Discrete

EE:1205 Signals and systems
Indian Institute of Technology, Hyderabad

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I. Question 11.9.1(5)

Write the first five terms of the sequence whose n^{th} term is : $x(n) = (-1)^{n-1}5^{n+1}$.

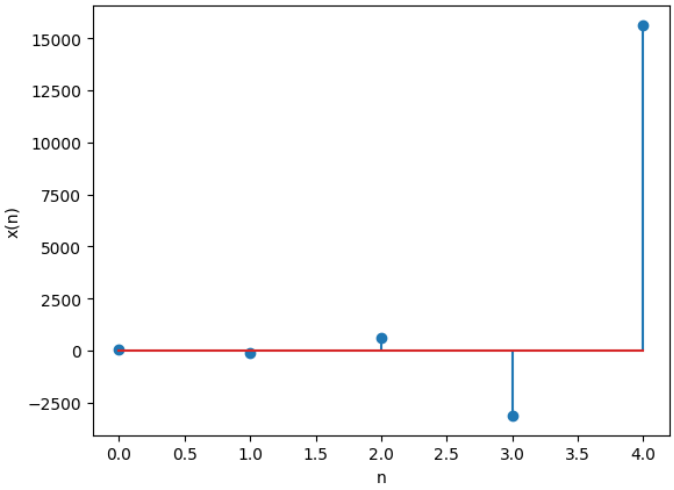
II. Solution

Parameter	Value	Description
$x(n)$	$(-1)^n 5^{n+2}$	General Term
$x(0)$	25	First term of G.P.
r	-5	Common ratio of G.P.
$X(z)$	-	Z-Transform

TABLE 0
Given Parameters

$$x(n) = (-1)^n 5^{n+2} u(n) \tag{1}$$
$$= 25(-5)^n u(n) \tag{2}$$

On substituting n = 0, 1, 2, 3 and 4, we get the first five terms.
Hence, the required terms are 25, -125, 625, -3125, 15625 .



$$x(n) \longleftrightarrow X(z)$$

$$a^n u(n) \longleftrightarrow \frac{1}{1 - az^{-1}} \; ; \; |z| > |a| \tag{3}$$

$$\therefore \; X(z) = \frac{25}{1 + 5z^{-1}} \; ; \; (|z| > 5) \tag{4}$$