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
a(0)	first term of the sequence
a(n)	$(n+1)$th term of the sequence
a(z)	$\mathcal{Z}$- transform of a(n)

TABLE 0
Table of parameters

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

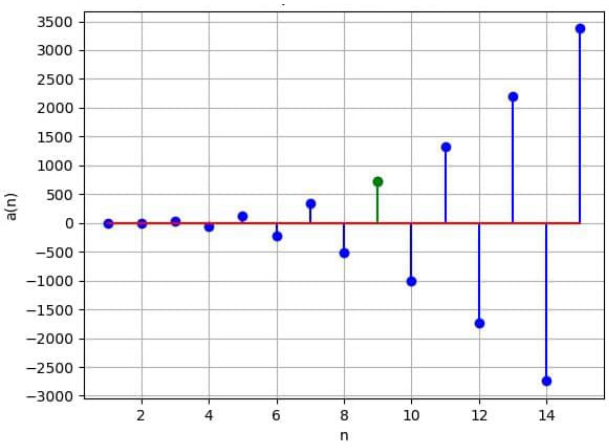
Subsitute n=9,

$$a(9) = 729 \tag{2}$$

Using z transform,

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

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



Graph of a(n)