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	12
d	Common difference of the AP	4
$x(n)$	General term of the AP	$(12+4n)u(n)$
n	no of multiples of 4 between 10 and 250	?

TABLE 1: Variables Used

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

$$n = 60 \tag{2}$$

Considering the series to start from $n = 0$,the general term is

$$x(n) = (x(0) + nd)u(n) \tag{3}$$

$$x(n) = (12 + 4n)u(n) \tag{4}$$

applying Z transform

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

$$\implies x(z) = \sum_{n=-\infty}^{\infty} (12 + 4n)u(n)z^{-n} \tag{6}$$

$$\implies x(z) = \sum_{n=0}^{\infty} (12 + 4n)z^{-n} \tag{7}$$

(8)

from **??**

$$\implies x(z) = \frac{12}{1 - z^{-1}} + \frac{4z^{-1}}{(1 - z^{-1})^2} \quad |z| > 1 \tag{9}$$

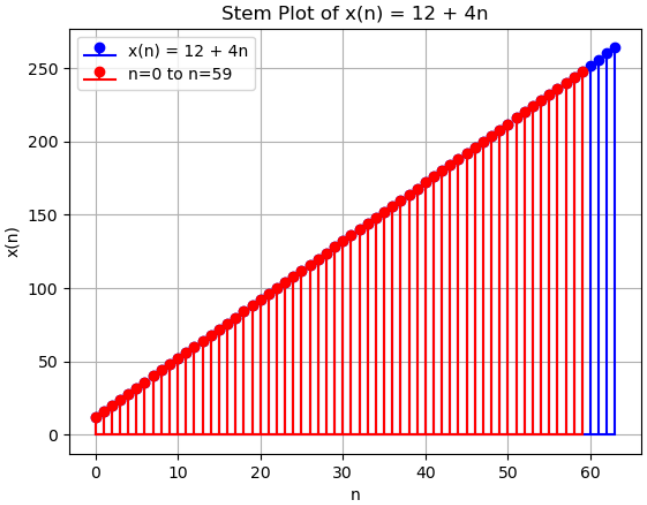

Fig. 1: stem plot of x(n)