10.5.2.14

EE23BTECH11003 - pranav

Question: How many multiples of 4 lie between 10 and 250?

Solution:

Variable	Description	Value
$x(0)$	First term of the AP	0
d	Common difference of the AP	d
$x(n)$	General term of the AP	$4nu(n)$
n	no of multiples of 4 between 10 and 250	?

TABLE 1: Variables Used

$$n = \frac{250 - 250 \bmod 2 - 10 - 10 \bmod 2}{4} + 1 \quad (1)$$

$$n = 60 \quad (2)$$

considering the series to start from $n = 0$ the general term

$$x(n) = [x(0) + nd]u(n) \quad (3)$$

$$x(n) = 4nu(n) \quad (4)$$

i

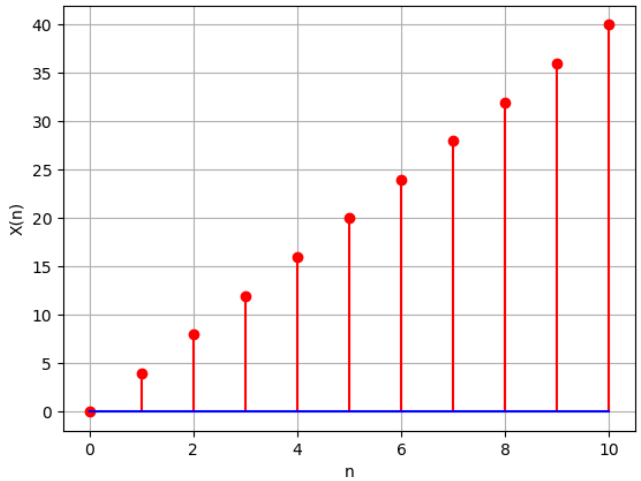

Fig. 1: stem plot of $X(n)$

applying Z transform

$$x(z) = \sum_{n=-\infty}^{\infty} x(n)z^{-n} \quad (5)$$

$$\implies x(z) = \sum_{n=-\infty}^{\infty} 4nu(n)z^{-n} \quad (6)$$

$$\implies x(z) = \sum_{n=0}^{\infty} 4nz^{-n} \quad (7)$$

$$(8)$$

from **??**

$$\implies x(z) = \frac{4z^{-1}}{(1 - z^{-1})^2} \quad |z| > 1 \quad (9)$$