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.

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

TABLE 0
PARAMETERS

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

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

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

$$s(n-1) = \frac{n}{2}\left[2x(0) + (n-1)\,d\right] \tag{4}$$

$$\implies n = 16 \tag{5}$$

$$\implies d = \frac{8}{3} \tag{6}$$

by substituting the value of n in the equation 2, we get the equation 6.

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

$$X(z) = \frac{7}{3(1-z^{-1})} + \frac{8}{3(1-z^{-1})^2} \tag{7}$$

$$S(z) = \frac{7}{3(1-z^{-1})^2} + \frac{8}{3(1-z^{-1})^3} \tag{8}$$

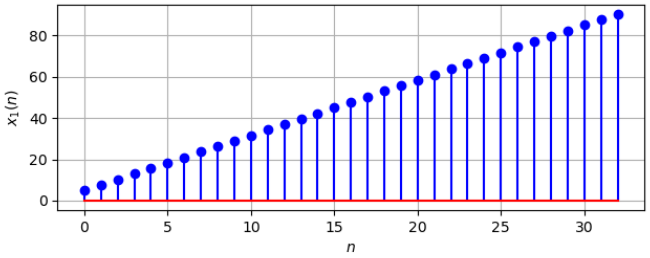

Fig. 0. figure:1