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 a(n)
u(n)	unit step function

TABLE 0
Table of parameters

$$x(n) = a_{n+1} \tag{1}$$

$$x(n) = (-1)^n \cdot (n+1)^3 \cdot u(n) \tag{2}$$

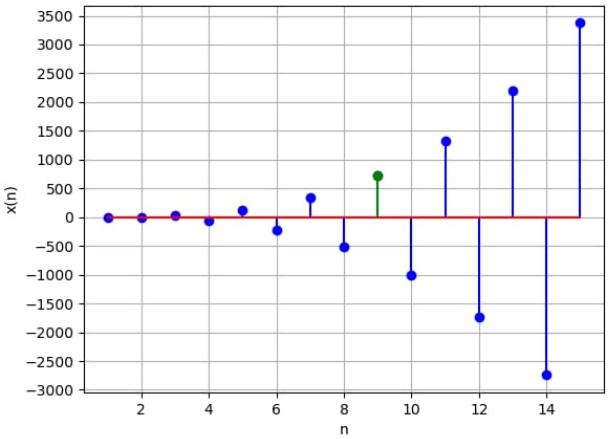
Subsitute n=8,

$$x(8) = 729 \tag{3}$$

Using z transform,

$$x(z) = \sum_{n=-\infty}^{n=\infty} (-1)^n \cdot (n+1)^3 \cdot u(n) \cdot z^{-n} \tag{4}$$

$$x(z) = \frac{z^{-1}\left(1 + 4z^{-1} + z^{-2}\right)}{(1 - z^{-1})^4} \quad \{z : |z| > 1\} \tag{5}$$



Graph of x(n)