10.5.2.14

EE23BTECH11003 - pranav

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

Solution:

Variable	Description	Value
$S(0)$	First term of the AP	12
d	Common difference of the AP	d
$S(n)$	General term of the AP	$12+4\cdot n$
$4n_1$	first multiple of 4 between 10 and 250	?
$4n_2$	last multiple of 4 between 10 and 250	?

TABLE 1: Variables Used

$$4n_1 > 10 \text{ and } 4n_2 < 250 \tag{1}$$

$$\implies n_1 = 3, n_2 = 62 \quad (\text{as } n \in \mathbb{N}) \tag{2}$$

$\therefore$ number of multiples of 4 which lie between 10 and 250 are $62-3+1=60$

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

$$X(n) = [X(0) + n\cdot d].u(n) \tag{3}$$

$$X(n) = 4n.u(n) \tag{4}$$

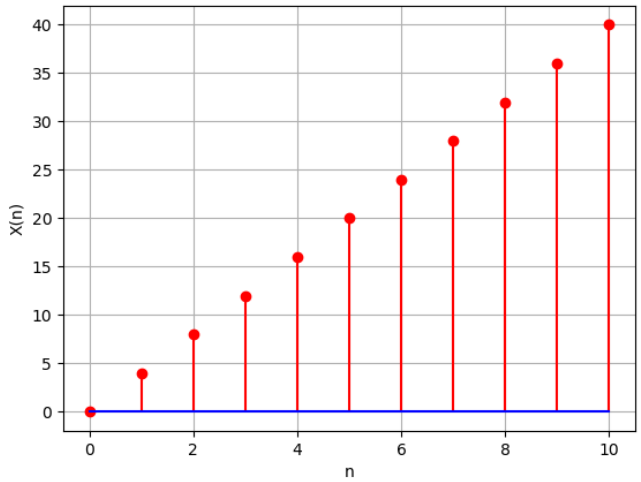

Fig. 1: stem plot of $X(n)$

applying Z transform

$$X(z) = \sum_{n=-\infty}^{\infty} X(n)\cdot z^{-n} \tag{5}$$

$$\implies X(z) = \sum_{n=-\infty}^{\infty} 4n\cdot u(n)\cdot z^{-n} \tag{6}$$

$$\implies X(z) = \sum_{n=0}^{\infty} 4n\cdot z^{-n} \tag{7}$$

from **??** (8)

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