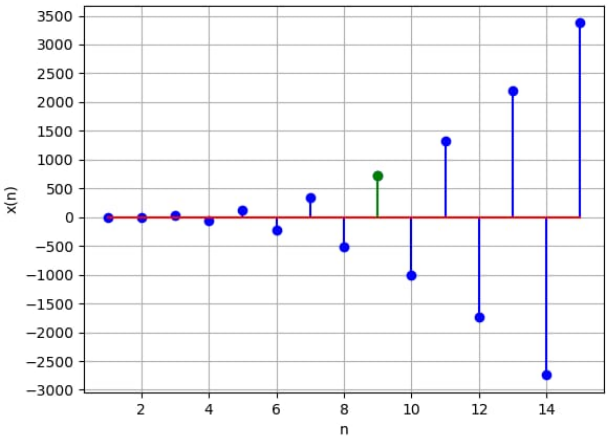
Subsitute n=8,$\left(to\ obtain\ \ (8+1)^{th}\ term\right)$

$$x(8) = 729 \tag{2}$$

Using z transform,

$$X(z) = \sum_{n=-\infty}^{n=\infty} (-1)^n \cdot (n+1)^3 \cdot u(n) \cdot z^{-n} \tag{3}$$

$$X(z) = \frac{z^{-1}\left(1 + 4z^{-1} + z^{-2}\right)}{\left(1 - z^{-1}\right)^4} \quad \{z : |z| > 1\} \tag{4}$$



Graph of x(n)