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

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

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

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

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

$$x(n) = 4nu(n) \tag{4}$$

applying Z transform

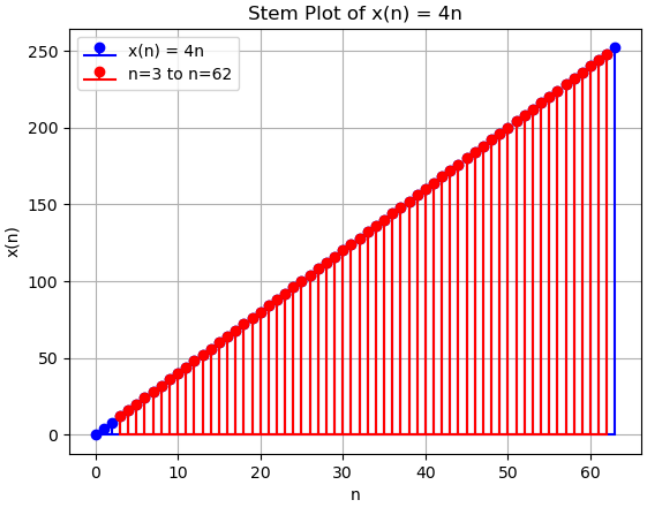

Fig. 1: stem plot for x(n)

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

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

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

$$\tag{8}$$

from **??**

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