

Assignment

11.9.1 - 9

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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
$x(n)$	nth term of the sequence
$x(n) \xrightarrow{Z} X(z)$	Z - transform of $x(n)$

TABLE 0
TABLE OF PARAMETERS

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

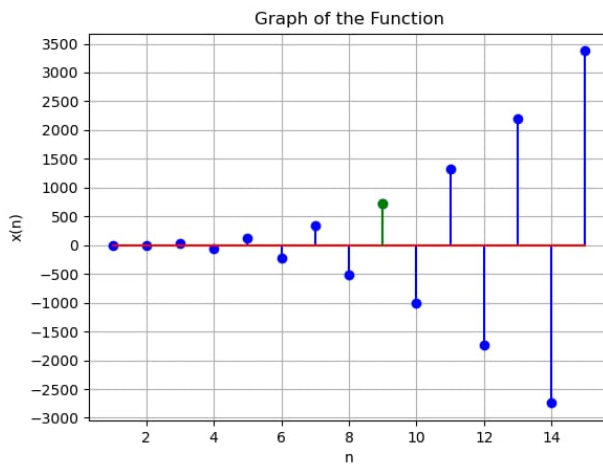
Substitute $n=9$,

$$x(9) = 729 \quad (2)$$

Using z transform,

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

$$X(z) = \frac{6z^2}{(z^2 - 1)^2} \quad \{z : |z| > 1\} \quad (4)$$



Graph of $x(n)$