

EE23BTECH11024 - G.Karthik Yadav*

EXERCISE 9.1

1. Write the first five terms of the sequence

$$a_n = n(n+2)$$

Solution:

Symbol	Parameters	value
$u(n)$	unit step function	
$x(n)$	general term of the series	$(n+1)(n+3)u(n)$
$X(z)$	Z-transform of $x(n)$?

TABLE I
INPUT PARAMETERS

$$x(0) = (0+1)(0+3) = 3 \quad (1)$$

$$x(1) = (1+1)(1+3) = 8 \quad (2)$$

$$x(2) = (2+1)(2+3) = 15 \quad (3)$$

$$x(3) = (3+1)(3+3) = 24 \quad (4)$$

$$x(4) = (4+1)(4+3) = 35 \quad (5)$$

$$X(z) = \sum_{n=-\infty}^{\infty} x(n) z^{-n} \quad (6)$$

$$= \sum_{n=-\infty}^{\infty} (n+1)(n+3)u(n) z^{-n} \quad (7)$$

$$\Rightarrow X(z) = \frac{3 - z^{-1}}{(1 - z^{-1})^3}, \quad |z| > 1 \quad (8)$$

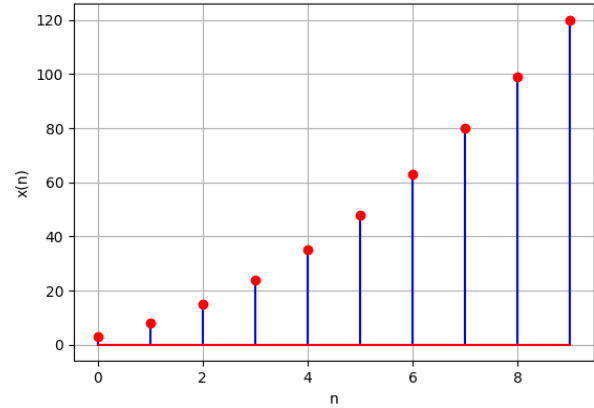


Fig. 1. Plot of x(n) vs n