NCERT DISCRETE

EE23BTECH11020 - Raghava Ganji*

Question 10.5.3.5: The first term of an AP is 5, the last term is 45 and the sum is 400. Find the number of terms and the common difference.

solution:

Given AP is 5, …, 45.

$x(1)$	5	1st term
$x(n)$	45	nth term
$s(n)$	400	sum of n terms
n	?	no.of terms
d	?	common difference
$x(0)$	$x(1) - d$	0th term

TABLE 0

PARAMETERS

$$x(n) = x(0) + nd \tag{1}$$

$$40 = (n - 1)d \tag{2}$$

$$s(n) = \frac{n}{2}[2x(0) + (n + 1)d] \tag{3}$$

$$n = 16 \tag{4}$$

$$d = \frac{8}{3} \tag{5}$$

by substituting the value of n in the equation 2, we get the equation 5.

z transform of $x(n), s(n)$ are $X(z), S(z)$

$$X(z) = 5 \times \frac{z^{-1}}{(1 - z^{-1})} \tag{6}$$

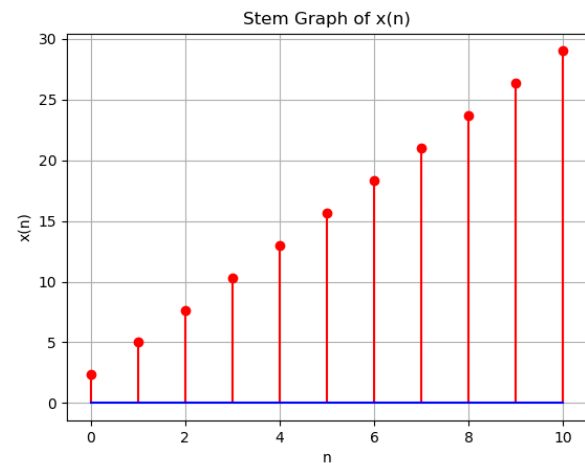$$S(z) = \frac{22}{3} \times \frac{z^{-1}}{(1 - z^{-1})^2} \tag{7}$$

Fig. 1. 1